

NÜFER YASİN ATEŞ

# The Strategy Process

A Middle Management Perspective



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A MIDDLE MANAGEMENT PERSPECTIVE



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A MIDDLE MANAGEMENT PERSPECTIVE

Het strategieproces: een middenmanagement perspectief

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To My Mother



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Tilburg, 2013

Nufer Yasin Ates

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# Chapter 1

## INTRODUCTION

**W**hy do organizations act as they do? This question has been at the centre of strategic management research for decades. The initial response to this question was the economist's neoclassical model of the firm as 'a smoothly running machine in a world without secrets, without frictions or uncertainty, and without a temporal dimension' (Rumelt, Schendel and Teece, 1991: 13) under a mechanical quest for economic optimization. This 'rational actor' model of utility maximization in explaining strategic choice and action was criticized, because strategic choice and action are argued to have a large behavioral component (Cyert and March, 1963) as each decision maker brings his or her own set of 'givens' (i.e. the cognitive base) to a decision context (March and Simon, 1958). Organizations' response to the environment is mediated by these 'givens' –the strategic cognitions of managers–, as organizations only act through the choices and actions of the managers within them (Kaplan, 2011). As a result, the following research put managers –who were once seen as a source of error variance in performance equations– at the center of attention (Walsh, 1995). Perhaps, it was not the routines (Nelson, 1991), firm capabilities (Teece, Pisano and Shuen, 1997), or resources (Barney, 1991), but individual managers who were driving superior strategic choices. This proposition has attracted a lot of research attention, especially following the seminal work of Hambrick and Mason (1984) that articulates the need to for an upper echelons perspective. Hambrick and Mason (1984) propose that cognitive and background characteristics of the most influential managers in a firm (i.e., Top Management Team) have influence over strategies and performance.

Besides the huge body of work accumulated on organizational elites (e.g., Finkelstein and Hambrick, 1990, Hambrick, Cho and Chen, 1996, Laamanen and Wallin, 2009), Bertnard and Schoar (2003) demonstrated that the top managers explain no more than 5% of the variation on firm performance among Fortune 800 companies. Moreover, this line of research notably paid more attention to formulation of strategies and neglected the strategy implementation

phase. However, these two are closely intertwined (Mintzberg and Waters, 1985) and around 50% of the decisions in organizations fail due to strategy implementation rather than formulation (Nutt, 1999). This calls for consideration of a broader spectrum of managers with a focus on strategy implementation.

In this dissertation, I focus on the strategic cognitions of a broad spectrum of managers within organizations from a strategy process perspective. ‘A broad spectrum of managers’ was at the center of my interest, because strategies leading to organizational action stem not only from deliberate influences of the upper echelons, but also from emergent influences at the middle and lower levels of the organization (Mintzberg and Waters, 1985). I focus on their ‘strategic cognitions’, because organizational action is crafted through managers’ beliefs about environment and the state of the organization (Narayanan, Zane and Kemmerer, 2011). Compared solely to the cognitive frames of organizational elites (Hambrick and Mason, 1984), that of a wider range of managers is more effective at comprehending the causal ambiguities around the link between organizational capabilities and firm performance (King and Zeithaml, 2001). Finally, I adopt a ‘strategy process perspective’, as strategic cognitions of this larger scope of managers have immediate effects on the process rather than on the content of strategies (Wooldridge, Schmid and Floyd, 2008) and organizational action is realized through the strategy implementation efforts of these organizational actors. In addition, to my quests in strategy process, I also focused on research process in the pursuit of better ways to conduct empirical research. I tackled a rampant problem in management, namely repeated testing problem, and proposed normative and statistical solutions.

This thesis brings together topics from strategic cognition, strategy process and behavioral strategy with a special focus on psychological foundations of middle managers’ contribution to strategy. Among this broader set organizational actors, I especially look into middle managers as they are essential to the strategy process outcomes (Wooldridge, Schmid and Floyd, 2008: 1191) due to their intermediate position that links otherwise disconnected layers of the organization (Raes *et al.*, 2011). Following Wooldridge *et al.* (2008), I adopt a broad definition of middle managers that is based on functional designation, and not based on hierarchical structure: middle managers are managers who have access to top management coupled with their knowledge of operations.

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## Overview of this dissertation

This dissertation consists of five stand-alone research projects, and each chapter can be read independently. Although each chapter contributes to their respective areas of research, a concluding chapter summarizes the overall contributions that this dissertation makes to middle management literature. In the remainder of this chapter, I introduce the chapters and their contributions.

The second chapter of this dissertation proposes a state-of-art method to depict the strategic cognitions of a broad set of organizational actors, ranging from managers at the upper echelons to employees at varying layers of the organizational hierarchy. The method, ‘strategic consensus mapping’, captures not only the essence of individuals’ cognitions regarding organizational strategy, but also their shared understanding (i.e., strategic consensus). Capturing consensus is important for strategy implementation because it has been shown that higher consensus facilitates communication and coordination of actions required for successful strategy implementation (Kellermanns *et al.*, 2005). Nevertheless, previous literature on strategic consensus mostly focused on the degree of agreement on strategy within a team and did not include other important elements, such as what different group members agree and disagree on, between-group consensus, or the significance testing of differences in consensus (e.g., to evaluate the effectiveness of a strategic intervention). The new analytical approach we proposed provides a comprehensive analysis of strategic consensus within and between groups and includes intuitive and easy-to-grasp visualizations. This approach equips researchers with the necessary tools for integrative theory building in strategic consensus as well as managerial and organizational cognition. Using data from a field study, this chapter further illustrates the use of the proposed methods, which also includes testing the effectiveness of a consensus-creating intervention. This chapter, co-authored by Murat Tarakci, Jeanine Porck, Daan van Knippenberg, Patrick Groenen and Marco de Haas is forthcoming at Strategic Management Journal (Tarakci *et al.*, 2013).

This chapter contributes to the managerial and organizational cognition field by providing a refined tool for investigating cognition at a deeper level (Walsh, 1995, Kaplan, 2011), and by settling the confusion over how to measure group-level cognitive structures which was hindering the empirical work (Mohammed, Klimoski and Rentsch, 2000). Moreover it contributes to the behavioral strategy field by offering a method to eschew ‘the

trap of making simplistic assumptions about mental scaling for organizations' (Powell, Lovullo and Fox, 2011: 1374). Given the new integrative quantification for collective measures of cognition, researchers do not need to, for instance, assume that the organization has the psychology of an individual, that one person chooses for the collective or that the firm's actions correspond to a person's decisions.

The third chapter focuses on the congruence between strategic cognitions of the CEO and the managers and its effects on the strategic cognition and commitment of managers' direct subordinates. It investigates the effect of managers' transformational leadership on their teams' strategic commitment through the creation of strategic consensus. In this chapter, we challenge the popular perception of transformational leadership as a solely positive phenomenon and reveal its 'dark side,' proposing that the misalignment between the transformational leader and the CEO can reverse the positive effect of transformational leadership on strategic consensus. Data from 88 teams show that transformational managers can impede strategic consensus within their teams – and thereby hinder teams' strategic commitment – if they do not share the strategic views of the CEO. A more refined analysis demonstrates the underlying mechanism through which middle and lower-level managers divert their team members' opinion away from organizational strategies.

This chapter contributes to strategy process literature by unearthing the contingency factors that limit (or enhance) essential strategy implementation outcomes (Balogun and Johnson, 2004, Raes *et al.*, 2011). Alignment of managers with the upper echelons and managers' commitment to organizational strategies turn out to be key influential factors in explaining team members' consensus on and commitment to strategic priorities of the organization. This chapter closely follows the previous chapter, as we utilized the insights provided by the method developed in Chapter 2. The visualizations of team members' strategic understanding together with those of their immediate manager and the CEO make the influence mechanism of the misaligned manager interpretable. This chapter, co-authored by the same team of scholars as in the second chapter is submitted to a journal where it received a revise and resubmit decision.

The fourth chapter advances third chapter by investigating the drivers of middle managers' commitment to organizational strategies and their strategic alignment with the CEO. In addition to the effect of managers' strategy involvement, we stress the mediating role of managers' procedural justice perceptions about the strategic decision-making process,

and the moderating role of hierarchical position. Data from 128 middle managers from two organizations support our theorization and the findings are replicated in a follow up study of 356 middle managers in a third organization. Our results ascertain that strategic involvement leads to enhanced procedural justice perceptions of the strategy formation at all hierarchical levels, however its effect on strategic commitment and alignment is higher for the managers at the operational levels compared to middle and upper echelon managers of the organization. This study expands the procedural justice research in strategy formation to middle and lower levels of the organization while providing empirical evidence for the importance of strategic involvement in successful strategy implementation.

Chapter 4 contributes to strategy process research by responding the calls for research in the literature, as it considers the exposed position of the individuals involved in strategy process and explores the effects of their involvement (Hutzschenreuter and Kleindienst, 2006), and investigates the middle managers' fairness perceptions for shared understanding of and voluntary cooperation with the organizational strategy (Kellermanns *et al.*, 2005). This chapter further advances strategic management field by using more realistic assumptions grounded on organizational psychology and organizational behavior in an attempt to respond the call for behavioral strategy research (Powell, Lovallo and Fox, 2011). These contributions are fulfilled through two replication studies, and a complementary exploratory analysis that controls for the increased likelihood of committing type-I error. This chapter, co-authored by Murat Tarakci, Daan van Knippenberg and Patrick Groenen, is being prepared for submission at the moment.

Fifth chapter tackles the repeated testing problem which is ubiquitous and urgent in empirical strategic management research. Bettis (2012) warns researchers that the base of empirically tested theory in strategic management is threatened with false positives stemming from repeated testing. This chapter responds to Bettis by proposing realistic and applicable solutions to overcome the problem in short to mid-term. We posit that the nature of the solution depends on the theory building approach of a study (deductive vs. inductive), then provide normative and statistical guidelines for the repeated testing problem. The solutions provided in this chapter not only substantially mitigate repeated testing concerns, but also contribute to overcoming the publication bias against replications and non-results in management research. Further suggestions are made to journal editors, authors and research audience for the institutionalization of repeated testing remedies.

The contribution of this chapter is to help researchers reach better and truthful strategic management theories by raising awareness for the repeated testing problem and providing key insights to overcome the problem. It helps push forward the discipline of strategic management scholarship by enhancing the reliability of the answers we provide. Although the intended audience of this chapter is strategic management field, the implications of the proposed solutions are valid for the wider managerial and organizational sciences, and also for the social sciences at a generic level as well. This chapter, co-authored by Patrick Groenen, is currently under review.

Sixth chapter is a short research note introducing a tool in the form of an SPSS macro that facilitates the application of the statistical repeated testing remedies proposed in Chapter 5. The macro is specifically focused at the discovery of statistical moderators, as the contingency relations and boundary conditions are of primary importance to advance theory. We contend that the lack of easy and accessible tools for repeated testing remedies in popular data analysis programs is part of the problem. Therefore, this chapter aims to enhance the adoption of such remedies, eventually contributes to more truthful management theories. This chapter, co-authored by Andrew Hayes and Patrick Groenen, is being prepared for submission.

In conclusion, this dissertation brings together topics from strategic cognition, strategy process and behavioral strategy with a special focus on middle managers. It further addresses a core concern, repeated testing, in empirical strategic management research in order to advance strategic management theory. The first three studies in this dissertation offer a broad base of theoretical and managerial implications on strategic cognition and strategy implementation. The final two studies complement these efforts by shedding light on the right practice of empirical research. Consequent sections of the dissertation present the details of each study, followed by a final conclusion section where I discuss the overall contributions to middle management research and future research directions.

## Chapter 2

# STRATEGIC CONSENSUS MAPPING: A NEW METHOD FOR TESTING AND VISUALIZING STRATEGIC CONSENSUS WITHIN AND BETWEEN TEAMS

### Introduction

Strategic consensus, which refers to ‘the shared understanding of strategic priorities among managers at the top, middle, and/or operating levels of the organization’ (Kellermanns *et al.*, 2005: 751), has long been recognized as an important concept in the literature pertaining to strategy formation and implementation processes (Markoczy, 2001). It continues to attract the attention of scholars seeking to develop a deeper understanding of the concept (González-Benito *et al.*, 2012). Nevertheless, the dominant focus in strategic consensus research is the degree of within-group consensus (Kellermanns *et al.*, 2005, Kellermanns *et al.*, 2011, González-Benito *et al.*, 2012). Several scholars have highlighted the need to broaden this perspective and extend the focus to determining the strategic objectives on which individuals agree, identifying which individuals in a team are in agreement or disagreement with respect to these objectives, and studying the consensus among interdependent organizational units (e.g., Wooldridge and Floyd, 1989, Hodgkinson

and Johnson, 1994, Markoczy, 2001, Kellermanns *et al.*, 2005). We contend that a lack of appropriate methods for distinguishing the multiple dimensions of strategic consensus at various levels and time periods is an obstacle to a comprehensive analysis and integrative theory building in the strategic consensus domain.

To address this important methodological issue, this paper presents *Strategic Consensus Mapping* (SCM), a set of complementary procedures for probing multiple dimensions of strategic consensus and testing the cross-sectional and longitudinal differences within and between groups. This paper makes a number of contributions. First, SCM offers researchers the opportunity to study strategic consensus in an integrative manner that (i) allows for the quantification of multiple dimensions of consensus, (ii) enables the analysis of consensus at different levels, and (iii) visualizes consensus in an intuitive and clear fashion. Second, SCM answers the calls within the consensus literature for techniques that can facilitate the analysis of consensus between groups (Kellermanns *et al.*, 2005). SCM offers a way to bridge the gap between individual cognition and collective behaviors (Powell, Lovallo and Fox, 2011) at both group levels and between-group levels by combining different dimensions and levels of consensus using coherent methods. Researchers can thereby gain the unique opportunity to explain which mechanisms form consensus, when this consensus occurs, and why certain behaviors and outcomes arise at both individual and collective levels (Powell, Lovallo and Fox, 2011). Third, SCM makes it possible to test the significance of differences in consensus both over time and in cross sections of groups. The ability to test such changes in consensus is particularly important not only from the perspective of theory development but also for managerial practice, because strategic interventions aimed at enhancing consensus are widely practiced in business but are seldom (if ever) quantitatively evaluated for their effectiveness (Hodgkinson *et al.*, 2006, Hodgkinson and Healey, 2008b). Last but not least, in managerial and organizational cognition research, several scholars have suggested that the tools available today for investigating cognition must be refined to facilitate deeper analyses (Walsh, 1995, Hodgkinson, 2002, Kaplan, 2011). Thereby, SCM not only advances the theory on strategic consensus, but it also contributes to the broader field of managerial and organizational cognition.

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## Strategic Consensus: A Multifaceted Concept Within Strategic Cognition Research

Floyd and Wooldridge (1992 :27) state, ‘Successful [strategy] execution means managers acting on a common set of strategic priorities,’ and this requires consensus regarding those priorities. A higher *degree* of strategic consensus within a group may facilitate the communication and coordination of actions (Kellermanns *et al.*, 2008), create synergies (Cannon-Bowers and Converse, 2001), and improve group and organizational performance (Kellermanns *et al.*, 2011). Although it has been noted that high levels of consensus can hamper certain processes, such as change and innovation (Priem, 1990), this paper examines not whether or when strategic consensus has positive effects, but how strategic consensus can be comprehensively studied in a manner that enables integrative theory building while generating helpful implications for managerial practice. We anticipate that the study of the consequences of strategic consensus can benefit from a more integrative approach to strategic consensus.

To date, the most frequently investigated facet of strategic consensus has been the degree of within-group consensus (Markoczy, 2001, Kellermanns *et al.*, 2005). Although we do not dispute the importance of this research, we contend that focusing solely on the degree of consensus within groups is not sufficient for integrative theory building, but instead a multidimensional understanding of strategic consensus is required. The degree of consensus, what the consensus concerns (*i.e.*, the content of the consensus), where it is located in the organization (*i.e.*, the locus of the consensus), and who and how many people participate in it (*i.e.*, the scope of the consensus) should all be determinants of a comprehensive strategic consensus theory (Markoczy, 2001). In addition, strategic consensus should be assessed at multiple levels of analysis—not only within organizational groups but also between groups and for the organization as a whole. Organizations can be characterized as networks of interdependent groups (*e.g.*, Kramer, 1991), and a strong alignment between these groups is needed to eliminate the pursuit of subunit goals and to achieve organizational objectives (Ketokivi and Castaner, 2004, Kellermanns *et al.*, 2005). To fully comprehend how individuals and groups combine their understanding and to determine which antecedents and outcomes are associated with these processes, as Powell and colleagues (2011) argue, it is necessary to link both individual- and group-level cognition, to make comparisons between groups, and to distinguish the overall alignment in an organization. Finally, a longitudinal

assessment of changes in consensus within and between groups over time is essential because it reveals when strategy implementation benefits the most from strategic consensus (Kilduff, Angelmar and Mehra, 2000), provides further insights into the mechanisms of the consensus formation process (Markoczy, 2001), and evaluates the effectiveness of interventions used to foster strategic consensus (Hodgkinson *et al.*, 2006, Hodgkinson and Healey, 2008b). It is for these reasons that scholars have been seeking a comprehensive assessment of consensus (e.g., Wooldridge and Floyd, 1989, Hodgkinson and Johnson, 1994, Markoczy, 2001, Kellermanns *et al.*, 2005).

Thus, SCM has much to offer for the further development of strategic consensus theory because researchers can use it to assess the multidimensional, multilevel, and longitudinal aspects of strategic consensus. First, SCM scales individual understandings of strategies for both within-group and between-group levels. Second, SCM identifies within-group similarities and differences in strategic understanding both by identifying where consensus exists and by indicating its content. Following this process, a multilevel mapping of the locus and scope of strategic consensus can be generated. Third, SCM uses a complementary set of methods based on the same raw data, so the output of one method serves as the input for another method. Therefore, the distinction between within- and between-group consensus is not confounded by differences in measurement.

Scholars have previously developed techniques to study consensus and various types of cognitive structures at the individual, team, organizational, and industry levels both in strategic consensus field and in the larger body of managerial and organizational cognition research, in which consensus is rooted. Most of these measures were developed specifically for certain theoretical frameworks or contexts, and they can offer valuable insights. We reviewed the broader body of work on managerial and organizational cognition to assess the extent to which various methods can be used for comprehensive assessments of consensus. This review helped us to build on and target our method within the larger managerial and organizational cognition domain. As we outline below, our overview supports our conclusion that prior studies have not provided a method for simultaneous multidimensional, multilevel, and longitudinal analyses of consensus.

In our review, we considered methods presented in review articles by Hodgkinson and Healey (2008a); Mohammed, Klimoski, and Rentsch (2000); and Walsh (1995). We also reviewed more recent articles about these methods. We included methods that effectively

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perform multilevel, multidimensional, and/or longitudinal analysis of cognition, and we used a representative article for each method that demonstrates some form of shared cognition at a particular collective level. Our review is not limited to current uses of these methods, as we considered their potential for broader applications to multiple levels and dimensions. Table 1 summarizes this assessment and indicates whether a method is multidimensional with respect to its ability to simultaneously capture the degree, content, locus, and scope of cognition. The table also shows whether a method allows for analysis at multiple levels to indicate its ability to link individual-level cognition with cognition at the within-group, between-group, and/or (inter)organizational levels. A method enables longitudinal analysis when it can detect changes in cognition over time, and it enables significance testing when it allows statistical testing of both longitudinal changes and cross-sectional differences in cognition. In addition to its ability to test cross-sectional and longitudinal differences, each method's depth of visual representation is also assessed in Table 1. Finally, a method allows for joint-space representation when it can visualize individual and collective cognition together with the content of cognition and offers a more thorough, content-based understanding of consensus among group members.

To analyze different types of cognitive beliefs and structures, researchers have already successfully used a variety of quantitative and qualitative methods to elicit, measure, and compare the cognitive frameworks of managers, groups, and organizations. Despite the wide range of available techniques, Table 1 confirms our observation that an integrative approach has not yet been developed in the larger domain of managerial and organizational cognition. The existing methods primarily capture the degree and the content dimensions of consensus across a limited number of organizational levels. A detailed analysis of consensus via in-depth visualization, longitudinal investigation, and significance testing is barely provided. Table 1 indicates that causal mapping has advantages over previous methods in that it captures multiple dimensions of consensus and allows for pairwise testing of cross-sectional and longitudinal differences in consensus. SCM, however, moves beyond causal mapping by systematically analyzing consensus between groups and facilitating the in-depth visualization of consensus both within and between groups.

**Table 1 : Comparison of methods in managerial and organizational cognition research.**

Example	Methods			Dimensions		Analysis Level		Longitudinal Significance testing	Joint-space representation
	Elicitation	Measurement	Analysis	Degree	Content	Group	Individual		
<b>Team mental models</b>									
Edwards <i>et al.</i> (2006)	Pairwise similarity ratings	Closeness (C) index	Pathfinder	✓		✓	✓	✓	
Mathieu <i>et al.</i> (2000)	Pairwise similarity ratings	QAP correlations	Ucinet	✓		✓	✓	✓	
<b>Work unit similarities</b>									
Blackburn and Cumming (1982)	Pairwise similarity ratings	Mean similarity ratings	MDS	✓	✓		✓		
<b>Belief structures</b>									
Walsh <i>et al.</i> (1988)	Card sorting	Average squared Euclidean distance	MDS	✓	✓ <sup>†</sup>		✓		
<b>Competitor cognition</b>									
Hodgkinson (1997; 2005)	Repertory grid	Euclidean distances	MDS	✓	✓		✓	✓	✓
Daniels <i>et al.</i> (1995; 2002)	Card-sorting, repertory grid, rating of maps' similarity	Mean/standard deviation of similarity ratings	Hierarchical cluster analysis, PCA	✓	✓		✓	✓	✓
<b>Strategic groups</b>									
DeSarbo <i>et al.</i> (2009)	Financial measures		MDS	✓ <sup>†</sup>	✓			✓	✓
<b>Causal maps</b>									
Carley (1997)	Open-ended questions	Sum of overlapping concepts	Text-based causal mapping	✓	✓	✓	✓	✓	✓
Markoczy (2001), Clarkson and Hodgkinson (2005)	Pairwise comparisons, causal maps	Average/standard deviation of pairwise distances	Interactive causal mapping	✓	✓	✓	✓	✓	✓
<b>Strategic consensus</b>									
Bowman and Ambrosini (1997)	Rating	Standard deviation	PCA	✓	✓		✓	✓	
Strategic Consensus Mapping	Ranking/ rating	$\alpha$ (within group), $r$ (between group)	PCA, MDS, permutation testing	✓	✓	✓	✓	✓	✓

<sup>†</sup> The method is compatible for such extensions in multiple levels and dimensions although it is not presented in the related study.

Although we recognize that some methods may be better for particular purposes, the proliferation of methods has made it harder to accumulate knowledge (Resick *et al.*, 2010, Kellermanns *et al.*, 2011) and to develop comprehensive theories (Mohammed, Klimoski and Rentsch, 2000, Kellermanns *et al.*, 2005, Mohammed, Ferzandi and Hamilton, 2010). For instance, Mohammed and colleagues (2000: 128) argue that ‘confusion over how to measure group-level cognitive structures has hindered empirical work on team mental models.’ Hence, SCM addresses the much-needed consolidation of methods and makes it possible for researchers in strategic consensus and in subfields of managerial and organizational cognition to build integrative theory with a systematic assessment of cognition, as we explain in a later section.

## Strategic Consensus Mapping

SCM relies on data that quantify how individuals (i.e., members of work groups, teams, business units, organizations, or industries) assess strategic priorities—for example, by rating or rank ordering (potential) strategic objectives presented in a survey (the assessment of strategic consensus typically found in strategic management research; see Kellermanns *et al.*, 2011). SCM consists of a set of methodological procedures that aim to capture the facets of strategic consensus that are discussed in the previous sections. These procedures are introduced here in the order in which they should be executed. First, the vector model for unfolding (VMU) is employed to measure the degree of within-group strategic consensus and to visualize its content. Second, from the results of this VMU, two new measures are derived to operationalize the degree of within- and between-group consensus. Third, these quantified measures of within- and between-group consensus are used to visualize the between-group consensus using multidimensional scaling (MDS). Finally, the statistical significance of the observed differences in within- and/or between-group strategic consensus, both cross sectional and longitudinal, is assessed using permutation tests.

### *Visualizing the Degree and the Content of Within-Group Strategic Consensus*

To obtain both a visual mapping of the content and a measure of the degree of strategic consensus, SCM employs a vector model for unfolding (see, for example, Borg and Groenen, 2005). This approach is the same as that used in principal component analysis (PCA) with the transposed data matrix, which places the respondents in the columns (as variables) and the strategy items (i.e., strategic goals) in the rows (as cases). This procedure provides a joint-space presentation that jointly plots the strategy items in relation to the preferences of respondents regarding these items for all members of a team. In multivariate analysis, the VMU is a widely used statistical dimension reduction technique that summarizes a data set using one or more uncorrelated underlying latent variables to account for a maximum amount of the variance among the respondents. Below, we explain the specifications of the VMU in greater detail and demonstrate some of its features using an example.

Let  $\mathbf{H}$  be the data matrix with  $m$  rows (strategy items) and  $n$  columns (respondents).  $\mathbf{H}$  must be standardized so that all individuals have equal weight in the VMU. Consequently, the

VMU in  $p$  dimensions is equivalent to minimizing the sum of the squared errors  $\|\mathbf{E}\|^2$  for  $\mathbf{H}$  and the low-dimensional representation  $\mathbf{XA}$ ; that is,

$$L_{VMU}(\mathbf{X}, \mathbf{A}) = \|\mathbf{H} - \mathbf{XA}\|^2 = \sum_{ij} e_{ij}^2,$$

where  $\mathbf{X}$  is an  $m \times p$  matrix of the object scores for the  $m$  rows of the first  $p$  components and  $\mathbf{A}$  is an  $n \times p$  matrix of component loadings.  $\mathbf{X}$  is standardized to be orthogonal and has a column variance of 1, and the component loading matrix  $\mathbf{A}$  contains the correlations of the  $n$  respondents with  $p$  components  $\mathbf{X}$ . That is, the VMU reduces the dimensionality of the data to  $p$  dimensions, the object scores in  $\mathbf{X}$  contain the coordinates for each strategy item in these  $p$  dimensions, and the component loadings in  $\mathbf{A}$  are the correlations between the object scores for each strategy item and the respondents' answers.

The VMU facilitates the identification of a  $p$ -dimensional space that contains (i) a configuration of  $m$  objects that represents the strategy items (the content of the strategy, which is shown as object points on a biplot) and (ii) a  $p$ -dimensional configuration of  $n$  vectors that represents the respondents in the group such that the projections of all object points on each vector correspond to the individual preferences of each respondent regarding the strategy items in the data set. In two-dimensional space, the results of the VMU can be depicted using a biplot in which the rows of  $\mathbf{X}$  (the object scores of the strategy items) are represented as points and the rows of  $\mathbf{A}$  (the component loadings of the respondents) are represented as vectors (Gower, 1996).

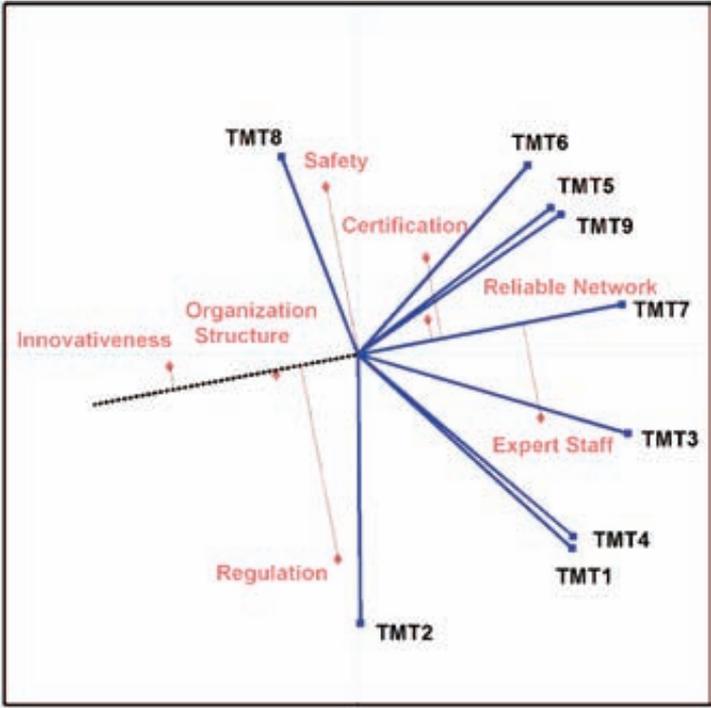


Figure 1: Example of a VMU biplot

Figure 1 shows several visual features that are associated with the resulting biplot representation of the VMU solution. (The raw data matrix for this example is presented in Table A1 in the Appendix.) Figure 1 presents the VMU solution of a top management team (TMT) where each respondent is a TMT member. First, the cosine of the angle between two respondents is an approximation of their pairwise correlation (Lee Rodgers and Nicewander, 1988, Linting *et al.*, 2007). This interpretation is based on the eighth way of interpreting correlations proposed by Rodgers and Nicewander (1988: 13), who argue that this approach is the easiest way to interpret the magnitude of correlations and add that ‘this inside-out space that allows [a correlation] to be represented as the cosine of an angle is relatively neglected as an interpretational tool.’ Respondents with small angles between their vectors have a similar opinion of the strategy items in question. For example, in Figure 1, the respondent TMT1’s goal prioritization is similar to that of TMT4 but is very different from TMT8.

Second, the spread of all the vectors in a biplot demonstrates the degree of within-group

strategic consensus. When the vectors are grouped in a tight cluster, there is a high degree of within-group strategic consensus. By contrast, a wide distribution of vectors of the respondents in opposing directions indicates a low degree of within-group consensus.

Third, the VMU biplot both provides a comparison of individuals and indicates their goals. The orthogonal projection of a strategy item onto a respondent's vector indicates the respondent's ranking for that particular strategy item. The farther an item is projected onto the vector, the higher the respondent prioritizes the item, whereas the respondent does not consider items that are projected in the opposite direction as high priorities. The projections of the strategy items onto the vector for respondent TMT7 are shown with a dashed line. We can see that TMT7 considers *Expert Staff* the most important because its projection is farthest on the vector that represents TMT7. *Expert Staff* is followed by *Certification* and *Reliable Network*. Because *Innovativeness* embodies the farthest projection in the opposite direction, it can be inferred that TMT7 valued that strategy item the least. In this manner, within-group strategic consensus is visualized so that it captures the content and locus (within-group) facets of the multifaceted definition of consensus proposed by Markoczy (2001).

Fourth, the VMU enables quantification of the opinions of groups, so consensus among groups is easier to determine. The dimensions in the regular VMU are chosen to maximize the reconstructed variance, which is orthogonal to higher dimensions. However, the total variance that is explained by the two dimensions does not change with the rotation of these two dimensions such that this freedom of rotation can be used to ensure that the average (vector) of component loadings coincides with the first dimension. As a result, the first dimension can be interpreted as the 'prototypical group' member who best represents the entire group's opinion. Therefore, the projections of strategy items onto the first axis represent the overall view of the group based on this prototypical group member. In Figure 1, when we make projections of the strategic goals onto the first dimension to attain the overall view of the group, we observe that the prototypical group member prioritizes *Expert Staff* the highest, followed by *Certification* and *Reliable Networks*, whereas *Innovativeness* has the lowest priority. In addition, the number of people who are close to the prototypical group member represents the scope of within-group consensus.

Finally, the length of a vector indicates how well a respondent is represented, where a length of 1 indicates a perfect fit (Gower, 1996). Short vectors indicate that the respondent is not well represented, so they should be interpreted cautiously because for that particular

vector low variance is accounted for (Linting *et al.*, 2007). Accounting for low variance must be interpreted as an indication of diverse opinions in a group and, thus, low consensus. The first two dimensions of the VMU solution are generally adequate to explain a large portion of the variance if the number of variables and the number of respondents are not very high. In the example in Figure 1, all of the respondents fit well into two dimensions because nearly all of the respondents have vectors with a length that is close to 1. Indeed, 79.5 percent of the variance in this example is explained by the first two dimensions.

### ***Quantifying the Degree of Within-Group Strategic Consensus***

In this section, we present a new measure for assessing the degree of strategic consensus within a group. A new  $\alpha$  measure of the degree of within-group strategic consensus is defined by the length of the average component loading vectors of the unrotated VMU solution; that is,

$$\alpha = \sqrt{\sum_{p=1}^2 \left( m^{-1} \sum_i a_{ip} \right)^2},$$

where  $a_{ip}$  is the  $p^{\text{th}}$  component loading for respondent  $i$  ( $i = 1, \dots, n$ ). Note that this vector coincides with the first dimension after the rotation, thus complementing our visualization of the content and degree of consensus.

$\alpha$  takes values between 0 and 1. If all of the members of the group have similar views regarding the strategy items—and so their vectors are close together in a tight group—then the  $\alpha$  measure will be close to 1. However, if the vectors are spread out, such as a set of rays evenly distributed on a circle, then the average component loadings will be close to zero, and the  $\alpha$  measure will be low. In Figure 1, the  $\alpha$  value is 0.55, which indicates a moderate degree of within-group strategic consensus.

### ***Quantifying the Degree of Between-Group Strategic Consensus***

When a firm wants to strategically align people in the organization, developing a consensus regarding the strategic priorities in each group is important, but ensuring a shared understanding of strategy across groups is also essential. Kellermanns and colleagues (2008) suggest the use of a correlation-based approach to measure consensus across groups,

especially when managers from several levels are studied. Therefore, we propose a correlational measure of the degree of between-group consensus that is derived from the within-group VMU object scores of the strategy items. Because the first axis can be interpreted as the prototypical member of the group who represents the aggregate measure of the entire group's overall opinion, the correlation between the prototypical members of two groups captures the between-group consensus for these two groups.

The measure that we propose,  $r(A, B)$ , is operationalized as the correlation of the object scores of the strategy items on the first principal component for two groups,  $A$  and  $B$ . Clearly, an  $r(A, B)$  of 1 indicates perfect overlap of the two groups regarding the strategy items;  $r(A, B) \approx 0$  represents no strategic consensus between the two groups, and  $r(A, B) \approx -1$  reveals two opposite notions of the strategy in the two groups.

This measure can also be used to measure the degree of overall strategic alignment in a given organization when all the groups in the organization have been surveyed. An aggregated index of the degree of between-group strategic consensus for all possible pairs of groups in the organization,  $r_{\text{overall}}$  value, can be operationalized as the average sum of the squared  $r$ -measures for all pairs. Therefore,  $r_{\text{overall}}$  indicates the overall degree of strategic consensus among all the groups in a given organization. The  $r_{\text{overall}}$  index can also be used to compare the strategic alignment between different organizations.

### ***Visualizing the Degree and Locus of Between-Group Strategic Consensus***

In addition to our within-group consensus visualization, we propose a visualization technique for between-group strategic consensus as well. The between-group visualization is a map that represents all the groups in the organization in a two-dimensional space according to their respective levels of between-group consensus. The visualization demonstrates which groups are located close together and share a strategic understanding, thus enabling us to determine the locus of consensus across the groups.

To obtain a mapping for between-group consensus, classical multidimensional scaling (MDS) is used. The main objective of MDS is to represent given measures of dissimilarity for all pairs of objects as distances between pairs of points in a low-dimensional space such that the distances correspond as closely as possible to the proximities (Torgerson, 1952). MDS and similar methods have been widely used in the analysis and comparison of intra- and

intergroup cognitive representations in strategic management (see, e.g., Hodgkinson, 1997, 2005, for applications of three-way MDS and Markoczy and Goldberg, 1995, for two-way MDS applications). For example, Hodgkinson (2005) used a one-mode (stimuli  $\times$  stimuli), three-way (stimuli  $\times$  dimensions  $\times$  participants) Procrustean Individual Differences Scaling approach to investigate the extent and locus of strategic consensus regarding actors' mental models of competition in a study of residential real estate agents' perspectives on competitor definitions. SCM, however, uses the simpler two-way (stimuli  $\times$  participants) approach. This enables more straightforward comparisons across teams because it displays strategic goals along with the team members, so the prototypical team member for each team can be determined, and this forms the basis of SCM's MDS analysis to compare the various teams. Regarding our use of classical MDS, note that when only a few groups are involved, the results of classical and other forms of MDS (such as least-squares MDS, which minimizes stress) are very similar. If several groups are being analyzed (e.g., in an industry-wide application), then we suggest first performing a classical MDS and then using it as the initial configuration for a least-squares MDS (e.g., using the SMACOF algorithm in SPSS Proxscal see Borg and Groenen, 2005).

As a measure of the dissimilarity between two groups, we transform  $r$  measures by subtracting from 1 (see Borg and Groenen, 2005). Geometrically, this measure of dissimilarity is effective because it is equal to the squared Euclidean distances between the end points of the vectors of the prototypical managers. Alternatively, other dissimilarity measures, such as city-block and Minkowski measures, can be used. MDS finds an optimal representation of the between-group  $r$  measures using distance in two-dimensional space. Each group is represented as a point, and the distances between the points represent the between-group consensus. Groups that more similarly value the strategy items are thus grouped closer together on the MDS map, whereas groups with opposing views are placed farther away from one another.

To offer a broader perspective on strategic consensus across organizational groups in our particular case, we add certain features to the between-group consensus maps. First, each group is not represented by a single point in the two-dimensional space, but rather, each group is represented by a shaded bubble whose size represents the current degree of within-group consensus (i.e., the  $a$  measure). To provide perspective, we use an outer ring for the bubble, and the size of this outer ring indicates the potential maximum size of the bubble, if

the group ever achieves perfect consensus (i.e.,  $a = 1$ ). Second, our graphical representations place the TMT in the center of the MDS plots. However, the TMT is only used as an example, as depending on the primary research question, other groups or stakeholders can be used as a reference group. Third, to make the mappings more comparable, this example uses ten rings encircling the TMT that represent the correlational distance to the TMT ranging from 0.9 to 0.

### *Assessing the Statistical Significance of Differences in Strategic Consensus*

To test changes in strategic consensus over time (e.g., before and after a strategic intervention) or differences in consensus between groups, we must determine the statistical significance of the difference in the degree of consensus. To conduct significance tests of such differences, the respective  $\alpha_{\text{diff}}$  or  $r_{\text{diff}}$  values must be defined. For instance, if we are interested in determining whether there has been a significant change in the within-group consensus of a group over time, then the null hypothesis is  $\alpha_{\text{diff}} = 0$ , where  $\alpha_{\text{diff}} = \alpha_{\text{post}} - \alpha_{\text{pre}}$ . Similarly, if we are interested in determining whether group A exhibits greater within-group consensus than group B, then the null hypothesis becomes  $\alpha_{\text{diff}} \leq 0$ , where  $\alpha_{\text{diff}} = \alpha_A - \alpha_B$ , and the alternative hypothesis is  $\alpha_{\text{diff}} > 0$ .

To our knowledge, the only study that proposes a method for comparing consensus across groups is that of Pasisz and Hurtz (1990), who suggest that a series of  $F$  tests can be used to compare within-group agreement across two or more groups. However, their procedure is parametric and thus may be sensitive to deviations from normal distribution (Markowski and Markowski, 1990). Our methods are not constrained by such assumptions because the VMU method is a nonparametric technique without a statistical error model. Because the within- and between-group consensus measures are functions of the VMU results, they do not entail any distributional assumptions. This is also true of the distributions of  $\alpha_{\text{diff}}$  or  $r_{\text{diff}}$ , for which no standard statistical theory is available. Therefore, the use of the permutation test as a nonparametric method of hypothesis testing is more appropriate given our method. Moreover, Hodgkinson (Hodgkinson, 1998) warns against the conditional dependency problem of observations associated with significance tests of MDS-related outputs and distances derived from proximities. However, because in our analyses the  $\alpha$  and  $r$  statistics are derived from pairs of VMU solutions rather than from MDS, conditional

dependency is not an issue. Nevertheless, our use of permutation tests is consistent with the work of Jones (1983), who recommends using nonparametric tests to mitigate conditional dependency problems.

The permutation test yields the distribution of any test statistic for two groups under the null hypothesis that there is no difference between the two groups by rearranging the labels of the observed data (Good, 2005). The permutation test compares the  $\alpha_{\text{diff}}$  and  $r_{\text{diff}}$  values of the true groups with the  $\alpha_{\text{diff}}$  and  $r_{\text{diff}}$  values that are obtained from a large number of data sets (e.g.,  $N = 9,999$ ) in which the grouping information is destroyed and individuals are randomly assigned to one of the groups (Hesterberg *et al.*, 2005). To ensure that the group size remains constant, the array indicating the number of individuals is randomly permuted, and new random group memberships are assigned for each permutation data set. To determine the significance, the  $p$ -values of the observed  $\alpha_{\text{diff}}$  and  $r_{\text{diff}}$  are determined by their percentiles with respect to the permutation distribution. If the null hypothesis of no difference is rejected, then the observed  $\alpha_{\text{diff}}$  or  $r_{\text{diff}}$  is significant at the level of the  $p$ -value.

### **Using Strategic Consensus Mapping to Facilitate Strategic Reflection: A Case Example**

To illustrate SCM, our case example uses data from a large Western European firm in the service industry. The company was composed of a top management team (TMT) and nine functional departments, each of which had several subdepartments at the time of data collection. The company's TMT included the managing director and the heads of the nine functional departments. The department heads directed teams of four to ten managers each, who in turn each supervised at least one subdepartment. To assess the strategic alignment of the organizational units, we focus on the TMT as well as the management teams making up the company's nine departments. In the subsequent departmental analyses, the TMT members (i.e., the department heads) are also included in their respective departments.

Instead of generic strategic goal statements, this case uses strategic goals provided to us by the TMT that are specific to our selected company. These goal statements outline the organization's strategic priorities, using a definition common to strategic consensus research (Kellermanns *et al.*, 2005, Kellermanns *et al.*, 2011). In this case, we presented these strategic goals to 72 top and middle managers in the organization with the following instructions:

‘Please rank the following strategic goals of your company from most important to least important in order of their importance to you.’ Because the strategic priorities in the current paper are those from the TMT, researcher interference in eliciting strategic goals is limited. We received 64 responses—a response rate of 89 percent. Of those 64 responses, 63 percent of the respondents were male, and 56 percent of this group had master’s degrees (the rest have bachelor’s or comparable college degrees). The average work experience of the respondents was 18.6 years, and they had been in their current positions at the time of the survey an average of 3.37 years.

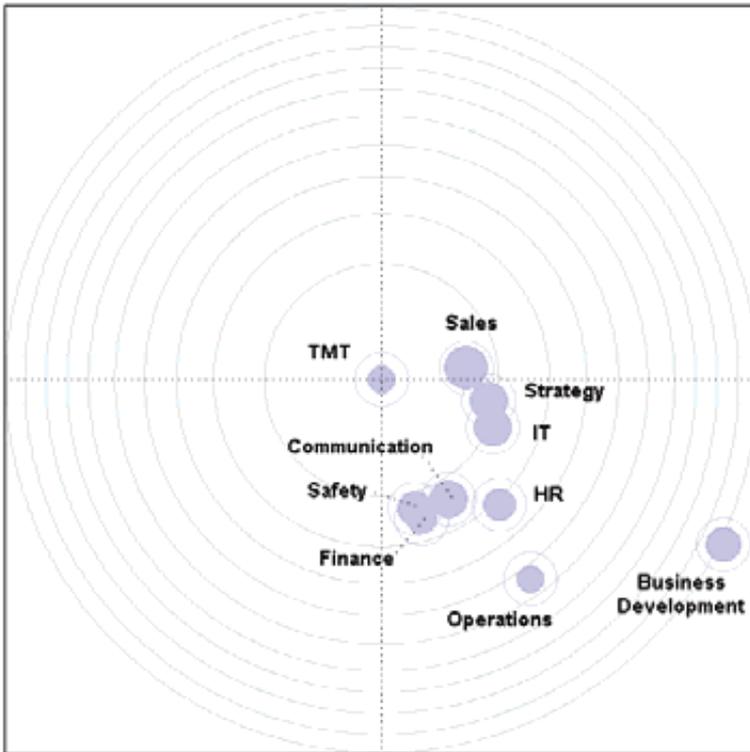
In order to preserve the confidentiality of the respondents, we relabel the department names of this illustrative case study, and we conceal the respondents’ names. Furthermore, we present only shortened versions of the TMT’s seven strategic priorities of the company: *Innovativeness*, *Regulation*, *Reliable Network*, *Safety*, *Expert Staff*, *Organization Structure*, and *Certification*.

For this illustrative case study, we present the firm-wide results first, followed by the results for the respective levels of the organization (i.e., the team and individual levels). Presenting the results in this way provides a clearer picture of the organization and enables more efficient interpretation of the between- and within-group consensuses as well as the overall, firm-level alignment.

### ***Locus and Degree of Between-Group Strategic Consensus***

Figure 2 shows the MDS plot of all the organizational units in the firm. (The correlation matrix used to generate Figure 2 is presented in Table A2 in the Appendix.) The distances between the bubbles represent the degree of consensus between the organizational units; the smaller the distance, the greater the consensus between the groups (i.e., the closer the value to  $r = 1$ ). For this example, we place the TMT at the center to make it easier to determine if it is the locus of the consensus.

Figure 2 shows that the Sales, Strategy, and IT departments are all relatively close to the TMT, which indicates that they have a high level of consensus with the TMT’s given strategic priorities. The Operations and Business Development departments are much farther away from the TMT, which indicates that they have a low level of between-group consensus with the TMT.



**Figure 2: MDS solution depicting the locus and degree of between-group consensus**

The bubbles in Figure 2 also represent the degree of within-group consensus for each department, and the rings around the bubbles indicate the potential size of a bubble if the group ever achieves perfect consensus regarding their ranking of the strategic priorities (i.e.,  $a = 1$ ). For example, the Sales, Communication, and IT departments ( $a = 0.81, 0.79,$  and  $0.73,$  respectively) have large bubbles, indicating a high level of within-group consensus. However, the Operations, TMT, and Finance departments ( $a = 0.53, 0.54,$  and  $0.56,$  respectively) have relatively small bubbles, indicating a low level of within-group consensus.

The degree of within-group consensus must be interpreted in conjunction with the departments' distance from the group positioned at the center of plot representing consensus between the groups. The combined degree and distance indicate the locus of consensus in the organization. If the organizational units that have high degrees of within-group consensus are all clustered far away from the central group, then the locus of consensus in the organization cannot be the group currently fixed in the center of the figure, in this case

study, the TMT. Similarly, the number of groups that are close to the locus indicates the scope of consensus within the organization. Figure 2 shows that the TMT has a relatively low degree of within-group consensus and that the locus of consensus is decidedly not the TMT's view of strategic priorities, evidenced by the high degrees of within-group consensus of the departments clustered far away from the TMT. Figure 2 shows that in this case, each department has uniquely ranked the strategic goals for the organization and that these views, particularly those of Business Development and Operations, differ from the TMT views.

### *Content and Degree of Within-Group Strategic Consensus*

To determine the disparate views causing the shift of locus in this case study, we have to examine each management team more closely. The VMU step provides the biplots for each team such that we can observe each team member's view of the strategic priorities (See Figure 1 for the biplot of the TMT). Figure 3 shows the biplots of two departments: Sales, which is close to the TMT, and Operations, which is far away from the TMT.

Note that to investigate the stability of the VMU procedure's results—that is, to determine whether slight changes in the data can lead to drastically different representations—we use the bootstrap method (Efron and Tibshirani, 1993) for resampling. In our case study, the results of this procedure do not reveal any violations of the stability criteria.

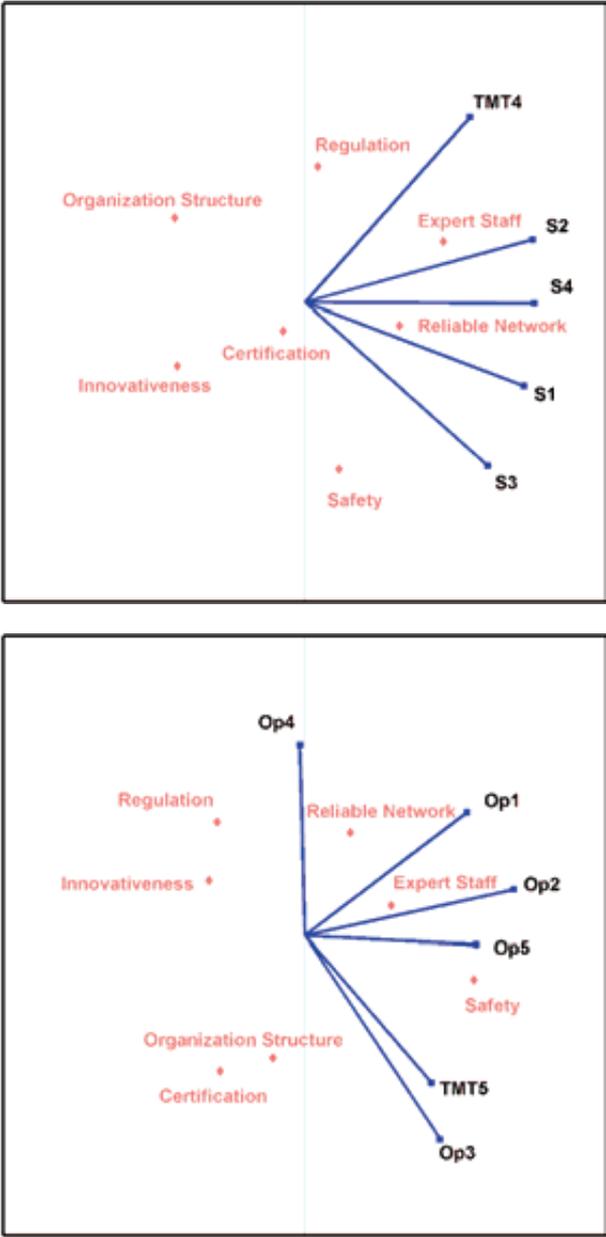


Figure 3: VMU biplots representing the degree and content of strategic consensus within the Sales (top) and Operations (bottom) departments

Because the projections of the strategy items onto the horizontal axis correspond to the views of the prototypical group member, we can identify, on an item-by-item basis, which particular strategic issues account for any divergence in viewpoints within the group. For example, based on the projections of the strategy items onto the first axis in Figure 1, *Expert Staff*, *Certification*, and *Reliable Network* are the top three strategic priorities for the TMT. Figure 3 shows that the Operations department rank *Safety* as the most important, while they rank *Certification*, *Innovativeness*, and *Regulation* as the least-important strategic priorities. This difference in responses pertaining to the consensus content generates a low degree of between-group consensus between the Operations department and the TMT, as shown by the distance between these groups in Figure 2. In contrast, the Sales department views *Expert Staff* and *Reliable Network* as the most important strategic priorities and regards *Innovativeness* and *Organization Structure* as the least-important strategic priorities; these views are similar to those of the TMT, placing the Sales department close to the TMT and yielding a high level of between-group consensus in Figure 2.

When we examine the individual Sales and Operations managers in Figure 3, we observe that the respondent vectors for the Sales department are a tighter cluster than those for the Operations department; this observation shows that the degree of within-group consensus in the Sales ( $a = 0.81$ ) is greater than that of the Operations ( $a = 0.53$ ). Consequently, we conclude that the members of the Sales department have more consensus regarding the relative importance of the strategic priorities than the members of the Operations department.

In Figure 3, the large spread of the vectors in the Operations department results from differences in the department members' individual preferences. For instance, person Op4 prioritizes *Regulation*, *Reliable Network*, and *Innovativeness* as the most important strategic priorities, whereas respondent Op3 considers these three strategic priorities to be the least important, considering *Safety*, *Organization Structure*, and *Certification* to be the most important. However, some team members, such as Op3 and TMT5, have similar views because the angle between their vectors is small. Finally, TMT5's and Op5's vectors are slightly shorter than the others that all have lengths of approximately 1. This observation indicates that preferences of TMT5 and Op5 are less adequately represented in the biplot compared to the preferences of the other department members. Indeed, two dimensions account for 66 percent of the variance in the Operations department, which indicates that the preferences of

some members are not perfectly represented in these dimensions. In Figure 3, the members of the Sales department exhibit a greater shared understanding regarding strategic priorities, and all members are represented adequately in the biplot, with lengths close to 1; 90 percent of the variance is accounted for in the biplot.

### *Assessing the Statistical Significance of Differences in Between-Group Strategic Consensus*

Both the biplot and the  $a$  measures indicate that the Sales department has a greater degree of within-group strategic consensus than the Operations department. However, we do not know whether this difference is statistically significant. We use permutation testing to determine whether the degree of within-group consensus of the Sales department is significantly different than the Operations department—that is,  $H_0$  equals  $a_{\text{diff}} = 0$ . After 9,999 permutations, the difference of  $a_{\text{diff}} = 0.83 - 0.53 = 0.28$  is statistically significant at the 98th percentile (i.e.,  $p = 0.02$ ). Therefore, the null hypothesis, which states that there is no difference between the Sales and Operations departments with regard to their within-group strategic consensus, can be rejected at the 5 percent level.

Additional evidence of the validity of our  $a$  measure can be obtained by comparing our results with those obtained using other common consensus measures, such as standard deviations, squared Euclidean distances, and correlations (see Kellermanns *et al.*, 2011). Table 2 shows that the results remain qualitatively the same.

**Table 2 : Permutation tests for comparison of within-group consensus between Sales and Operations departments**

Measures	Sales	Operations	Difference	$p$ -value
$a$	0.81	0.53	0.29	0.020
Standard deviations	-1.22	-1.81	0.59	0.009
Squared Euclidean distance	-23.60	-47.07	23.47	0.024
Correlations	0.586	0.16	0.42	0.024

A permutation test can also be used to test whether two groups have different levels of correlation with the TMT. For example, in our illustrative case study, the results show that the difference observed between the TMT and the Sales and Operations departments [ $r_{\text{diff}} = r(\text{TMT}, \text{Sales}) - r(\text{TMT}, \text{Operations})$ ] is significant at the 10 percent level ( $p = 0.08$ ). We can conclude, therefore, that there is some (albeit not strong) evidence that the Sales department

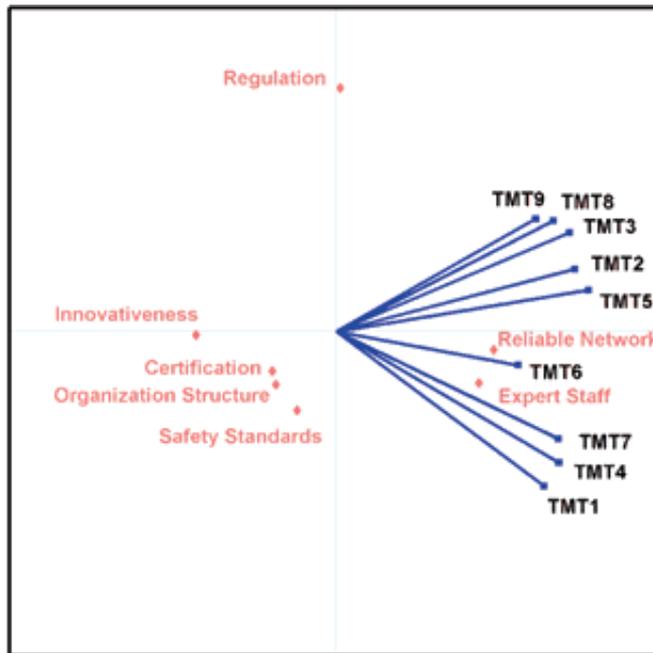
does indeed have a higher degree of consensus with the TMT than does the Operations department. Figure 2 also suggests that the Sales department is more aligned with the TMT than the Operations department.

### *Assessing the Effectiveness of the Strategic Intervention*

When we presented these findings to the TMT, it was apparent that our illustrations made it easier for the managers to understand the results. The TMT members were especially surprised to see the low within-group consensus of their own team, the TMT, regarding strategic priorities ( $a = 0.55$ ). Consequently, the TMT decided to arrange a semistructured half-day strategic intervention. This intervention was intended to enhance the team members' shared understanding of the firm's strategic priorities.

We reevaluated the TMT members' priorities after the intervention to determine the intervention's effectiveness. Clearly, more rigorous research designs, such as a two-group pretest/posttest design that compares an intervention's outcomes with those of a control group (e.g., Cook, Campbell and Day, 1979) are required to comprehensively assess the effectiveness of strategic interventions. Nevertheless, for illustrative purposes, we now demonstrate how SCM can be used to measure the effectiveness of strategic interventions.

The measurements taken after the intervention show that the degree of the TMT's within-group consensus is higher ( $\alpha_{pre} = 0.55$ ;  $\alpha_{post} = 0.81$ ). Thus, the next step is to test whether this increase is statistically higher. The results show that  $\alpha_{post}$  is significantly higher than  $\alpha_{pre}$  at the 5 percent level ( $p = 0.04$ ).



**Figure 4: VMU biplot of TMT after the strategic intervention**

Figure 4 also presents the consensus content, which can be compared to Figure 1. We see that there is greater consensus regarding the high importance placed on *Reliable Network* and *Expert Staff*, and the TMT members have a high degree on consensus regarding the low priority of *Innovativeness*. Despite the need to apply more rigorous designs, these results show that this particular strategic intervention is effective in increasing the degree of consensus within the TMT regarding the desired content.

## Discussion

In this paper, we present a set of complementary techniques for mapping strategic consensus. SCM enables the quantification of the degree of consensus within and between a given set of groups as well as the visual representation of the content of consensus within groups. This method also makes it possible to test whether longitudinal or cross-sectional differences in the degrees of within- and between-group consensus are statistically significant.

We illustrate the use of SCM drawing on data gathered during the course of a strategic intervention.

SCM's core contribution is the enhanced potential it provides strategic management researchers to conduct more fine-tuned and extended analyses of strategic consensus within and between groups and, consequently, to develop overarching theories. The method complements earlier conceptual arguments regarding the multifaceted nature of strategic consensus (e.g., Wooldridge and Floyd, 1989, Hodgkinson and Johnson, 1994, Markoczy, 2001, Kellermanns *et al.*, 2005) by providing the methodological tools that are necessary for rigorous empirical studies in this area. This multifaceted view prevents biases such as assuming that a high level of within-group consensus also indicates agreement on the same content or solely looking at the consensus at higher echelons when, in reality, the real locus of consensus is at the middle and lower levels. In addition, SCM's longitudinal assessment of consensus makes it possible to detect changes in consensus over time, providing further insight into the mechanisms of the consensus-formation process (Markoczy, 2001) and the effectiveness of strategic-consensus-fostering interventions (Hodgkinson *et al.*, 2006, Hodgkinson and Healey, 2008b). Thus, future research can derive visualizations of consensus and statistical tests of differences in consensus in an integrative approach. Because the measurements of within- and between-group consensus with SCM rely on the same raw input, they are thus not confounded by the specifics of their measurement. Therefore, with the tools to operationalize the different facets of strategic consensus at multiple levels over time, SCM can further our understanding of the role of strategic consensus in the strategy process.

Clearly, SCM is intended for studying strategic consensus. However, the method may be used also to study managerial and organizational cognition, which also calls for an integrative approach (Walsh, 1995, Hodgkinson, 1997, Mohammed, Klimoski and Rentsch, 2000, Hodgkinson, 2002, Kaplan, 2011). In this regard, SCM has a great deal to offer researchers on managerial and organizational cognition because SCM makes it possible to multidimensionally and longitudinally compare both individuals and groups. For example, research on intergroup relationships in organizations (van Knippenberg, 2003) may benefit from the use of SCM to visually display a shared understanding across interdependent organizational groups in areas other than strategic priorities. Likewise, in an interorganizational context, SCM can help researchers to identify and visualize strategic

groups, and the within-group consensus measure may provide a proxy for the degree of strategic group identity, which refers to the mutual understanding among the members of an intraindustry group regarding the central, enduring, and distinctive characteristics of the group (Peteraf and Shanley, 1997). SCM's contribution to these streams of cognition research lies in its ability to assess cognition simultaneously at different analytical levels by decomposing different dimensions of cognition and testing longitudinal and cross-sectional differences in cognition.

We do note that ordinal data must be treated cautiously when applying SCM. In such cases, 'ordinary' VMU could be replaced by categorical principal component analysis (CatPCA) in the transposed data matrix. The two techniques provide similar outputs, and the overall differences between CatPCA and PCA are negligible; however, CatPCA is the more appropriate technique to use with ordinal data (Linting *et al.*, 2007). In addition, the two fundamental tools that are used in SCM—VMU and MDS—are based on the idea of representing multivariate data in lower dimensions. By their nature, these procedures involve searching for low-dimensional representations that show only the most important information rather than all the information. Representing only the most important information eliminates noise and unimportant relationships from the representation. However, these processes may not provide important information that is visible only in higher dimensions. This issue may be particularly relevant to VMU solutions that are obtained for many strategy items or groups with many members. A large number of strategy items are unlikely in strategic consensus research; however, there may be a large number of group members when large organizations with many organizational units are studied. In these cases, the two-dimensional MDS solution, which indicates the between-group similarities, becomes more of a compromise as the number of groups grows. However, poorly fitting groups can be easily detected when the MDS diagnostics are applied. The between-group measures and their significance can provide valuable support for an MDS map in these cases. Other options would be to apply more conventional MDS techniques to explore higher dimensional models to derive separate subgroup models or to rely on other established techniques, such as similarity tree analysis and hierarchical clustering (see Hodgkinson, 2005).

### ***Managerial Implications***

This paper has important implications for both practitioners considering the use of strategy workshops and those investigating consensus in their companies and/or groups. Companies invest significant resources in strategic interventions; however, the effectiveness of these interventions is seldom, if ever, assessed (Hodgkinson and Healey, 2008b). SCM can be used to evaluate whether a particular strategic intervention has been effective, and the results can reveal where, as well as regarding which issues, a lack of strategic consensus exists within an organization. Thus, SCM can provide the starting point for an intervention that is intended to increase consensus.

In the analysis of strategic consensus in organizations, between-group visualization provides an intuitive, clear means of determining the strategic alignment of teams. Firms can then take the appropriate actions to achieve a desired level of alignment. Similarly, within-group visualizations can help firms identify the strategic content on which the members of a group agree or disagree. Top managers can then use this information to better communicate strategies to employees via newsletters or workshops. The ability to identify these issues enables organizations to generate policies that increase strategic consensus in a more targeted, cost-effective, and productive manner.

### **Conclusion**

Strategic consensus has become a prominent concept in the strategy process and strategy implementation research. The Strategic Consensus Mapping technique proposed here is closely aligned with the conceptual analysis of strategic consensus and can help researchers break new ground through more fine-grained and extended analyses of the multifaceted and multilevel nature of strategic consensus. This paper extends a clear invitation to strategic management researchers to apply this new approach in the study of strategic consensus.

## Appendix

**Table A 1: Data matrix underpinning the VMU biplot reported in Figure 1. Higher numbers indicate higher prioritization.**

Strategic Priority	Respondent								
	TMT1	TMT2	TMT3	TMT4	TMT5	TMT6	TMT7	TMT8	TMT9
Safety	1	2	3	2	5	6	4	7	5
Certification	4	1	4	3	6	5	5	2	7
Expert staff	7	6	7	7	7	4	7	3	6
Regulation	6	7	5	6	1	2	3	1	2
Reliable network	5	3	6	5	3	7	6	6	3
Organization structure	3	5	2	4	4	3	1	4	4
Innovativeness	2	4	1	1	2	1	2	5	1

**Table A 2: Distance matrix between departments used for MDS solution in Figure 2.**

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. TMT	1.00									
2. Strategy	0.72	1.00								
3. HR	0.71	0.78	1.00							
4. Sales	0.86	0.96	0.81	1.00						
5. Operations	0.41	0.74	0.84	0.62	1.00					
6. Finance	0.74	0.82	0.88	0.80	0.82	1.00				
7. IT	0.79	0.91	0.95	0.94	0.76	0.85	1.00			
8. Business Development	-0.03	0.33	0.58	0.27	0.60	0.30	0.46	1.00		
9. Communication	0.77	0.88	0.95	0.87	0.87	0.96	0.94	0.40	1.00	
10. Safety	0.86	0.71	0.87	0.78	0.72	0.90	0.81	0.31	0.91	1.00



## Chapter 3

# THE DARK SIDE OF TRANSFORMATIONAL LEADERSHIP IN STRATEGY IMPLEMENTATION

### Introduction

‘Well-formulated strategies only produce superior performance for the firm when they are successfully implemented’ (Noble, 1999: 119); the essence of the strategy process is effective execution. Strategies are mostly formulated by the higher echelons of organizations, yet it is within the middle and lower organizational levels that strategies are put into practice (Wooldridge, Schmid and Floyd, 2008). Unless the intermediary and operational actors understand and are committed to the strategic goals of the top management, they are unlikely to support strategy implementation (Dess, 1987, Floyd and Wooldridge, 1992, Wooldridge, Schmid and Floyd, 2008). Strategic consensus – that is, the shared understanding of organizational goals among team members (Kellermanns *et al.*, 2005) – is particularly important for strategy implementation because it facilitates communication, cooperation, and coordination (Cannon-Bowers, Salas and Converse, 2001, Kellermanns *et al.*, 2005) and reduces the pursuit of subunit goals over organizational goals (Ketokivi and Castaner, 2004). In addition, unless individuals are committed to and believe in organizational strategies, they may continue to doubt whether the strategies are feasible and whether they serve the interests of the organization and/or the goals and interests of their subunit (Wooldridge and Floyd, 1989, Floyd and Wooldridge, 1992, Amason, 1996, Dooley, Fryxell and Judge, 2000). They may even attempt to prevent strategy implementation (Guth

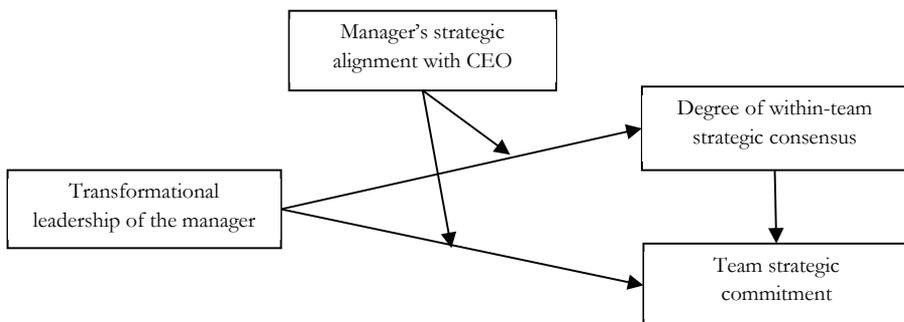
and MacMillan, 1986). Therefore, organizations must generate strategic consensus and commitment at all levels throughout the organization to successfully implement the desired strategy.

Transformational leadership among middle and lower-level managers plays an important role in generating strategic consensus and commitment to an organization's strategy. It has been argued that transformational managers provide a collective sense of mission that reinforces and promotes the achievement of strategic goals (e.g., Herold *et al.*, 2008, O'Reilly *et al.*, 2010, Hoffman *et al.*, 2011). They communicate with and inspire their team members to commit to and execute organizational objectives, build a sense of organizational citizenship, and improve employee and team performance (e.g., Judge, Piccolo and Ilies, 2004, Bass and Riggio, 2006, Piccolo and Colquitt, 2006, Liao and Chuang, 2007). However, although these studies clearly note the positive effects of transformational managers on strategy implementation, they overlook the contingencies that may moderate this positive effect – indeed, that there may be situations in which transformational leadership is detrimental to strategy implementation. For example, imagine a transformational manager who has an understanding of an organization's strategic goals that differs from that of the top management. In such a case, transformational leadership may be used to exert influence on followers to divert their focus away from the strategic goals of the organization. As a result, such a manager will neither be fulfilling his/her downward strategic role (Floyd and Wooldridge, 1992) nor be facilitating strategy implementation (Wooldridge, Schmid and Floyd, 2008). To identify such contingencies, one must examine how transformational managers create consensus and develop commitment to organizational strategies. This focus has long been called for by several researchers (i.e., Cannella and Monroe, 1997, Boal and Hooijberg, 2000, Hoffman *et al.*, 2011).

This paper extends the current strategy implementation and leadership literature by revealing how transformational leadership helps managers to build commitment through the formation of strategic consensus. We propose that the strategic alignment of the manager with the CEO acts as a moderator in this process. Figure 5 presents the model of the proposed relationships among the primary variables examined in this study. Data collected from 88 middle and lower-level teams show that transformational managers generate greater strategic consensus and commitment to organizational objectives only when their perspective

is aligned with the CEO's strategic views. Transformational managers who are not aligned with the CEO, however, divert their team from organizational strategies.

The contribution of this study is three-fold. First, we offer broad insight into how transformational leadership can either facilitate or hinder strategy implementation. In developing and testing this model, we challenge the dominant view of transformational leadership as a positive phenomenon and shed light on its darkside in strategic leadership. Our focus on such a moderation is consistent with the contingency approaches in leadership research, which hold that the effectiveness of leadership behavior is dependent on factors within the leadership context (e.g., Van Knippenberg and Hogg, 2003, Yukl, 2010). Second, this study puts the focus back on the lower and middle levels as the primary constituencies of strategy implementation, whereas both strategic consensus and strategic leadership studies have mostly been confined to higher echelons (i.e., Bourgeois III, 1980, Dess, 1987, West Jr and Schwenk, 1996, Colbert *et al.*, 2008). Accordingly, the study responds to calls in the consensus and leadership literature to extend studies on these topics to the middle and lower echelons of the organization (Herold *et al.*, 2008, Wooldridge, Schmid and Floyd, 2008, DeChurch *et al.*, 2010, O'Reilly *et al.*, 2010). Third, we provide empirical evidence of the importance of the strategic alignment of managers with the CEO as a reason why subordinate level managers either assist or resist strategy implementation. This finding responds to the call from the strategy formulation and implementation literature to study the alignment of managers and the Top Management Teams (TMTs) (Balogun and Johnson, 2004, Raes *et al.*, 2011).



**Figure 5: The research model**

## Theoretical Background

### *Transformational Leadership and Strategic Alignment*

The interpersonal process perspective of strategy emphasizes the communication and interaction processes that take place between the actors involved in strategy implementation as essential to its success (Cannella and Monroe, 1997, Raes *et al.*, 2011). Building on this perspective, researchers have suggested that organizations should generate understanding of and commitment to organizational strategies among those who are to implement it (Hambrick and Cannella Jr, 1989, Floyd and Wooldridge, 1992, Noble, 1999). However, strategic behavior is largely voluntary and is not formally coordinated within organizations (Floyd and Lane, 2000), which leaves room for the influence of managers. Especially at the middle and lower levels, it is the managers who must communicate and clarify the underlying logic of the strategic priorities to their subordinates and interpret the strategy in the context of daily operations (Floyd and Wooldridge, 1992, Wooldridge, Schmid and Floyd, 2008).

The extent to which team members agree with and are committed to organizational strategies can be greatly affected by their manager's leadership skills (Hitt and Tyler, 1991, Wooldridge, Schmid and Floyd, 2008). Accordingly, the transformational leadership of the manager is highly relevant because transformational leaders are expected to influence their followers to transcend lower-order needs and goals for the sake of the long-term benefit of the organization, instill a sense of purpose and mission among their followers, and make them perform beyond expectations (Bass, 1985, Rafferty and Griffin, 2004).

A plethora of studies have found positive associations between transformational leadership and various individual and team-level outcomes (see Lowe, Kroeck and Sivasubramaniam, 1996, Judge and Piccolo, 2004 for meta-analyses) such as greater employee commitment to the organization (Bass and Riggio, 2006) and the leader (Kark and Shamir, 2002), increased organizational citizenship (Piccolo and Colquitt, 2006), higher employee performance (Liao and Chuang, 2007), and more effective work units (Judge and Piccolo, 2004). In strategic management context, based on the call within the strategic leadership literature to examine the processes by which leaders execute organizational strategies (Cannella and Monroe, 1997, Boal and Hooijberg, 2000), some researchers have investigated the effects of transformational leadership on strategy relevant outcomes. In particular,

Colbert *et al.* (2008) demonstrate that transformational leadership is positively related to within-team consensus regarding goal importance, which consequently is positively related to organizational performance. Herold *et al.* (2008) find that transformational leadership is positively associated with followers' commitment to change.

These studies underscore the importance of transformational leadership to managers' downward strategic roles in creating and disseminating strategic consensus and commitment within the organization. Transformational leaders are theorized to create higher levels of consensus with regard to organizational strategic priorities because they exhibit idealized influence, serve as influential role models, behave consistently with their promises and gain the trust of subordinates (Bass, 1985) and thus can more convincingly communicate their views on strategy. Furthermore, transformational leaders identify new opportunities for their teams and inspire team members with their vision of the future (Podsakoff *et al.*, 1990). Therefore, they are found to be more effective at communicating organizational goals (Berson and Avolio, 2004). As a result, the strategic priorities communicated by transformational leaders are more fully noted, understood, and remembered (Colbert *et al.*, 2008), which results in higher strategic consensus within their teams. Transformational leaders are also expected to stimulate higher levels of follower commitment to organizational strategies because these leaders articulate a vision that emphasizes the consonance of overall organizational goals with the values of their subordinates, thus leading their subordinates to regard these organizational goals as their own (Shamir, House and Arthur, 1993, Bono and Judge, 2003). Transformational leaders clarify for their subordinates how the work of the latter contributes to the achievement of the strategic vision (Bass, 1985) and establish a strong link between organizational goals and member commitment to such goals (Shamir, House and Arthur, 1993), which results in higher strategic commitment.

Despite the support for the impact of middle and lower-level managers' transformational leadership on strategy implementation, some leadership researchers have expressed skepticism regarding the positive effects of transformational leadership. Transformational leaders have been criticized for creating overdependent, passive, and obedient followers (Graham, 1991, Beyer, 1999, Yukl, 1999) and for emphasizing conformity rather than creativity, individuality, and innovation (Reave, 2005). The severity of the criticisms increases when transformational leaders primarily seek to further their self-interests regardless of the impact on long-term organizational effectiveness, abusing their power to communicate a

vision that serves their own purposes rather than that of the organization (Bass and Steidlmeier, 1999, Yukl, 1999, Kark, Shamir and Chen, 2003). A similarly skeptical approach is adopted in the strategy process literature, which questions whether the impact of middle managers on strategy implementation is indeed solely positive. It is theorized that middle and lower-level managers may have a functional and/or subunit orientation that influences their perceptions and turns their behavior toward a pursuit of goals that are suboptimal with respect to the organization's overall strategy (Kiesler and Sproull, 1982, Walsh, 1988, Markoczy, 2001).

Taking into account these concerns from the leadership and strategic management literature, we propose that the effectiveness of transformational middle and lower-level managers in strategy implementation is contingent on the alignment of the manager with the strategic priorities established by the top management. Only if these intermediary actors are aligned with the top management in terms of their strategic goals are the former likely to act as facilitators of the strategy and truly support strategy implementation (Dess, 1987, Floyd and Wooldridge, 1992, Wooldridge, Schmid and Floyd, 2008); otherwise, they will impede the implementation efforts.

We define strategic alignment as the similarity between the CEO's and an individual subordinate manager's perceptions regarding the importance of specific strategic priorities of the organization (Colbert *et al.*, 2008). Consistent with the upper echelon theory of the organization, this definition assumes that the CEO's strategic priorities represent the organization's strategic direction (Hambrick and Mason, 1984). There are several reasons why the alignment of middle and lower-level managers with the CEO will enhance the shared understanding of strategic priorities in a work unit. First, when the CEO and subordinate managers have similar perceptions about the importance of specific organizational goals, the latter are likely to receive higher levels of positive reinforcement regarding their work (Shamir, House and Arthur, 1993, Boswell, 2006) and to direct their efforts toward the endorsed goals (Herold *et al.*, 2008). Second, leaders may have higher-quality relationships with followers who share their perceptions about the importance of specific organizational goals (Vancouver and Schmitt, 1991). Moreover, research on leader-member exchange has shown that high-quality exchange relationships are positively associated with follower job satisfaction, organizational commitment, and satisfaction with the leader (Gerstner and Day, 1997). Finally, the manager's alignment with the key decision-

makers in an organization lends credibility to their decisions and signals their importance to the organization (Dooley and Fryxell, 1999, Dooley, Fryxell and Judge, 2000), which has a positive influence on organization-wide implementation efforts.

In the absence of alignment, the very same traits attributed to transformational leaders can undermine strategic consensus and commitment within the teams. Without alignment, “[transformational] leadership is likely to induce ... resistance to directives from management... Thus, [transformational] leadership represents a strong force for or against member commitment to organizational goals” (Shamir, House and Arthur, 1993: 584). Strategy implementation is then likely to be hindered by foot-dragging and interdepartmental politics (Guth and MacMillan, 1986). In such instances, subordinate managers are even able to initiate new strategic initiatives to slow down strategy implementation or to sabotage it completely (Floyd & Wooldridge, 1997). Such developments could be very costly to the organization, as even slight delays are critical, especially in highly competitive and dynamic environments (Eisenhardt and Bourgeois III, 1988). Moreover, within their teams, misaligned transformational leaders may build consensus on and commitment to strategies that are different from those that are desired by the CEO. Such efforts will contradict the strategic direction communicated by the CEO and because these mixed messages can reduce the employee’s understanding of and commitment to the strategic direction of the firm (cf., Clegg, Courpasson and Phillips, 2006). Consequently, we propose that the alignment between the subordinate manager and the TMT is likely to moderate the effect of transformational leadership on strategic consensus and commitment within the team.

*H1: The transformational leadership of the subordinate manager is positively related to within-team strategic consensus when the CEO and manager are strategically aligned and negatively related to it when they are not aligned.*

*H2: The transformational leadership of the subordinate manager is positively related to within-team strategic commitment when the CEO and manager are strategically aligned and negatively related to it when they are not aligned.*

These hypotheses challenge the dominant view of transformational leadership as universally positive. Although previous research has identified numerous moderators of the relationship between transformational leadership and outcomes, these moderators are exclusively boundary conditions that strengthen the impact of the transformational leaders

(Judge *et al.*, 2006). For example, Shamir and Howell (1999) proposed an extensive set of organizational and contextual moderators that can increase the effect of transformational leadership rather than render its influence negative. Although these earlier studies contributed greatly to our understanding of transformational leadership, they overlook the ‘double-edged sword’ characteristic of transformational leadership. Thus, in an important challenge to the current state of the science, this study investigates the potentially detrimental effect of transformational leadership in strategy implementation by focusing on the moderating role of CEO-manager strategic alignment.

### ***Strategic Consensus and Strategic Commitment***

Several researchers have called for a process view of transformational leadership (Cannella and Monroe, 1997, Yukl, 1999, Boal and Hooijberg, 2000, Hoffman *et al.*, 2011). In response to this call, we argue that transformational leaders’ creation of strategic commitment within their teams is mediated by the formation of strategic consensus in the team.

Strategic consensus, the agreement to strategic priorities among a group of individuals at the top, middle, and/or operating levels of an organization (Kellermanns *et al.*, 2005), allows those managers who are in charge of strategy implementation to act independently “but in a way that is consistent with the actions of others and consistent with the spirit of the decision” (Amason, 1996: 125). The successful execution of organizational strategies requires consensus among the parties involved in the implementation of the strategy (Floyd and Wooldridge, 1992). In addition, it is argued that to improve organizational performance, enhanced coordination and cooperation within and between units are necessary (Kellermanns *et al.*, 2005, Kellermanns *et al.*, 2011).

Commitment is another central concept in organizational research and has been found to explain several organizational outcomes, including job performance, organizational citizenship, absenteeism, and turnover (e.g., Mowday, Steers and Porter, 1979, Meyer, Becker and Vandenberghe, 2004). In the strategic management context, commitment goes beyond just a positive attitude toward a strategy; it includes the employee’s intention to support the strategy and his/her willingness to work toward the successful implementation of the strategy (Herold *et al.*, 2008). Consequently, we consider strategic commitment as a group-level construct following Dess’ (1987) initial conceptualization: it is the shared level of

commitment of a team to organizational strategies. It represents shared voluntary effort, cooperation and support for the strategy within the team. This conceptualization is also consistent with Korsgaard and colleagues' (1995) definition of strategic commitment as the extent to which team members accept strategic decisions and intend to cooperate in carrying it out.

The literature presents several clues about the link between consensus and commitment. During consensus formation, managers must confront the concerns and issues voiced by their subordinates regarding the strategic decisions in question (Priem, 1990), and they must also resolve these issues effectively. Dooley and Fryxell (1999) found that decision-making teams that effectively resolved disagreements during the decision-making process developed higher levels of commitment to the decision. Moreover, the agreement that the best decision had been made also restores the confidence of the team members in the efficacy of the decision, thus further increasing commitment to the decision (Riggs and Knight, 1994). Consensus leads to commitment by increasing the belief that individual efforts will lead to implementation success (Riggs and Knight, 1994, Dooley and Fryxell, 1999).

Transformational leaders are proposed to encourage team members to work cohesively toward successful strategy implementation (Marks, Mathieu and Zaccaro, 2001). They can bridge organizational strategies and team members' efforts to implement these strategies by effectively communicating about the strategies to team members and creating a shared mental model among them. Given these findings and the preceding hypotheses, we propose that transformational leadership is positively associated with strategic commitment partly because of its relationship to strategic consensus. The process of generating consensus, in which transformational leaders effectively solve disagreements within the team, generates commitment to the chosen strategies. Therefore, we propose that strategic consensus within a team mediates the relationship between the transformational leadership of the manager and the strategic commitment of his/her subordinates.

*H3: Within-team strategic consensus mediates the relationship between transformational leadership and the strategic commitment of the team.*

## Methods

### *Participants and Procedures*

Our study population is a large Western European service organization that specializes in providing energy to households. Data were collected through an organization-wide employee survey. The executive board of the company was willing to participate in this research to obtain feedback about leadership, consensus and commitment across organizational units.

Before conducting the survey, we identified the work teams in the organization using the information about manager-subordinate relationships in the company's human resource databases. Through several interviews with company representatives, we verified that these work teams actually "(a) are composed of two or more individuals, (b) exist to perform organizationally relevant tasks, (c) share one or more common goals, (d) interact socially, (e) exhibit task interdependencies (i.e., workflow, goals, outcomes), (f) maintain and manage boundaries, and (g) are embedded in an organizational context that sets boundaries, constrains the team, and influences exchanges with other units in the broader entity" (Kozlowski and Bell, 2003: 334). The teams that were not consistent with this definition were omitted from the analysis. Moreover, individual employees (such as administrative assistants, secretaries, external consultants, and auditors) who have a place in the formal organizational hierarchy but are not identified by team members as members of the group (Hackman, 1987) were excluded from the teams. We identified a total of 110 work teams within the organization that ranged in size from 3 to 16 members.

We obtained responses from all 110 teams. A total of 661 responses were received from 891 employees; thus, we obtained a response rate of 74%. We discarded 6 teams that had within-group response rates lower than 50% (e.g., O'Reilly III, Caldwell and Barnett, 1989). Because consensus is a group-level construct like diversity (i.e., the opposite of diversity of opinions), when the within-group response rate is low, it becomes possible that the remaining responses do not represent the group as a whole (Allen *et al.*, 2007). The mean within-group response rate for the remaining groups was 80.42%. We also discarded 16 teams because their managers did not respond, which caused us to be unable to match the team data with manager data. These teams did not differ from the teams in the sample with

respect to any of the study variables or control variables (largest  $t$  value was 1.07,  $p > 0.1$ ). The final sample consisted of 88 work teams and 536 individuals.

Of the respondents, 79% were male, 14.2% had received secondary-level education or lower, 37.8% had followed their secondary education with vocational education, 30% had a bachelor's degree and 18.1% had a master's degree or higher. The respondents had total average work experience of 22.1 years ( $s.d. = 11.7$ ) and had worked in their current function for 5.8 years on average ( $s.d. = 7.6$ ).

## ***Measures***

### *Degree of strategic consensus*

We measured strategic consensus with regard to the organization's strategic priorities, as Kellermanns et al., (2005: 730) recommends that "...the language of strategic priorities provides a likely bridge" as the content of the consensus when managers from different organizational levels are involved. Strategic priorities are translated into operational plans and daily actions by managers (Floyd and Wooldridge, 1992), which makes them more relevant to the middle and lower levels of the organization. In our study, organizational strategic priorities were articulated by the TMT, and a list of 7 strategic priorities was communicated to us with detailed explanations. To preserve confidentiality, we only present the strategic priorities in short form: "increasing certified work processes", "improving network reliability", "innovation in business development", "optimizing organizational structure", "professional staff", "regulatory framework", and "improved safety standards".

After presenting the set of strategic priorities in our survey, we asked the respondents to rate each strategic priority with respect to the importance that they attach to it. We measured the degree of strategic consensus within a team by taking the mean of the standard deviations of the team members' scores for each strategic priority item and then multiplying the mean by -1 (Bourgeois III, 1980, Bourgeois III, 1985, West Jr and Schwenk, 1996, Colbert *et al.*, 2008). Accordingly, a high score for this variable indicates higher consensus in the team members' views regarding the strategic priorities.

### *Managers' strategic alignment with the CEO*

To measure the similarity between the CEO's perceptions about the importance of the strategic priorities and the perceptions of the subordinate managers, we calculated the

squared Euclidean distance between strategic priority ratings of the managers and the CEO. This value was then multiplied by -1 (Colbert *et al.*, 2008). Accordingly, a high score indicates a high degree of alignment between the CEO and a manager with respect to their views regarding the strategic priorities.

*Transformational leadership of the middle manager*

We conceptualized transformational leadership as a group-level variable as such a group-level variable reflects behavior occurring in the work unit that were shared or experienced by all individuals in that unit (Kozlowski and Klein, 2000). As transformational leaders were expected to direct many of their behaviors toward their entire group of followers, transformational leadership theory was originally proposed to capture effective leadership of group- and organization-level activity (Bass, 1985). In response to the calls in leadership literature (Yammarino *et al.*, 2005), recent empirical work has increasingly analyzed transformational leadership as a group-level phenomenon (e.g., Bono and Judge, 2003, Herold *et al.*, 2008, Hoffman *et al.*, 2011). Because our research is focused on the relationship of transformational leadership to shared understanding of and commitment to organizational strategies on teams, we also conceptualize transformational leadership as a group-level variable.

We used Rafferty and Griffin's (2004) 15-item measure to assess the five dimensions of transformational leadership: vision, inspirational communication, supportive leadership, intellectual stimulation, and personal recognition. The lead-in for all of the items was, "My leader..." with sample items such as "... behaves in a manner that is thoughtful of my personal needs", "... commends me when I do a better than average job" and "... has ideas that have forced me to rethink some things that I have never questioned before" (see the Appendix for the complete set of items). The respondents indicated their level of agreement with the statements on a five-point Likert scale from strongly disagree (1) to strongly agree (5).

As earlier research in transformational leadership has consistently supported a single-factor transformational leadership structure (Judge and Piccolo, 2004), we conducted a confirmatory factor analysis of our data. This analysis also revealed that a higher order transformational leadership factor explained the common variance among the five dimensions of leadership ( $\chi^2_{85} = 293.4, p < 0.001, SRMSR = 0.03, RMSEA = 0.06, NNFI =$

0.95, CFI = 0.96). Therefore, we aggregated the dimensions ( $\alpha = 0.97$ ). We obtained an aggregate leadership rating for each manager by averaging the ratings by his/her subordinates who were experiencing the same group-level phenomena, thus following past research (e.g., Bono and Judge, 2003, Herold *et al.*, 2008). The mean  $r_{wg}$  value (James, Demaree and Wolf, 1984) for the groups was .94. We also determined the intraclass correlation coefficients (ICC[1] and ICC[2]) to assess the validity of our group-level leadership construct following Bliese (2000). ICC[1] indicates the reliability of a single rating of the team mean or the statistical agreement among the team members with regard to a rated variable. ICC[2] indicates the reliability of the average across the responses of the team members. We employed a one-way analysis of variance and found that the between-group variance with regard to transformational leadership was significant ( $F_{103, 527} = 2.576, p < 0.001$ ). The ICC[1] and ICC[2] measures were 0.18 and 0.72, respectively, which suggests that much of the variance in the transformational leadership construct was due to group membership; thus, aggregation was justified.

#### *Strategic commitment*

To measure strategic commitment, we adapted 6 items from Mowday, Steers, and Porter's (1979) organizational commitment scale following Dooley *et al.* (2000) and Wooldridge and Floyd (1990). The wording of the items was changed to emphasize overall commitment to organizational strategies, as is also shown in the Appendix. The items were evaluated on a five-point Likert scale. Sample items include, "This strategy really inspires me to perform my very best at my job", "I find it difficult to put effort toward this organization's strategy (reverse)", and "For me, this is the best of all possible strategies to work toward". We obtained an aggregate strategic commitment score for each team by averaging the ratings of the team members. The mean  $r_{wg}$  value was 0.92. The significant effect of the between-group variance ( $F_{103, 527} = 1.845, p < 0.01$ ) and the ICC[1] and ICC[2] values of 0.11 and 0.64, respectively, further supported this aggregation.

We established the discriminant and convergent validity of the transformational leadership and strategic commitment constructs using confirmatory factor analysis. First, each of the transformational leadership scales was set to load on a single latent transformational leadership factor, and each of the strategic commitment items was set to load on a strategic commitment factor. The results suggest that this model fits the data well (

$\chi^2_{183} = 536.04, p < 0.001, SRMSR = 0.05, RMSEA = 0.05, CFI = 0.95$ ). The factor loading of each item was greater than 0.7 and was significant at the 0.001 level, which indicated the convergent validity of both transformational leadership and strategic commitment. Furthermore, a chi-square difference test indicated that this model was a better fit than the model in which all of the items were set to load on a single latent construct ( $\chi^2_{189} = 2356, p < 0.001, SRMSR = 0.11, RMSEA = 0.13, CFI = 0.70$ ), such that  $\Delta \chi^2_1 = 891, p < 0.001$ .

#### *Control variables*

To more powerfully test our hypotheses and rule out alternative explanations of our findings, we controlled for certain variables that may affect our dependent variables. First, we controlled for the *strategic commitment of the manager*, which is operationalized at the individual level using the measure that was employed for the strategic commitment of the team ( $\alpha = 0.78$ ); claiming that higher committed managers may exert more effort in consensus creation and may develop higher commitment on his/her team members.

We also controlled for *team size*, which is simply defined as the number of team members, taking into account that creating the same level of strategic consensus can be more difficult on larger teams than it is on smaller teams and that team size can explain some portion of the variance in the degree of consensus within a team. Moreover, because strategic awareness (Hambrick, 1981) and strategic understanding (Wooldridge and Floyd, 1990) diminish as hierarchical distance of the team from the TMT increases, establishing employee commitment to organizational strategies can be more difficult for lower-level teams than it is for higher-level teams. To rule out the effect of hierarchical distance, we controlled for *team level*, defined as the team's hierarchical distance from the top management team in the formal organizational structure. We coded the team level of the TMT as 1; thus a higher team level score indicates a lower level in the organizational hierarchy.

Two of our constructs, transformational leadership and strategic commitment, were measured using the same method, and the data were collected simultaneously. This relationship between the constructs may generate concerns regarding common method bias (Podsakoff *et al.*, 2003). However, the mediator and moderator variables were operationalized using objective fit scores that reflect a collective reality at the group or dyad level rather than a single individual's perception (Glisson and James, 2002), thus mitigating these concerns regarding common method bias. Moreover, common method bias actually makes it more

difficult to identify significant interactions; indeed, Evans (1985) found that the likelihood of obtaining significant interaction effects is reduced to the extent that a method effect is present. Accordingly, any support for interaction effects that is identified in this study will not be inflated by common method bias.

### *Analysis*

In combination, our hypotheses generate the type of moderated mediation model depicted in Figure 5 (one similar to Model D in Edwards and Lambert, 2007, and Model 4 in Preacher, Rucker and Hayes, 2007). To test this model, we run a series of multiple regression analyses. First, to test the first moderation hypothesis, strategic consensus is regressed on transformational leadership, strategic alignment and their interaction. In this model, the presence of a moderation effect is indicated by the significance of the interaction variable when the independent and moderator variables are controlled for (Baron and Kenny, 1986). Similarly, the interaction effect of transformational leadership and strategic alignment is investigated for strategic commitment.

Second, to test for mediation, we must meet four conditions: (i) the independent variable (i.e., transformational leadership) must be significantly related to the mediator (i.e., strategic consensus); (ii) the independent variable must be significantly related to the dependent variable (i.e., strategic commitment); (iii) the mediator must be related to the dependent variable; and (iv) the relationship between the independent and dependent variables must become non-significant when the mediator variable is introduced into the equation. If the relationship is reduced but remains significant when the mediator is introduced, this constitutes evidence of partial mediation (Kenny, Kashy and Bolger, 1998).

Third, we investigate the effect of the moderator on the mediator and the dependent variable by constructing bootstrapping confidence intervals (Preacher, Rucker and Hayes, 2007). This is a nonparametric approach to hypothesis testing and imposes no assumptions regarding the distributions of the variables or the sampling distribution of the statistics. We conduct Aiken and West's (1991) simple slope analysis to further probe the interaction effect.

Finally, based on the results obtained using the moderated mediation model, we extend our analysis from the degree of consensus to the content of the consensus. We conduct exploratory analyses by visualizing the content of the consensus within teams, thus

developing a deeper understanding of the interaction mechanism. Then, we statistically test our inferences.

## Results

Table 3 presents the means, standard deviations and correlations among our constructs. We observe that there are significant correlations between our constructs in the hypothesized directions. To provide a clearly interpretable interaction term, as Baron and Kenny (1986) note, the moderator variable should be uncorrelated with both the independent and the dependent variable. In Table 3, we observe that strategic alignment is not significantly correlated with transformational leadership, strategic consensus or strategic commitment.

**Table 3 : Means, standard deviations and correlations among the constructs**

Constructs	Mean	s.d.	1	2	3	4	5	6
1. Transformational leadership	3.57	0.36	<b>0.97</b>					
2. Strategic consensus of the team	-0.60	0.15	0.19*	-				
3. Manager's strategic alignment with CEO <sup>a</sup>	-4.43	0.98	0.00	0.09	-			
4. Strategic commitment of the team	3.62	0.32	0.31**	0.40**	0.10	<b>0.79</b>		
5. Manager's strategic commitment	3.99	0.48	-0.12	0.05	0.26*	0.24*	<b>0.78</b>	
6. Team size	6.06	3.62	-0.15	-0.13	-0.03	-0.12	0.06	-
7. Team level	3.90	0.99	-0.12	-0.13	-0.24*	-0.33**	-0.15	0.26**

$n = 104$ , Bold text indicates an alpha reliability coefficient. \*  $p < 0.05$ , \*\*  $p < 0.01$

<sup>a</sup>  $n=88$  because we received responses from 88 team managers.

In Table 4, we present four multiple regression models. The first two display the regression coefficients for the mediator model (with strategic consensus as the dependent variable); the last two display the regression coefficients for the dependent variable model (with strategic commitment as the dependent variable). Because the strategic consensus and strategic alignment with the CEO constructs have scales that are different from those of strategic commitment and transformational leadership (i.e., 1 to 5 Likert scales), we run the analysis on the standardized variables and report standardized regression coefficients.

**Table 4 : Multiple regression results used to test the hypothesis**

Constructs	Mediator variable model (Strategic Consensus)		Dependent variable model (Strategic Commitment)	
	Model 0	Model 1	Model 2	Model 3
Transformational leadership	0.170	0.329**	0.341**	0.234*
Strategic consensus				0.324**
Strategic alignment with CEO	0.066	-0.088	-0.015	0.013
Transformational leadership × Strategic alignment with CEO		0.369**	0.047	-0.073
<i>Control Variables</i>				
Strategic commitment of the manager	0.053	0.107	0.251*	0.217*
Team size	-0.168	-0.132	-0.006	0.037
Team level	-0.025	-0.061	-0.324*	-0.304*
R <sup>2</sup>	0.078	0.188	0.318	0.404
Adj. R <sup>2</sup>	0.022	0.127	0.267	0.351
Δ R <sup>2</sup>		10.68%		8.55%
Overall F	1.387	3.09	6.224	7.64

The entries are standardized coefficients (betas). Standard errors are given in parentheses. \*  $p < 0.05$ , \*\*  $p < 0.01$  (2-tailed)

We investigate the moderating role of strategic alignment with the CEO on the relationship between transformational leadership and strategic consensus using the mediator model (see Model 1 in Table 4). First, we run a regression analysis without the interaction term (i.e., Model 0), and observed that when we introduce the interaction term (transformational leadership × strategic alignment with CEO), the model improves significantly ( $\Delta R^2 = 10.68\%$ ,  $p < 0.001$ ). Moreover, the significant interaction term ( $\beta = 0.369$ ,  $p = 0.0024$ ) indicates that strategic alignment with the CEO moderates the relationship between transformational leadership and strategic consensus. In essence, transformational leadership has a stronger effect on strategic consensus when the manager is strategically aligned with the CEO. We also sought to clarify the conditional indirect effect for high and low alignment using the bootstrap procedure to construct bias-corrected confidence intervals based on 1000 random samples (Preacher, Rucker and Hayes, 2007). The conditional indirect effect of transformational leadership on strategic commitment was significant for both managers with low strategic alignment with the CEO ( $\beta = -0.0438$ ; 95% CI, -0.0865 to -

0.0011) and managers with high strategic alignment with the CEO ( $\beta = -0.1456$ ; 95% CI, 0.0851 to 0.2061). Thus, Hypothesis 1 is fully supported. In contrast, the interaction term was not significant when the dependent variable was strategic commitment (see Model 3 in Table 4), thus indicating that the empirical evidence to support Hypothesis 2 is lacking.

We tested the mediating role of strategic consensus in the relationship between transformational leadership and strategic commitment using the dependent variable models (see Models 2 and 3 in Table 4). As we noted in the analysis section, we checked for Kenny et al.'s (1998) four conditions for mediation. The first condition is met in Model 1 given the confirmed significant association between transformational leadership and strategic consensus. Model 2 also shows that transformational leadership is significantly related to strategic commitment ( $\beta = 0.341$ ,  $p = 0.0013$ ) (second condition). When we include the mediator (i.e., strategic consensus) in Model 3, the model improves significantly ( $\Delta R^2 = 8.55\%$ ,  $p < 0.001$ ), and it appears that strategic consensus is significantly related to strategic commitment ( $\beta = 0.324$ ,  $p = 0.0011$ ) (third condition). Finally, the effect of transformational leadership is reduced (from  $\beta = 0.341$  to  $\beta = 0.234$ ), although it remains significant ( $p = 0.0243$ ) (fourth condition). This result suggests partial mediation and provides partial support for Hypothesis 3. It appears that the effect of transformational leadership on strategic consensus is partially through the manager's efforts to generate consensus. However, that we find partial mediation only indicates that there are still other aspects of transformational leaders that explain the increased commitment of team members.

Based on the standardized regression coefficients, we interpret the size of the relative effects of the variables on the outcomes. In the mediator variable model, both the interaction ( $\beta = 0.369$ ) and transformational leadership ( $\beta = 0.329$ ) have similarly sized effects on the degree of within-group strategic consensus. Although strategic alignment with the CEO has a negative coefficient, this finding does not imply that such strategic alignment has a negative association with strategic consensus. The total effect of the interaction must be interpreted based on the coefficients of all three variables: the independent variable, the moderator and their interaction. In analyzing the commitment of the team members to the strategy, we find that the degree of consensus within the team has the greatest effect ( $\beta = 0.324$ ), followed by the transformational leadership of the manager ( $\beta = 0.234$ ).

We also notice that two control variables, the strategic commitment of the manager ( $\beta = 0.217$ ,  $p = 0.02$ ) and team level ( $\beta = -0.304$ ,  $p = 0.03$ ), are significantly related to the strategic

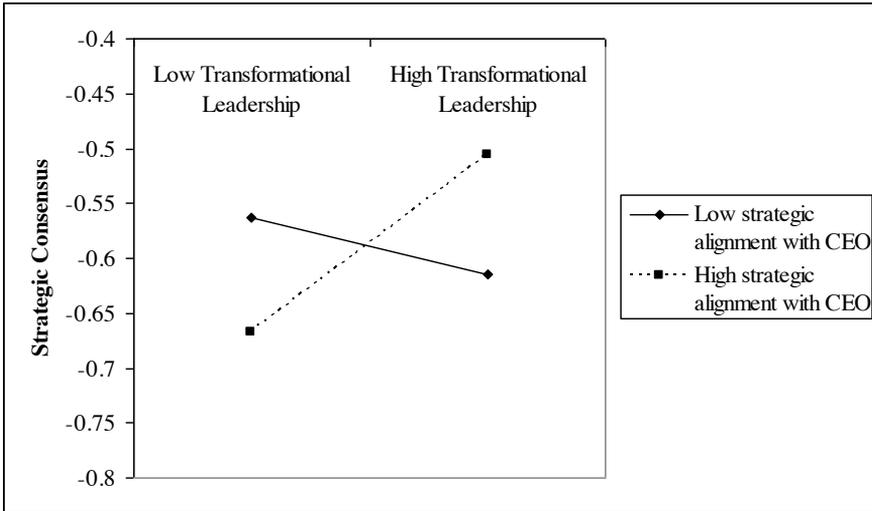
commitment of the team. This means that managers with high strategic commitment exert more effort in creating strategic commitment within their teams and that lower-level teams have lower degrees of commitment to organizational strategies.

Before proceeding further, we run two sets of complementary analysis. First, we repeated our analysis using the strategic alignment of the entire top management team with the manager instead of his/her strategic alignment with the CEO alone because this approach was perhaps more consistent with Hambrick & Mason's (1984) upper-echelons perspective. In our data set, we observed a high degree of within-group consensus within the TMT, which implies that the priorities of all of the TMT members are similar. For this reason, the manager's alignment with the TMT<sup>1</sup> was highly correlated with the manager's alignment with the CEO ( $r = .83$ ). When we run our analysis using this measure, we obtain the same results. Second, we run our analysis using alternative measures of consensus and alignment: namely, Tarakci *et al.*'s (2013)  $\alpha$ -measure for the degree of within-group consensus, and the bi-variate correlations  $r$  between the CEO and manager ratings for strategic alignment. The analysis conducted using these alternative measures produces results that are similar to the ones that were already reported, thus indicating the robustness of our results.

We further investigated the moderating effect of alignment with the CEO on the relationship between transformational leadership and strategic consensus. Figure 6 graphically depicts the interaction using the unstandardized values. Aiken and West's (1991) simple slopes analysis indicates that both slopes were significant for low ( $\beta = -0.141, p < 0.01$ ) and high ( $\beta = 0.613, p < 0.01$ ) values of the moderator at mean  $\pm$  standard deviation.

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<sup>1</sup> A manager's alignment with the TMT is operationalized similar to his/her alignment with the CEO. The squared Euclidean distances between the strategic priority ratings of the manager and the TMT were calculated. We obtained the overall view of the TMT ratings following Tarakci *et al.*(2013)'s procedure for prototypical manager analysis – that is, by sorting the object scores from the vector model of unfolding for the TMT members' rating data.



**Figure 6: The relationship between transformational leadership of the manager and the degree of within-team strategic consensus as a function of the manager’s strategic alignment with the CEO.**

Figure 6 shows that when there is high alignment between the CEO and the manager, the manager’s transformational leadership is positively associated with the degree of strategic consensus within the team. Transformational leaders who are aligned with the strategic views of the CEO communicate a consistent sense of their organizations’ strategic goals (Bass, 1985, Shamir, House and Arthur, 1993). As a result, followers of transformational leaders develop a common understanding of the importance of organizational strategies and thus exhibit higher levels of within-team strategic consensus (Colbert *et al.*, 2008). Another essential finding that was further confirmed by Figure 6 is that the reverse also occurs: that is, when the transformational leader is not aligned with the strategic views of the CEO, the level of strategic consensus within the team significantly diminishes. This finding is particularly important given that managers’ possible counter-efforts in the strategy implementation context have long been a crucial issue in the literature (e.g., Guth and MacMillan, 1986, Huff, Huff and Thomas, 1992, Donald and Goldsby, 2004, Meyer, 2006, Sillince and Mueller, 2007). This finding certainly warrants considerable speculation regarding why a negative relationship actually exists. To explore the mechanism through which the degree of strategic consensus is reduced on teams with highly transformational leaders who do not share the

CEO's viewpoint regarding the firm's organizational strategies, we switch our focus from the degree of consensus to the content of the consensus.

### ***Broadening the Analysis to the Content of Consensus***

Thus far, we have focused on the degree of strategic consensus within the team, yet the theory asserts that consensus is a multi-faceted concept (Wooldridge and Floyd, 1989, Markoczy, 2001, Tarakci *et al.*, 2013). A team manager can generate a high degree of strategic consensus among his/her followers, but this consensus can be very different from the orientation of the CEO. Therefore, we integrate the content dimension of consensus into our discussion as we attempt to develop a deeper understanding of the potentially detrimental influence of transformational leadership.

We conducted a median split of our teams based on their managers' transformational leadership and strategic alignment with the CEO. This split yielded four sub-groups that correspond to the four quadrants in Figure 6. To visualize the content of the consensus for each team, we then conducted a principal component analysis of the transposed data matrix (i.e., vector model of unfolding), placing the team members in columns and the strategy items in the rows. This technique yields a biplot that depicts the object scores of the strategic priorities as points and the component loadings for the respondents as vectors in the two-dimensional space. It is particularly useful as a means to visualize the multiple facets of consensus, including the content and the degree of consensus within and between groups (Tarakci *et al.*, 2013).

The reader may refer to Tarakci *et al.* (2013) for further methodological details, although a number of features of the technique are noteworthy and affect the interpretation of the resulting biplot. First, if two vectors (i.e., two team members) are close to each other, their proximity indicates that they hold similar views regarding the prioritization of organizational strategies. Second, the spread of all of the vectors (i.e., all of the team members) represents the degree of strategic consensus within the team. Third, the orthogonal projection of a point (i.e., a strategic priority) onto a vector (i.e., a team member) indicates the rating of that particular strategic priority by that team member such that the longer projections in the positive direction represent higher prioritization.

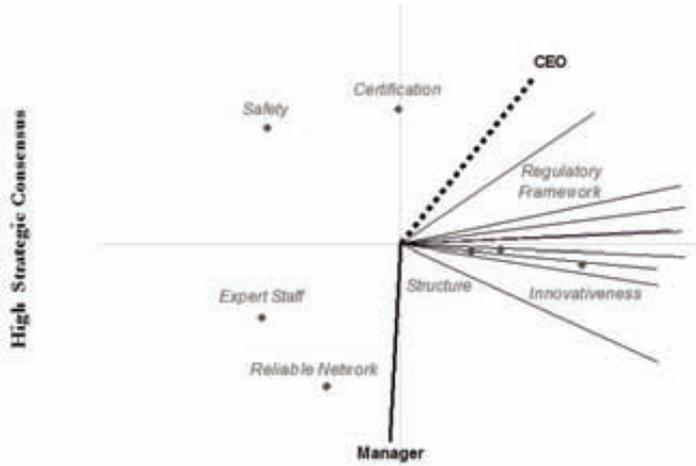
Using this technique, we visualize the content of the consensus for all of the teams in the four subgroups. In addition to analyzing the team members, we also include the responses of the team manager and the CEO in the analysis of each group to determine the positions of the team members with respect to these two influential actors and to observe the strategic alignment between them. Although each team has a unique biplot, we observe similar patterns within the subgroups. For illustrative purposes, we chose four teams, one from each subgroup, for depiction in Figure 7.

In Panels (b) and (c) of Figure 7, the vectors that represent the CEO and the manager are close to each other, which indicates the high degree of strategic alignment between them. The ideal case for successful strategy implementation seems to be that depicted in Panel (b), in which the highly transformational manager who shares the views of the CEO developed consensus among his/her followers regarding the desired content, ensuring that all of the relevant actors are focused on the same goals. The spread of the team members' vectors is very narrow, suggesting a high degree of consensus. In Panel (c), in contrast, although the manager shares the views of the CEO, he/she, as a manager who exhibits low levels of transformational leadership, fails to create consensus among his/her team members regarding the desired content. The manager's and team members' prioritizations are almost orthogonal, and there is a wider spread among the team members' vectors, which indicates a lower degree of consensus.

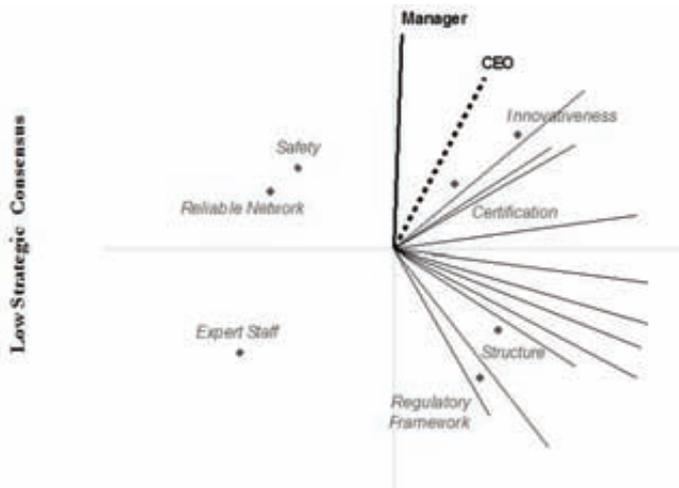
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 Low Transformational Leadership
 

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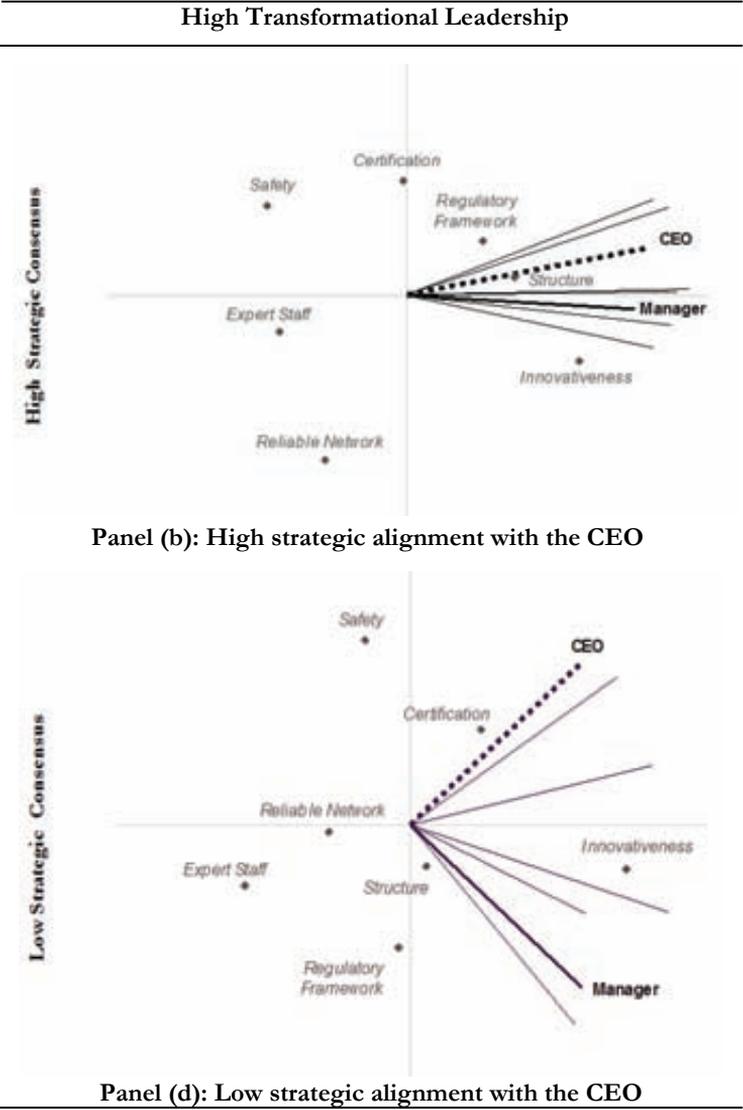
Panel (a): Low strategic alignment with the CEO



Panel (c): High strategic alignment with the CEO

**Figure 7.a: A sample of four teams where the content of strategic consensus is visualized through a biplot of a PCA on the transposed data matrix**

Vectors represent team members, and points represent strategic priorities. An orthogonal projection of a point onto a vector indicates the rating of that particular strategic priority by that team member such that the longer projections in the positive direction represent higher importance. If two vectors are close to each other, those two team members share a similar view. The spread of all of the vectors represents the degree of strategic consensus within the team.



**Figure 7.b.:** A sample of four teams where the content of strategic consensus is visualized through a biplot of a PCA on the transposed data matrix

In Panels (a) and (d) of Figure 7, the vectors representing the CEO and the manager are far from each other, indicating a low level of strategic alignment between them. In Panel (a), the manager is not a highly transformational manager; thus, again, his/her prioritizations are incongruent with those of his/her team members. The team members seem to resemble

neither the CEO nor their manager in this case. In Panel (d), the team members exhibit segmentation with regard to their views; most of them are closer to their highly transformational manager, yet some of them hold opinions that are more similar to those of the CEO.

Overall, this exploratory analysis helps us to make important inferences. First, a high degree of consensus does not necessarily indicate that the consensus is on the right content in the desired direction (i.e., Panel a, c). A high degree of consensus regarding the wrong content is not likely to improve strategy implementation. Second, transformational leaders actually seem to be more influential in communicating organizational goals, as the team member vectors are closer to those of the transformational leaders (i.e., Panel d).

To empirically test our second inference, we first calculate the difference between team members' average distance from the CEO and their average distance from their manager for each team. A positive difference signifies that the team members are closer to their manager on average in their strategic views. We operationalized the average distance of the team members' views from those of the CEO (and those of their manager) by using the average Euclidean distance of the team members' ratings from those of the CEO and the team manager. We then regressed this difference on transformational leadership, strategic alignment with the CEO and their interaction and found that the transformational leadership construct had a significant effect ( $\beta = 0.25$ ,  $p < 0.05$ ). Thus, based on this analysis, we conclude that transformational managers are more influential in convincing their followers to believe in the importance of the strategic priorities that they communicate, even when these priorities are different from the priorities communicated by the organization.

## Discussion

Our study adds to the body of strategy process research that investigates the strategic roles of middle and lower-level managers in strategy implementation and the body of leadership research that investigates the contingency factors that affect effective leadership behavior. We make a unique contribution to both literatures by examining managers' alignment with the CEO as a contingency that can reverse the positive association between transformational leadership and effective strategy execution.

Based on in-depth analyses, we provide empirical evidence that managers' transformational leadership can enhance or hamper the level of strategic consensus within their teams and, consequently, can either increase or decrease the level of strategic commitment of their teams. The most intriguing finding of our research is that a highly transformational manager who does not share the CEO's views on strategy can generate a lower level of shared understanding of organizational strategies among his/her team members by creating an opinion faultline within the team; some team members will hold views that are similar to those of the manager, and others will hold views that are similar to those of the CEO, as depicted in Panel (d) of Figure 7. This finding is consistent with polyphony theory, which addresses 'the presence of competing and conflicting voices' (Clegg, Courpasson and Phillips, 2006: 150). As in Milgram's (1974) experiments, the plurality of leaders with opposing views (i.e., the manager and the CEO) may have reduced the legitimacy of both leaders' commands (i.e., their views of and instructions regarding organizational strategies) and may have given their followers subjects (i.e., the team members) pause in reflecting on their decisions. Similarly, Hofmann et al., (2011) argue that if the managers' and CEOs organizational values are inconsistent, the resulting mixed messages can leave team members confused, which in our case yields a lower level of commitment to organizational strategies.

In contrast, we did not find evidence of the predicted moderating effect of strategic alignment on the relationship between transformational leadership and strategic commitment (Hypothesis 2), and this finding requires clarification. The analyses reveal that transformational leaders generate higher levels of team-level commitment to organizational strategic priorities regardless of whether they are strategically aligned with the top management than do non-transformational leaders. Accordingly, it can be inferred that transformational leaders who do not share the strategic priorities of the top management will not acquiesce to the latter and will instead create higher levels of commitment to their own strategic priorities. Supporting this inference, our subsequent analysis indicated that highly transformational managers who are not strategically aligned influence their team members in such a way that the strategic views of the latter become closer to those of the manager rather than the CEO. These findings support the skeptical approach to transformational leadership, which has already criticized transformational leadership for promoting follower dependence, submission, and obedience (Shamir, 1991; Turner, 1993) and then allowing subordinates to

be manipulated for personal gain (Conger, 1990; Conger & Kanungo, 1998; Sankowsky, 1995). Yukl (1999) argues that team members' over-identification with their leader may generate greater loyalty to the leader and encourage the followers to act in the service of the leader's vision, which in our case entails a commitment to the leaders' strategic priorities. The potential negative influence of middle and lower-level managers on organizational strategies has also been echoed in strategy process research. It is found that managers generate self-serving interpretations of organizational strategy, which may lead to destructive interventions (Meyer, 2006), opportunism and linguistic influencing of strategic initiatives (Sillince and Mueller, 2007), and foot-dragging or even sabotage the strategy implementation (Guth and MacMillan, 1986). In summary, the low consensus and high commitment that results when the alignment of a transformational subordinate manager is low may indicate a hindrance against organizational strategies.

Additionally, our findings underscore the importance of transformational leadership to the creation of strategic consensus and commitment. The results demonstrate that managers who are rated higher with regard to transformational leadership are more efficient in creating strategic consensus and commitment to organizational strategies not only at the higher echelons, as often emphasized by previous studies (e.g., Colbert *et al.*, 2008), but also at other organizational levels. Moreover, the positive relationship between strategic consensus and strategic commitment, which was previously shown to hold solely for decision-making teams (Dooley *et al.*, 2000), is also supported for teams that do not make strategic decisions but simply are expected to comply with them and act accordingly. Thus, the present study provides further insight into how managers' transformational leadership can help them to fulfill their downward strategic roles in strategy execution as defined by Floyd and Wooldridge (1992).

Our supplementary findings regarding the control variables also reveal essential points for discussion. First, the commitment of a manager to organizational strategies is a highly influential factor in team members' support of organizational strategies. This finding reconfirms the importance of generating manager commitment in the first place (Burgelman, 1983, Wooldridge and Floyd, 1990). Second, we find that lower-level teams exhibit lower levels of commitment to organizational strategies. This finding is similar to that of Hambrick (1981), who reports that strategic awareness decreases with organizational levels, and to that

of Wooldridge and Floyd (1990), who find that strategic understanding decreases at the lower levels of organizations.

### ***Managerial Implications***

Overall, our empirical findings offer a set of compelling implications for managers and organizations. First, subordinate managers must commit to organizational strategies to facilitate swift and smooth implementation. Mintzberg (1975) notes that as the immediate manager is the primary source of organizationally relevant information for his/her team members, the top management team should ensure alignment at the various managerial levels and prevent managers from negatively influencing followers by communicating messages that differ from those of the organization. Although dissent is argued to be necessary for high-quality strategic decisions (Priem, 1990), opposing opinions regarding organizational strategies should be voiced upwards by subordinate managers. Communicating opposing views to subordinate team members may engender skepticism and may thus damage the subordinates' commitment to organizational strategies and adversely affect their strategy-related performance.

Moreover, alignment is a reciprocal process. The alignment of subordinate managers also ensures that through effective communication and integrative bargaining, they will be able to make their viewpoints known to the TMT (Raes *et al.*, 2011). Managers do not only obey; rather, they also play upward strategic roles that involve sense-making, synthesizing information and championing alternative strategies (Floyd and Wooldridge, 1992). These actions, in return, will enhance the quality of the strategy formation process. Unless upward communication channels are healthy and the higher levels of management remain open to the input of subordinate managers, thus ensuring the involvement and potential influence of the latter on the strategy formation process, transformational subordinate managers may engage in efforts to oppose the organizational strategy. In summary, we suggest that top management bring subordinate managers 'on board' before the subordinate managers get their team members on board.

Second, when strategic consensus is generated among middle and operational teams that are actually in charge of putting a strategy into practice, they are more likely to understand one another's perspectives, to communicate more succinctly, to coordinate their efforts more

effectively, and to improve overall team performance (Cannon-Bowers, Salas and Converse, 2001). Therefore, the need for followers to form a consensus regarding organization strategies should explicitly be communicated to subordinate managers as a strategic role; they should be encouraged to internalize such efforts as a form of in-role behavior.

Finally, the positive effects of alignment are indeed stronger when the manager is a transformational leader who effectively communicates organizational strategies to team members and encourages them to work cohesively towards strategic goals. Organizations should therefore encourage and support their managers, helping them to be transformational leaders by providing the necessary training and other resources while also ensuring their alignment with and commitment to organizational strategies.

### ***Limitations and Future Research***

We recognize the strengths and limitations of our study. First, the cross-sectional nature of our data does not allow us to draw conclusions regarding causality, although we grounded the proposed causal links in transformational leadership theory and previous empirical findings from strategy process research. Second, we obtained a high response rate from all of our teams at all levels of the organization; however the entire sample comes from a single organization, which needs to be considered when generalizing the results. Finally, because we show that the effect of transformational leadership on strategic commitment is only partially mediated by strategic consensus, we have gathered that there are also other aspects of transformational leadership that ensure follower commitment to organizational strategies. Future research should investigate these other factors, possibly considering leader-member exchange theory in further analyzing the process of aligning employees with organizational strategies.

### **Conclusion**

This study demonstrated the strategic influence that transformational middle and lower-level managers exert on their subordinates by promoting strategic consensus and commitment to organizational strategies. Our findings highlighted not only the advantages of transformational leadership but also its hitherto neglected detrimental effects – the ‘dark side’

of transformational leadership in strategy implementation. We found that transformational managers achieve greater consensus and commitment within their teams if the managers are aligned with the CEO. However, when the CEO and the transformational manager do not have a shared understanding of the organizational strategies, the level of consensus (and, therefore, commitment within the group) deteriorates. The present study has important theoretical and managerial implications for the strategy implementation and leadership literature, identifying new contingencies, and underscoring the need to ensure that transformational managers are 'on board' in the strategy process.

## Appendix

### *Transformational Leadership Scale Items*

My leader...

1. Has a clear understanding of where we are going.
2. Has a clear sense of where he/she wants our unit to be in 5 years.
3. Has no idea where the organization is going (reverse).
4. Says things that make employees proud to be a part of this organization.
5. Says positive things about the work unit.
6. Encourages people to see changing environments as situations full of opportunities.
7. Challenges me to think about old problems in new ways.
8. Has ideas that have forced me to rethink some things that I have never questioned before.
9. Has challenged me to rethink some of my basic assumptions about my work.
10. Considers my personal feelings before acting.
11. Behaves in a manner which is thoughtful of my personal needs.
12. Sees that the interests of employees are given due consideration.
13. Commends me when I do a better than average job.
14. Acknowledges improvement in my quality of work.
15. Personally compliments me when I do outstanding work.

### *Strategic Commitment Scale Items*

Respondents indicated the extent they agree on these statements, after they see the strategic means (i.e. the strategy in the following questions) and rate their importance.

1. I am willing to put in a great deal of effort beyond that normally expected in order to help the strategy be successful.
2. This strategy really inspires the very best in me in the way of job performance.
3. Often I find it difficult to agree with this organization's strategy to put effort towards it (reverse).
4. I really care about the fate of this organization's strategy.
5. I find that my values and the strategic values are very similar.
6. For me, this is the best of all possible strategies to work on.



## Chapter 4

# A JUSTICE-POWER PERSPECTIVE ON MIDDLE MANAGERS' STRATEGY INVOLVEMENT

### Introduction

Successful strategy implementation requires not only higher echelons' but also middle managers' alignment with and commitment to organizational strategy (Dess and Origer, 1987, Floyd and Wooldridge, 1992, Wooldridge, Schmid and Floyd, 2008). Due to their intermediate position in the organization, middle managers play key roles in the strategy process by bridging together otherwise disconnected layers in the organization (Raes et al., 2011). This gives them a unique perspective on the causal ambiguities surrounding the relationships between organizational capabilities and performance (King and Zeithaml, 2001) and helps them translate the strategic direction into action. They integrate their subordinates' efforts around organizational strategy and encourage them to engage in initiative development to foster strategy formation (Floyd and Wooldridge, 1992). In the previous chapter, we empirically show that the managers' alignment with upper echelons and their commitment to the organizational strategies are significantly associated with their subordinates' consensus on and commitment to organizational strategies. Middle managers' alignment with the strategy ensures mutual and cooperative action necessary in the strategy implementation phase, whereas their misalignment leads to ineffective execution due to divergent understandings and interests (Guth and Mc Millan, 1986). Similarly unless middle managers believe in and are committed to organizational strategy, they are unlikely to support strategy implementation (Floyd and Wooldridge, 1992). Therefore organizations must get middle managers on board for putting strategy into action successfully.

How can organizations ensure middle managers' commitment and alignment? Involving middle managers in strategy formation has long been seen as essential factor to this end. Strategic involvement not only (i) increases shared understanding of strategies (i.e. strategic consensus) among middle managers which engenders swift and smooth execution of strategies at the strategy implementation phase (Wooldridge and Floyd, 1989; Wooldridge and Floyd, 1990), but also (ii) improves strategic decision making (e.g. increased rationality) which leads to superior and higher quality strategies (e.g. more adaptive strategies) at the strategy formation phase (Mintzberg and Waters, 1985, Wooldridge and Floyd, 1990, Burgelman, 1991, Dutton and Ashford, 1993). Nevertheless, later research also delineates the negative aspects of involvement: increased degree and scope of involvement (i) may lead to increased politics and more imposed constraints in strategy development which waste resources and undermine effective strategic decisions at the strategy formation phase (Salancik and Pfeffer, 1974, Eisenhardt and Bourgeois III, 1988, Collier, Fishwick and Floyd, 2004), and (ii) gives middle managers a chance to foresee the potential effects of unfavorable strategic decisions to self- or subunit-interest, thereby, provoking them to engage in self-serving interpretations of strategy, foot-dragging or even sabotaging the strategy at the strategy implementation phase (Guth and MacMillan, 1986). Reconciling these positive and negative sides, Ahearne, Lam and Kraus (2013) recently reported a curvilinear relationship between middle managers' strategy involvement and performance which reflects a control-flexibility paradox. The benefits of involvement by allowing for strategic flexibility are only up to a certain threshold; after this threshold, problems due to a lack of strategic control outweigh the benefits (Ahearne, Lam and Kraus, 2013).

In this research, we shed light on the psychological underpinnings of the control-flexibility paradox by uncovering how and when strategic involvement exerts influence of key strategy implementation variables (i.e., strategic alignment and strategic commitment). We propose a power-justice perspective to explain the mechanism and the contingency relationships in this process. By drawing from the literature on middle managers, organizational justice and intra-organizational power, we first posit that the positive effect of involvement occurs through the enhanced procedural fairness perceptions of strategy making. Second, we propose a distinction in the impact of involvement between hierarchical levels due to intra-organizational power differences. We test this framework using data from three organizations in two replication studies, which include 128 and 356 middle managers,

respectively. Complementing our framework, we explore the multi-level determinants of procedural justice of strategy making.

The contribution of this study is three-fold. First, we empirically demonstrate that the impact of middle managers' strategy involvement on key strategy process variables is through managers' procedural justice perceptions of strategy formation. This responds the call for research from Kellermanns et al. (2005, p.732) who praise the essence of middle managers' fairness perceptions for shared understanding of and voluntary cooperation with the organizational strategy. Second, we enrich the existing understanding of strategic involvement by shedding light on the differences among managers at different hierarchical levels. Positive effects of involvement through enhanced fairness perceptions are more influential at lower organizational levels, probably due to its symbolic meaning (i.e. the higher appreciation for feelings of being intellectually valued and respected) (Kim and Mauborgne, 1998), as higher echelon managers' value is already ensured by their formal rank and their roles encompassing strategic responsibility. This responds the call for behavioral strategy research (Powell, Lovallo and Fox, 2011) to advance strategic management field by using more realistic assumptions grounded on psychology and organizational behavior. Third, our multi-level examination identified the consistency of involvement among peers as an important determinant of middle managers' fairness perceptions regarding the strategy formation. This finding contributes to the research advocating the importance of team contexts for justice perceptions (Naumann and Bennett, 2000, Colquitt, 2004). Moreover our justice conceptualization contributes to the burgeoning research on multi-foci multi-target justice perspective (Rupp, Bashshur and Liao, 2007, Rupp, 2011) by introducing and validating another focus (i.e., organizational strategy making process) and target (i.e., middle managers) combination.

### **Strategic Involvement of Middle Managers**

Organizational strategies do not translate into high organizational performance, unless they are successfully implemented (Noble, 1999). Middle managers are particularly essential for strategy implementation, which has been evidenced by more than two decades of theoretical and empirical work (e.g., Burgelman, 1983, Floyd and Wooldridge, 1992, Dutton *et al.*, 1997, Floyd and Wooldridge, 1997, Huy, 2001, Pappas and Wooldridge, 2007, Wooldridge, Schmid

and Floyd, 2008). There are several reasons why middle managers have attracted such research attention. First, since organizational strategies are not articulated in great detail, middle managers are the ones who translate those broad objectives into congruent short-term operational plans (Hrebiniak and Joyce, 1984) and ensure alignment of organizational action with top management's intentions (Currie and Procter, 2005). Second, they provide adaptability and flexibility to organizational strategies, since organizational strategies are likely to be modified to incorporate new information as it presents itself (Quinn, 1980). Third, middle managers' mediating role between operational reality and executive management's vision (Nonaka, 1994) is intensified when they synthesize and channel up valuable task-relevant knowledge to top management –which would otherwise be unknown– and present them new strategic alternatives (Wooldridge and Floyd, 1990). Thereby, middle managers also shape TMT's strategic thinking on allocation of limited attention and resources (Dutton and Ashford, 1993) and contribute to generation of high quality strategies (Floyd and Lane, 2000). Consequently, middle managers are not only of primary importance for strategy's effective execution, but also their involvement in strategy formation is inevitable.

Hrebiniak and Joyce (1984) grouped strategic involvement's effects on the effectiveness of strategy process into two classes of benefits: utilitarian and psychological (see also Gerbing, Hamilton and Freeman, 1994). Utilitarian benefits highlight discovery and dissemination of managers' task-relevant knowledge, whereas psychological benefits include attitudinal outcomes such as commitment, understanding and values. In line with this classification, we propose that middle managers' strategy involvement can stimulate their strategic alignment (i.e., utilitarian benefit) and strategic commitment (i.e., psychological benefit) – both outcomes are of crucial importance for successful strategy execution.

First, when managers are involved in strategy making, they get the opportunity to communicate their opinion on the strategy and to reduce the discrepancy between their view and that of higher echelons. Based on the interpersonal process perspective of strategy implementation (Floyd & Wooldridge, 1992; Hambrick & Cannella, 1989; Noble, 1999), Raes et al. (2011) suggest that the interaction between the TMT and middle managers is a mutual influencing process where both parties try to find common or complementary interests for mutual benefit rather than just one party. Therefore, as strategic involvement takes place and the viewpoints of different parties are shared, congruence emerges between the views taken into account through mutual influencing. Germane to this view, Rapert and colleagues (2002)

and Ketokivi and Castaner (2004) documented increased alignment between middle managers and top management as a result of a participatory strategic planning process. High strategic alignment between top management and middle managers is important (Balogun and Johnson, 2004, Currie and Procter, 2005, Wooldridge, Schmid and Floyd, 2008), because strategy process involves a high degree of complexity and uncertainty where traditional coordination mechanisms do not suffice, unlike the operating environments (Wooldridge et al, 2008). As a result, the benefits of mental model similarity in the form of strategic goal importance congruence are boldly pronounced in the top management-middle managers' interface (e.g., Colbert, Kristof-Brown, Bradley and Barrick, 2008). When alignment between the top and middle managers emerges and they have similar perceptions about organizational strategic goals, the middle managers as the followers are likely to receive higher levels of positive reinforcement for their work (Boswell, 2006), and are more likely to put their efforts directed toward these agreed goals (Herold *et al.*, 2008). However, in the absence of alignment, different parties will begin to follow separate lines of action which may even be contradictory with each other (Raes et al, 2011), and then implementation is to become the victim of operating inefficiencies, resistance to change, and interdepartmental politics due to divergent understandings and interests (Guth and MacMillan, 1986).

Second, strategic involvement enhances managers' commitment to organizational strategies (Guth and MacMillan, 1986, Korsgaard, Schweiger and Sapienza, 1995). When managers are involved, besides getting informed about the strategy, they also get a chance to contribute to the shaping of it. As a result, they feel more attached to organizational strategy and develop a sense of ownership which builds their commitment to organizational strategy (Floyd and Wooldridge, 1997). In a case study, Vilà and Canales (2008) demonstrated that active participation in strategy formation helps managers to relate to strategy and to get ready for the implementation phase. Commitment of middle managers to organizational strategy is important (Floyd and Wooldridge 2000, Balogun and Johnson 2004), because they are the linking pins between organizational strategies and daily operational activities (Nonaka, 1994). As managers' strategic commitment represents a psychological attachment to strategy, rather than just accepting it (Korsgaard, Schweiger and Sapienza, 1995), it goes beyond just a positive attitude toward organizational strategy and includes the intention to support it, as well as the willingness to work on its successful implementation (Herold *et al.*, 2008). Managers' strategic commitment ensures that the mutual and consonant choices necessary

for coordinated, cooperative effort will be made, whereas lack of commitment limits the managers' alternatives of action for effective team functioning (Guth and MacMillan, 1986). Unless middle managers are committed to and believe in their organization's strategies, they may continue to doubt whether the strategies are feasible and whether they serve the interests of the organization or of their subunit (Floyd and Wooldridge, 1992).

Despite the accumulated theoretical and empirical work praising the importance of increased scope of involvement –including the middle managers in strategy process–, some researchers adopt a skeptical approach questioning the solely positive impact of middle managers in strategy process (e.g., Guth and MacMillan, 1986, Huff, Huff and Thomas, 1992, Donald and Goldsby, 2004, Meyer, 2006, Sillince and Mueller, 2007). These scholars conceptualize middle managers' contributions to strategy as a hindrance, and theorize that middle managers may have a functional and/or subunit orientation that turns their behavior toward pursuit of goals that are suboptimal from the perspective of the organization's overall strategy. They provide empirical evidence on several forms of middle manager counter efforts against the success of strategy process. Middle managers with divergent strategic preferences and interests may be involved in (i) self-serving interpretations of the strategy which lead to destructive interventions (Meyer, 2006), (ii) opportunism and linguistic influencing of the strategic initiatives (Sillince and Mueller, 2007), (iii) harboring subordinate employees away from organizational strategies or (iv) foot-dragging to execution (Guth and MacMillan, 1986). Consequently, organizational strategy may be delayed or may become fully non-functional by the counter efforts of middle managers who do not share the organization's strategic direction. Such negative efforts may incur major costs to organizations. Dyson and Foster (1982) found that more participative systems were adjudged ineffective and that a set effectiveness variables were inversely related to strategic involvement. Moreover, Collier, Fishwick, and Floyd (2004) argued that the increased scope of strategic involvement is likely to trigger increased politics, cultural inertia and more constrained strategies which will lead to both lower quality strategic decisions and less efficient strategy implementation.

Given the importance of strategic alignment and commitment for strategy implementation, these conflicting views make delineating when strategic involvement is effective even more important. Illuminating the mechanisms and boundary conditions of strategic involvement's effect on strategic alignment and commitment will allow scholars to

develop more integrative theories, and equip practitioners to build more effective tools to utilize strategic involvement to its full extent. Drawing on social-exchange, organizational justice and intra-organizational power theories, we propose managers' fair treatment in strategy process as an intervening mechanism, and formal power in the organizational hierarchy as a boundary condition for strategic involvement's relationship with strategic commitment and alignment.

### ***A Justice-Power Perspective on Middle Managers' Strategy Involvement***

Five decades of continuous research on organizational justice has ascertained that fair treatment is central to employees, and a major determinant of their reactions to organizational decisions (Konovsky, 2000, Cropanzano *et al.*, 2001b). Early justice research predominantly focused on distributive justice, which investigates the fairness of allocations of rewards and salaries. Later research shifted the attention to procedural justice, which looks into the fairness of processes by which outcomes are determined. That is, procedural justice assesses whether means used to make decisions are fair, consistent, bias free, accurate, correctable, and ethical (Leventhal, 1980; Thibaut & Walker, 1975). When managers perceive procedures to be fair (i.e., high procedural justice), they present a more positive attitude, even when the distributive justice is low (McFarlin and Sweeney, 1992). On the contrary, when a process leading to a certain outcome is perceived to be unfair (i.e., low procedural justice), managers direct their negative reactions at the whole organization, rather than at the specific outcome in question as in the case of low distributive justice (Sweeney and McFarlin, 1993).

Inline with organizational justice theory, we claim that a way to ensure managers' alignment with and commitment to organizational strategies is to enhance (or assure) their procedural justice perceptions. Leventhal (1980) argues that the needs, values, and outlooks of all the parties affected by the allocation process should be involved in the process, therefore procedural justice sustains the goodness of the information used in the allocation process, provides opportunities to change an unfair decision, and ensures compatibility of the allocation process with fundamental moral and ethical values of the perceiver (Leventhal, 1980). The goodness of information and ability to change unfair decisions will lead to alignment of strategic views, and the compatibility with the moral and ethical values of the perceiver will bring in the commitment to strategies. Although managers may have different

views about the strategic course that the organization should pursue due to their sub-unit orientation and (self or sub-unit) interests (Wooldridge and Floyd, 1989) and those divergent strategic preferences might turn their behavior away from the organization's overall strategy (e.g. to follow suboptimal strategies) (Kiesler & Sproull, 1982; Markoczy, 2001; Walsh, 1988), such behavior depends on how the whole strategy making process is handled in the organization. Kellermans *et al.* (2005) argue that the extent managers perceive the strategy process to be fair; they are more likely to develop shared understanding and to display higher levels of commitment to organizational strategies. High procedural justice during strategy process provides that -even when the resulting organizational strategies are not favorable to all managers-, managers will comply with and commit to the strategic decisions which will bring along successful strategy implementation.

Therefore we posit that the effect of strategic involvement on manager's strategic alignment and commitment will be through the increased procedural justice perceptions of managers, as procedural justice is fostered through voice during a decision-making process and influence over the outcome (Colquitt *et al.*, 2001) and procedures that promote perceptions of fairness such as strategic involvement are likely to strengthen the team members' commitment to (Earley and Lind, 1987) and alignment with the decisions (Kellermans, et al. 2005).

*Hypothesis 1: The procedural justice of the strategy formation mediates the relationship between strategic involvement of the manager and (a) manager's strategic commitment, (b) manager's strategic alignment with the CEO.*

Previously, in an international top management team's context, Kim and Mauborgne (1991) demonstrated the positive effect of procedural justice of strategy making on subsidiary top management team members' commitment, and on their behavior of compliance with the corporate headquarter (Kim and Mauborgne, 1993). It is noteworthy that Kim and Mauborgne limited their focus on higher echelons of the organization, whereas this study expands the scope of research into middle managers within the organization who actually direct the workforce putting strategies into practice.

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### *The Role of Hierarchical Level*

Higher ranked middle managers possess more strategic responsibilities and are expected to be involved to a larger extent in the strategy making compared to their lower level counterparts. Their actions in facilitating and implementing strategy are considered as their in-role behaviors. Similarly, managers ranked higher in the organization have more resources under their control than those in lower ranks (Keltner, Gruenfeld and Anderson, 2003) and have more formal power due to their position in the organizational structure (French and Raven, 1959, Yukl and Falbe, 1991) So they can easily mobilize these resources to achieve their strategic responsibilities, even when procedural justice is low. Thereby the procedural justice perception engendered by strategic involvement is less likely to affect their commitment to and alignment with organizational strategies as they affect middle managers at lower echelons. Consequently, we contend that middle managers reactions to procedural justice vary in relation to differences in hierarchical levels.

Aquino, Tripp and Bies (2006) found that individuals who have absolute hierarchical status are less likely to act on procedural injustices. In addition to the insensitivity of higher levels to procedural justice, Begley, Lee and Hui (2006) showed that effect of procedural justice on a number of outcomes such as commitment, satisfaction, intention to quit and organizational citizenship behaviors are magnified for those at lower organizational levels. Similarly, procedural justice stemming from strategic involvement can also provide social validation, and lower ranked managers need such a validation more than higher ranked managers (Aquino, Tripp and Bies, 2006). For higher ups, social validation is formally granted due to their power stemming from their hierarchical rank. Hence, procedural justice becomes a great motivator and increases the trust of those at the lower ends of the organizational hierarchy (Aquino, Tripp and Bies, 2006, Van Dijke, De Cremer and Mayer, 2010). Procedural justice grants self-esteem and identity recognition to lower ranked managers which will significantly increase their willingness to align and commit to organizational strategies (Tyler, 1999, Begley, Lee and Hui, 2006).

All in all, we place a distinction among middle managers based on their hierarchical levels, proposing that the effect of procedural justice of strategy formation will be higher on the outcomes when the manager is positioned at a lower hierarchical level. Therefore, we posit:

*Hypothesis 2: The hierarchical level of the manager moderates the relationship*

*between procedural justice of the strategy formation perception of the manager and (a) manager's strategic commitment, (b) manager's strategic alignment with the CEO.*

## **Methods**

To test our hypotheses, we conducted two replication studies, as replications are highly suggested for “a self-correcting research reporting system” (Bettis, 2012, p.113) and yet very few replication studies take place in strategic management research (Ketchen, Boyd, Bergh, 2008). Because of the publication bias against replication studies and non–results (Bettis, 2012), it is less likely that a previously confirmed relationship will attract research attention again, and even if it is replicated, it is less likely that a non–confirmed relationship (i.e. a non–results) will get published. This makes it important to carry out replication studies within the same manuscript, and thereby also build further confidence in empirical results.

Our first study examines the managerial layers of two Dutch service organizations, while the second study focuses on the top 350 middle managers of a large service organization in the Netherlands. The second study also brings some methodological advancements to the model in the first study, such as an improved measurement of our dependent variable: commitment to organizational strategies. Moreover, the data structure in Study 2 enables us to explore the multi-level antecedents of our study variables.

## **Study 1**

### ***Data and Context***

In the first study, we focused on the managerial levels of two organizations of similar strategy making contexts. The first organization is responsible for sustaining the energy distribution network to households and the second one is an IT consulting company. Both organizations are characterized by a clear intention of the CEO to develop shared understanding of and commitment to organizational strategies among managers. Both organizations also strive to communicate and instill the TMT's vision of the overarching mission for the firm and then allowing each individual to participate in strategy development and in designing their work procedures in concert with that mission. The strategies we investigate in these companies

were planned strategies as they were clear and articulated intentions of the top management team of the organization (Minzberg and Waters, 1985). Therefore, the involvement of managers has already taken place when we collected our data. We also observed that the top management was also intended to setting up formal controls to ensure the pursuit of organizational strategies; however, no mechanisms were at place yet. The organizational strategies were determined by the TMT and got their place in formal company documents (e.g., yearly reports to company stake holders). For instance, in one of the organizations, each strategy item has a separate chapter in the company year book clarifying why this strategy is important for the company and how employees will contribute to execution of it. Hence, the strategy implementation context of the company was a commander, consensus model with an emphasis on the cultural model (Bourgeois and Brodwin, 1984).

We adopted Wooldridge et al.'s (2008) definition of middle managers which is based on functional designation: middle managers are managers who have access to top management coupled with their knowledge of operations. Unlike the structuralist views which define middle managers as below top management and above first-level supervision (e.g. Dutton and Ashford, 1993), or as having at least two management levels below them, our definition comprises general line managers, functional line managers, and project based managers as well. In line with this definition, Study 1 encompasses all managerial levels including the first-level managers too. In both organizations, we observed that the structuralist definition would have left out even some of top management team members. For instance, the human resources manager in both organizations and the finance manager in the second organization do not have any managerial levels below them. As both organizations are in service sector, the line managers fulfill middle managers' strategic roles and thereby qualify to be included in the sample<sup>2</sup>.

We conducted an online personalized survey to a total of 152 managers, and got 128 responses ( $N_1=85$ ,  $N_2=43^3$ ) corresponding to a response rate of 84.2 percent. The companies were willing to participate in this research to obtain feedback on the amount of strategic alignment among their managers and the support of the TMT lead to such a high response

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<sup>2</sup> As a robustness check, we controlled for whether a manager has at least one layer of management below him or her with a dummy variable, and observed no significant effect.

<sup>3</sup> We obtained similar results when we run our analysis only with the first company. In the second company, we observed significant correlations on the expected directions for the main effects. However due to low sample size, we did not observe any interactions when we only use the data from second company. Since both companies possess similar strategy making contexts, we decided to pool these two samples in our first study.

rate. The average age of the respondents was 47.6 (s.d. = 15.3) and 11.5 percent of the managers were female. Respondents had a total working experience of 18 years on the average (s.d. = 10.1). Independent samples *t*-tests revealed no difference between respondents and non-respondents with respect to their age, gender, and tenure.

### ***Measures***

We used both formative and reflective measures to operationalize our constructs. The direction of causality between the indicators and the construct is the main difference between formative and reflective constructs. The widely used reflective latent constructs cause the indicators; therefore, the reflective indicators are highly correlated with each other and are interchangeable. Conversely, formative latent constructs are caused by the indicators and can be perceived as a composite index of the defining variables (Diamantopoulos and Winklhofer, 2001). The distinction is important, as it determines the appropriate methods for data analysis and the suitable criteria for reliability and validity testing (Diamantopoulos and Winklhofer, 2001). Our constructs and rationales for their formative and reflective conceptualizations are as follows:

#### *Dependent variables*

We have two dependent variables in our model: strategic commitment and strategic alignment. For their operationalization, we refer to the specific organizational strategies of the two companies we investigated. Both organizations expressed their organizational strategy in terms of strategic priorities corresponding to strategic ends and means. The strategic ends set out what the top management wants to achieve (i.e., where to go), and strategic means set out how they want to do so (i.e., how to get there). The top management teams in each company determined 7 strategic ends and 7 strategic means for their organizations representing their organizational strategy. This set up is in line with both synoptic (rational-normative) and incremental (political) views of strategy making which distinguish strategic ends and strategic means as essential elements of the strategy (Bourgeois III, 1980).

To measure *strategic commitment*, we adapted six items from Mowday, Steers and Porter's (1979) organizational commitment scale, following Dooley *et al.* (2000) and Wooldridge and Floyd (1990). The wordings of the items were changed to reflect the overall commitment to

organizational strategies. Items are evaluated on a five point Likert scale, and sample items include “This strategy really inspires me to perform my very best at my job” and “I find it difficult to put effort towards this organization's strategy” (reverse). We referred to all strategic means and ends items as the organizational strategy when we measure managers’ commitment.

We conceptualize *strategic alignment* as the congruence of a manager’s strategic view to that of the CEO. We asked respondents to prioritize these strategic ends and means in terms of importance on a 1-5 Likert scale. For each manager, the similarity between the CEO and the manager on their views of the strategy items was calculated as the square root of the sum of the squared differences between priority ratings of the manager and the CEO (i.e. Euclidian distance), and multiplied by minus 1 (Colbert *et al.*, 2008), so that a high score indicates high degrees of similarity. We obtained two fit (congruence) indices, one for strategic ends and one for strategic means, which together form the strategic alignment of the manager with the CEO. The literature supports our formative approach to scale construction since strategic ends and means are shown to have different nomological nets (i.e., antecedents and consequences (Bourgeois III, 1980, Dess, 1987).

Our measure preserves two essential characteristics. First, it is an objective measure representing the actual fit between the managers and the CEO, rather than a perceptual subjective measure. Value congruence research describes the use of perceptions of congruence as a limitation (Herold et al., 2011). Second, our use of CEO-manager congruence in the operationalization of strategic alignment is supported by the upper echelons view, as Hambrick and Mason (1984) refer to CEO as a formal point of reference in the top management team<sup>4</sup>.

#### *Independent variables*

Our main variable of interest is *strategic involvement*. To operationalize the degree of involvement to strategy formation, we used Wooldridge and Floyd’s (1990) measure. Respondents were asked to rate on a five-point scale their involvement in five aspects of the strategic process: (1) identifying problems and proposing objectives, (2) generating options, (3) evaluating options, (4) developing details about options, and (5) taking the necessary

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<sup>4</sup> We also obtained similar results when we measure strategic alignment as the distance to the TMT’s average view instead of CEO. This result was expected as the TMT’s of both organizations held meetings where they discuss strategy items which increased similarity of importance ratings of TMT members with the CEO. Indeed we observed high degrees of within-group consensus in the top management teams of both organizations.

actions to put changes into place. The scale anchors ranged from “fully involved” to “not involved at all.” In their study, Wooldridge and Floyd (1990) did not take the average of these five items to obtain the overall level of strategic involvement, but they treated each item separately as each refer to a different form of management involvement in strategy process. Following this approach we adopt this measure as a formative scale of managerial strategic involvement, because managers at different hierarchical levels may contribute to strategic decision making process of the organization by executing different tasks. For instance, a higher echelon manager may be involved in the strategy process by proposing a new strategic objective that the whole organization shall pursue, while a lower level manager may simply develop details about a strategic option by producing operational plans about the option. Therefore, this scale comprises all possible forms of involvement and is appropriate for managers at all levels.

To measure *procedural justice perceptions* we used Colquit's (2001) 7 item procedural justice scale which are based on Thibaut and Walker's (1975) and Leventhal's (1980) procedural justice conceptualizations. Since we are interested in the procedural justice perceptions of managers particularly about the organizational strategic decision-making process, we adapted the items and refer to the strategy formation process as the focus of our measurement. Sample items included “Have those procedures been applied consistently?” and “Have you been able to appeal the outcome arrived at by those procedures?”. Previously Kim and Mauborgne's (1991) developed a procedural justice of strategy formation scale, yet it was exclusively aimed at top management teams and was context specific (i.e. referring to the procedural justice perceptions of strategy formation between the head office of a multinational organization and its subsidiaries). It was not appropriate in this study, because we do not confine our focus just to higher echelons, and we span a larger set of managerial levels. So we take a broader perspective and adapt a more fundamental measure of procedural justice in to the strategy formation context.

We measured a manager's formal *intra-organizational power* with his/her hierarchical rank following Greer et al. (2010). Hierarchical level of the manager is measured by the number of layers in the formal organizational structure between the manager and the CEO, plus one. So, the CEO's hierarchical level is coded by 1, the remaining TMT members who are direct subordinates of the CEO have a hierarchical level value of 2, and so on. A higher hierarchical

level corresponds to a lower rank in the organizational structure, as in Collier, Fishwick and Floyd (2004).

#### *Control Variables*

Social identification is an essential factor related to the attachment of employees to the organization. Research shows that commitment to organizational goals can also be an outcome of identification of the manager with the organization (Ashforth & Mael, 1989; Hogg & Terry, 2000). Therefore, we controlled for *organizational identification* of the manager. We used Mael and Tetrick's (2008) scale to operationalize organizational identification where sample items include "When I talk about this organization I usually say we rather than they" and "When someone praises this organization, it feels like a personal compliment". As managers' demographic characteristics can shape their perceptions leading to alignment with and commitment to organizational strategies, we also controlled for managers' *educational level*, *tenure*, and *gender*. Gender is coded zero for male, and one for female managers. As many managers already hold bachelor degrees, we coded educational level as a dummy variable where zero represents a bachelor's degree or lower, and one represents a master's degree and higher. 35 % of managers hold masters degree or higher.

#### *Analysis*

We test our hypothesis by employing Partial least squares (PLS) structural equation modeling with SmartPLS software (Ringle, Wende and Will, 2005). PLS analysis is a structural equation modeling technique that enables the simultaneous analysis of theory and measures (Fornell and Bookstein, 1982; Hulland, 1999). Using both formative and reflective constructs in covariance-based structural equation modeling techniques could lead to identification problems, inadmissible solutions and factor indeterminacy (Fornell and Bookstein, 1982). Gruber *et al.* (2010) indicate overcoming such problems may involve altering the original model in terms of substantive meaning and model parsimony. PLS method offers a reasonably straightforward way of testing complex theoretical structures and can accommodate models that combine formative and reflective constructs (Chin, 1998). Moreover PLS places minimum requirements on measurement levels, does not require multivariate normal data and is more suitable for small samples (Chin, 1998). PLS also qualifies to be appropriate for models with complex relationships (Fornell and Bookstein,

1982), such as the combination of mediating and moderating effects. For all these reasons, PLS is better suited for our study.

### ***Measurement Validation***

The reliability and validity of the measurement model is assessed following the procedures recommended by Chin (1998) and Hulland (1999). For reflective constructs, item reliability is ensured when items load on their respective constructs with loadings greater than 0.7 (Hulland, 1999). One indicator from each reflective construct (i.e. procedural justice, strategic commitment and organizational identification) with a loading of less than 0.7 is eliminated to ensure item reliability. We examined convergent validity of the scales by means of Cronbach's alpha, composite reliability, and average variance extracted (AVE). AVE is the ratio of the amount of variance of its indicators captured by the construct relative to the total amount of variance, including the variance due to measurement error. As a general rule a ratio of less than 0.50 is judged inappropriate as more variance is due to random error (Fornell and Larcker, 1981). Composite reliability, like Cronbach's alpha, is a measure of construct reliability, but it is not influenced by the number of items of the scales and uses item loadings extracted from the causal model (Fornell and Larcker, 1981). The subsequent calculation of Cronbach's alpha, composite reliability, and average variance extracted (AVE) also indicated satisfactory reliability on the construct level (see Table 5), using conventional threshold criteria of 0.7 for Cronbach's alpha, 0.7 for composite reliability, and 0.5 for AVE (Bagozzi and Yi, 1988; Fornell and Larcker, 1981; Nunnally, 1978).

**Table 5 : Validity checks for the reflective constructs**

<b>Items</b>	<b>Mean</b>	<b>s.d</b>	<b>Item loading</b>	<b>Cronbach's alpha</b>	<b>Composite Reliability</b>	<b>AVE</b>
<b>Procedural Justice</b>				0.92	0.89	0.64
Item 1	3.07	1.31	0.86			
Item 2	2.7	1.31	0.83			
Item 3	2.79	1.07	0.75			
Item 4 <sup>a</sup>	3.3	0.92	-			
Item 5	3.22	0.93	0.85			
Item 6	2.91	1.3	0.83			
Item 7	3.67	0.95	0.72			
<b>Strategic Commitment</b>				0.89	0.89	0.63
Item 1	4.03	0.82	0.73			
Item 2	3.62	0.77	0.85			
Item 3 <sup>a</sup>	4.21	0.91	-			
Item 4	4.16	0.74	0.75			
Item 5	3.93	0.72	0.75			
Item 6	3.57	0.78	0.85			
<b>Organizational Identification</b>				0.85	0.78	0.53
Item 1 <sup>a</sup>	3.38	1.00	-			
Item 2	4.13	0.65	0.72			
Item 3	4.34	0.67	0.74			
Item 4	3.90	0.79	0.76			
Item 5	4.13	0.67	0.74			
Item 6	3.93	0.83	0.68			

<sup>a</sup> Eliminated due to low loading score (< 0.7)

For the convergent validity of formative constructs, individual item reliability is irrelevant (Hulland, 1999). In this case, each indicator coefficient shows the direct structural relation between the indicator and the latent variable; the magnitudes of the coefficients can be interpreted as validity coefficients. Thus, high multicollinearity renders the assessment of indicator validity problematic and the indicator which turns out to be an almost a perfect linear combination of the others can be excluded from the index (Diamantopoulos and Winklhofer, 2001). We checked the multicollinearity of the items by calculating the variance inflation factors. We observed that the third strategic involvement item (i.e. evaluating options) is likely to contain redundant information with a VIF slightly larger than 10. Following Diamantopoulos and Winklhofer's (2001) suggestion, we eliminated that item. This elimination was also theoretically sound as that item represents the mediocre form of

involvement between higher forms of involvement and lower forms of involvement. The subsequent VIF values for all indicators were well below the threshold criterion of 10, suggesting that there is no excessive multicollinearity present in the data (see Table 6).

**Table 6 : Validity checks for the formative constructs**

<b>Items</b>	<b>Mean</b>	<b>s.d</b>	<b>Item weight</b>	<b>VIF</b>
<b>Strategic Involvement</b>				
Item1	3.24	1.31	0.19	5.53
Item2	3.08	1.37	0.31	5.95
Item3 <sup>a</sup>	2.93	1.34	-	
Item4	3.12	1.28	0.39	3.81
Item5	3.40	1.27	0.20	3.59
<b>Strategic Alignment with the CEO</b>				
Item1	-3.02	1.10	0.81	2.01
Item2	-2.50	1.04	0.25	2.01

<sup>a</sup> Eliminated due to multicollinearity

Satisfactory discriminant validity among constructs is obtained when the correlation between any two latent constructs is statistically less than the square root of AVE which implies that the variance shared between any two constructs is less than the variance shared between a construct and its indicators. In line with Fornell and Larcker (1981), Table 7 suggests satisfactory discriminant validity for the reflective constructs. Moreover, at the item level we observed that all items share more variance with their respective constructs than with any other construct in the model, indicating discriminant validity on the item level. The item cross loadings table is presented in the appendix (Table A.1). Thus, it appears that the measured constructs have good reliability and convergent and discriminant validity.

**Table 7 : Correlations and discriminant validity on the construct level**

	1	2	3	4	5	6	7	8	9	10
1. Procedural Justice	<b>0.80</b>									
2. Strategic Alignment	0.38	n.a.								
3. Strategic Commitment	0.55	0.40	<b>0.79</b>							
4. Strategic Involvement	0.58	0.34	0.54	n.a.						
5. Hierarchical Level	-0.16	-0.31	-0.16	-0.28	n.a.					
6. Organizational Identification	0.41	0.24	0.58	0.34	-0.09	<b>0.73</b>				
7. Tenure	0.30	-0.07	0.14	-0.01	0.36	0.17	n.a.			
8. Gender	-0.07	0.08	-0.07	0.10	0.05	-0.07	-0.24	n.a.		
9. Education Level	0.11	0.20	0.10	0.28	-0.38	0.06	-0.21	0.22	n.a.	
10. Organization Dummy	-0.18	0.15	-0.10	0.00	-0.57	-0.18	-0.59	-0.13	0.03	n.a.

Square-root of the AVE on diagonal, correlations of latent variables off-diagonal; n.a.: not applicable for formative constructs and single item constructs

### *Common Method Variance (CMV)*

Although we collected survey data from single informants, common method bias is less likely to be a problem for our analysis, due to these three reasons: (i) our moderator, hierarchical level, is not a perceptual measure; (ii) although the input for strategic alignment is gathered with the common method, its operationalization as an Euclidean distance prevents the bias; (iii) as Evans (1998) pointed out, the common method variance works against the discovery of interactions. CMV deflates interaction terms and as such increases the risk of type II errors (i.e. not finding it when the interaction is present) for interaction effects (Siemsen et al., 2010). Therefore, any support for our moderation hypotheses is not likely to be inflated due to common method variance. Moreover, at the research design and data collection phases, we took particular precautions for the common method bias. First, we guaranteed confidentiality and respondent anonymity to reduce the likelihood that respondents “edit their responses to be more socially desirable, lenient, [and] acquiescent” (Podsakoff et al., 2003, 888). Second, we distribute the questions pertaining to the independent and dependent variables into different parts of the survey. Such procedural remedies for controlling method biases make it difficult for the respondents to link together the various measures (Podsakoff et al., 2003). Moreover our complex mediation and moderation hypotheses make it harder

for respondents to answer “consistent with how they think the researcher wants them to respond” (Podsakoff et al., 2003, 888).

After data collection, we also conducted several post-hoc tests of the data to evaluate the extent to which CMV influences our empirical findings. We performed (i) Harman’s (1967) single factor approach, (ii) the test with unmeasured latent methods factor (Podsakoff et al., 2003; Liang et al., 2007), and (iii) the modified marker variable analysis (Rönkkö and Ylitalo, 2011). Results from Harman’s single-factor test do not suggest a severe effect of method bias (Harman, 1967), as a single unrotated principal component does not explain more than the threshold level of 50% of the variance for the indicators of procedural justice, strategic commitment, and organizational identification. The variance explained by one factor was 36.4%. Moreover an exploratory factor analysis using principal components with varimax rotation determined 3 factors where each of the indicators loaded on their intended factors.

The unmeasured latent methods factor test (Podsakoff et al., 2003) was performed following the procedure developed for PLS by Liang et al. (2007). We introduced a common method variance factor that includes all the principal constructs’ indicators and calculated the degree to which each indicator’s variance was explained by its principal construct (i.e., substantive variance) and by the common method variance factor. After controlling for the effects of an unmeasured latent method factor in our PLS model, all path loadings of the hypothesized indicators with their respective constructs remain statistically significant. The substantive variance is on average 0.65, while the average method-based variance is 0.01, as presented in Table 8. Because the ratio of method variance to substantive variance is very low and most of the method factor loadings are insignificant, this analysis also indicates that the common method is unlikely to be a critical factor for this study.

We performed the modified marker variable analysis following the approach suggested by Rönkkö and Ylitalo (2011). Marker variables are theoretically irrelevant constructs and surrogates for common method variance. Based on the examination of the item correlations of the study variables as well as the items of additional constructs that were also included in the survey, we identified 8 items which have the lowest and most consistent correlation with the indicator items of our study variables and belonged to constructs such as distributive justice, psychological safety, and personalized recognition. Since the number of marker items should be at least equal to the number of indicators in the endogenous construct with the most indicators, i.e., procedural justice (6 items), we included more items in the marker

construct (8 items). These items were then used to establish the marker variable that was added as a predictor to all endogenous latent variables in the PLS model. The results of this model indicate that the marker variable does not have a significant influence on the endogenous latent variables (largest  $t$  value was 1.363, between the marker and procedural justice) and that the results are qualitatively equal to the reported results for all hypothesized relationships.

**Table 8 : Common method variance analysis with the unmeasured latent methods factor**

<b>Item</b>	<b>Construct Loading</b>	<b>CL<sup>2</sup></b>	<b>Method-Factor Loading (MFL)</b>	<b>MFL<sup>2</sup></b>
SI.1 <sup>a</sup>	0.886	0.785	0.031	0.001
SI.2	0.946	0.895	-0.032	0.001
SI.4	0.894	0.799	-0.001	0.000
SI.5	0.893	0.797	0.002	0.000
PJ.1	1.06	0.980	-0.218	0.048
PJ.2	0.822	0.676	0.022	0.000
PJ.3	0.792	0.627	-0.049	0.002
PJ.5	0.770	0.593	0.080	0.006
PJ.6	0.873	0.762	-0.041	0.002
PJ.7	0.492	0.242	0.239	0.057
SC.1	0.799	0.638	-0.072	0.005
SC.2	0.913	0.834	-0.067	0.004
SC.4	0.868	0.753	-0.120	0.014
SC.5	0.705	0.497	0.045	0.002
SC.6	0.663	0.440	0.198	0.039
OrgID.2	0.733	0.537	-0.004	0.000
OrgID.3	0.781	0.610	-0.058	0.003
OrgID.4	0.732	0.536	0.004	0.000
OrgID.5	0.658	0.433	0.089	0.008
OrgID.6	0.750	0.563	-0.072	0.005
<b>Average</b>	0.798	0.650	-0.001	0.010

SI: Strategic Involvement, PJ: Procedural Justice, SC: Strategic Commitment, OrgID: Organizational Identification. a: to ensure interpretability of the results strategic involvement was modeled as a reflective construct when we assessed the common method bias.

Given that all three analyses indicate no common method bias, we conclude that the validity of our results is not threatened by common method bias.

**Model fit**

We employed the 'goodness-of-fit' criterion (GoF) introduced by Tenenhaus et al. (2005) to assess the global fit of our structural model. GoF is defined as the geometric mean of the average communality and average  $R^2$  for endogenous constructs. Our analysis reveals a GoF of 0.483, which exceeds the suggested cut-off value of 0.36 for large effect sizes of  $R^2$ . Hence, we conclude that our model performs well with regard to the GoF criterion.

An additional assessment of model fit in PLS analysis is Stone-Geisser test. The outcome of this test,  $Q^2$ , is a measure of the extent that the observed values are reconstructed by the model and its parameter estimates (Chin, 1988). Models with positive  $Q^2$  values are considered to have predictive relevance, and higher values indicate more predictive relevance<sup>5</sup> (Duarte and Raponzo, 2012). We performed a blindfolding procedure where we omit one case at a time, re-estimate model parameters based on the remaining cases and then predict the omitted case values. We obtained cross validated (cv) communality values which measure the capacity of the path model to estimate the indicator variables from their own latent variables score. Thus, cv communality is an indicator of the quality of the measurement model. We also obtained cv redundancy values which measure the capacity of the model to predict endogenous indicator variables using the latent variables that predict the construct. Therefore, cv redundancy is an indicator of the quality of the structural model (Tenenhaus et al., 2005). We set the omission distance to 7, as Chin (1988) indicates that a value between 5 and 10 is feasible. We provide these values at Table 9. The cv-communality values demonstrate high quality for our measurement model, and our hypothesized model indicates strong overall predictive power since all corresponding Stone-Geisser  $Q^2$  values are positive (Henseler et al., 2009).

**Table 9 : Blindfolding results: cv-communality and cv-redundancy**

	Cv-Communality	Cv-Redundancy
Procedural Justice	0.648	0.226
Strategic Alignment	0.632	0.326
Strategic Commitment	0.844	0.209
Strategic Involvement	0.794	-
Organizational Identification	0.535	-

<sup>5</sup>  $Q^2$  is calculated as follows  $1 - \sum_D SSE / \sum_D SSD$  where D is the omission distance, SSE is the sum of squares of prediction errors and SSO is the sum of squares of observations.

### Testing the Structural Model

Having established confidence in our measurement model, we tested the structural model. Table 10 shows the results of the PLS estimation and Figure 8 depicts the results on the path model. We follow Chin (1998) in estimating the coefficient of determination  $R^2$ , and the path coefficients with their respective  $t$ -statistics. A bootstrapping procedure with 1000 re-samples is used to obtain the significance of the hypothesized relationships (Tenenhaus *et al.*, 2005). To assess the stability of the parameter estimates, we utilized bootstrap samples of 250, 500, and 1000, generated from the original dataset (Nevitt and Hancock, 1998). The results were consistent across all applied samples.

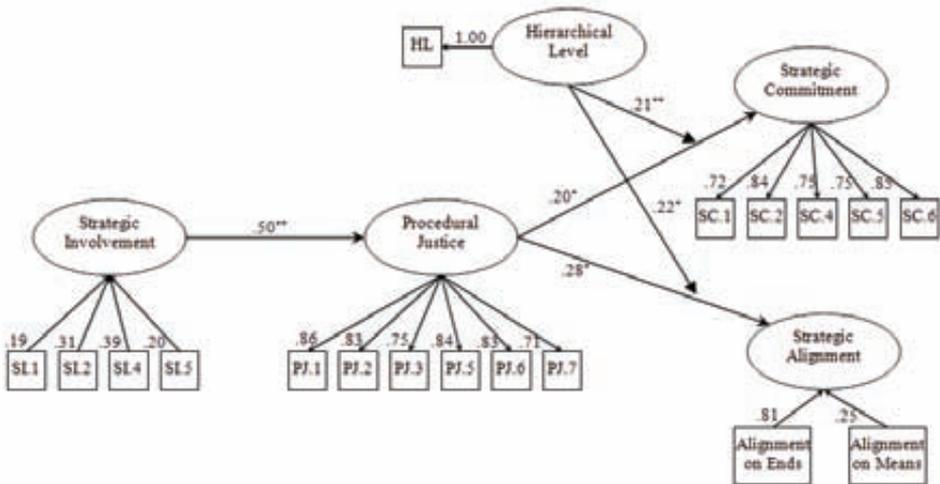


Figure 8: Results of the PLS modeling analysis

To test the mediation as indicated by Hypothesis 1, we used both Baron and Kenny's (1986) approach –as this is a widely adopted practice to test mediations–, and a bootstrapping approach checking the significance of the indirect effect (Preacher and Hayes, 2009). Baron and Kenny's approach includes testing the following steps: first the independent variable (i.e., strategic involvement) is significantly related to the mediator (i.e., procedural justice); second, the independent variable is significantly related to the dependent variable (i.e. strategic commitment/strategic alignment); third, mediator must be related to the dependent variable; fourth, the relationship between the independent and the dependent variables becomes insignificant when the mediator variable introduced into the equation. If

that relationship remains significant but is reduced in size, then it is called a partial mediation (Baron, Kashy and Bolger, 1998). However the technical literature disputes some of these steps and addresses several flaws in Baron and Kenny's intuitive approach (Zhao, Lynch, Chen, 2010). Therefore, we prefer to use the bootstrapping approach to determine the significance of the indirect effect (Preacher and Hayes, 2009). In this approach, the significance of the indirect effect is simply determined by using the standard deviation of the indirect effect calculated from the bootstrapping samples.

To test moderations in Hypothesis 2, we used product-indicator approach to create the interaction terms, following Chin, Marcolin, and Newsted (2003). We meancentered the indicators prior to multiplying them as suggested by Chin, Marcolin, and Newsted (1996). This PLS-based latent variable interaction approach is proposed to model interaction effects (Chin, Marcolin, and Newsted, 2003), as the traditional statistical techniques, such as multiple regression, may fail to accurately estimate interactions under the conditions of measurement error (McClelland and Judd, 1993).

**Table 10 : Path Estimates and Bootstrapping t-statistics**

	<b>Procedural Justice</b>	<b>Strategic Alignment</b>	<b>Strategic Commitment</b>
Strategic Involvement	0.50 (7.20**)	0.05 (0.39)	0.29 (3.75**)
Procedural Justice		0.28 (2.18*)	0.20 (2.54*)
Hierarchical Level		-0.07 (0.65)	0.03 (0.35)
Procedural Justice × Hierarchical Level		0.24 (2.15*)	0.21 (2.73**)
<i>Control Variables</i>			
Organizational Identification	0.19 (3.16**)	0.11 (1.35)	0.35 (4.06**)
Tenure	0.27 (2.99**)	0.06 (0.47)	0.03 (0.36)
Gender	-0.04 (0.51)	0.13 (1.51)	-0.04 (0.64)
Education Level	0.04 (0.63)	0.02 (0.24)	-0.07 (1.13)
Organization Dummy	0.0043 (0.05)	0.22 (1.79*)	0.02 (0.16)
$R^2$	45.4%	28.1%	54.4%

Bootstrapped t-statistics in parenthesis, \*  $p < .05$ , \*\* $p < .01$

The standardized path coefficients associated with the structural model are provided in Figure 8 and Table 10. First of all, the  $R^2$  values for the three endogenous variables (0.266 – 0.544) indicate satisfactory explanatory power for our model.  $R^2$  values of 0.28, 0.45 and 0.54

for endogenous latent variables are described as moderate to substantial (Chin, 1998, p. 323). We found empirical support that the strategic involvement positively influences procedural justice ( $\beta=0.50$ ,  $t=7.20$ ), and procedural justice positively influences strategic commitment ( $\beta=0.20$ ,  $t=3.75$ ) and strategic alignment ( $\beta=0.28$ ,  $t=2.18$ ). Recall that Hypotheses 1a and 1b posit that procedural justice mediates the relationship between strategic involvement and (a) strategic commitment, and (b) strategic alignment, respectively. We observe that all four conditions are met for our mediation hypotheses (H1a and H1b), and Table 11 suggests partial mediation for strategic commitment and full mediation for strategic alignment. The evaluation of mediation with bootstrapping was congruent with the previous finding. We obtained  $t$ -statistics of 2.56 for strategic commitment and 2.26 for strategic alignment which both suggest the significant indirect effect of involvement on outcome variables through the procedural justice.

**Table 11 : Results of mediation analysis**

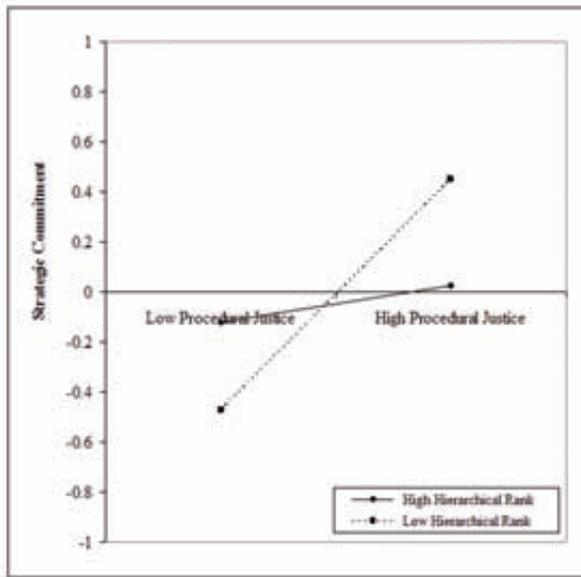
Model	Path	Strategic Commitment		Strategic Alignment	
		Path Coefficient	t-statistic	Path Coefficient	t-statistic
1. X → Y	X → Y	0.41	6.02**	0.22	2.16**
2. X → M	X → M	0.53	8.22**	0.53	8.22**
3. X, M → Y	M → Y	0.21	2.67*	0.28	2.05*
	X → Y	0.29	4.19**	0.06	0.49
4. X → M; X, M → Y	X → M	0.50	7.20**	0.50	7.20**
	M → Y	0.20	2.54*	0.28	2.18*
	X → Y	0.29	3.75**	0.05	0.39

X stands for the independent variable: strategic involvement; M stands for the mediator: procedural justice; Y stands for the dependent variable: strategic commitment and strategic alignment respectively. \*  $p < .05$ , \*\*  $p < .01$

The significant interaction terms provide support for our moderation hypotheses (*H2a* and *H2b*). The effect sizes of the interaction terms were 9% for strategic commitment and 7% for strategic alignment suggesting moderate-weak strength<sup>6</sup> (Cohen, 1998), yet the importance of even the small interaction effects is well recognized in the literature (Chin, Marcolin and Newsted, 2003). If the changes in the slope are significant, then it is important to take the moderator into account (Chin, Marcolin and Newsted, 2003). We further probe the moderation with Aiken and West's (1991) simple slope analysis on the latent variable

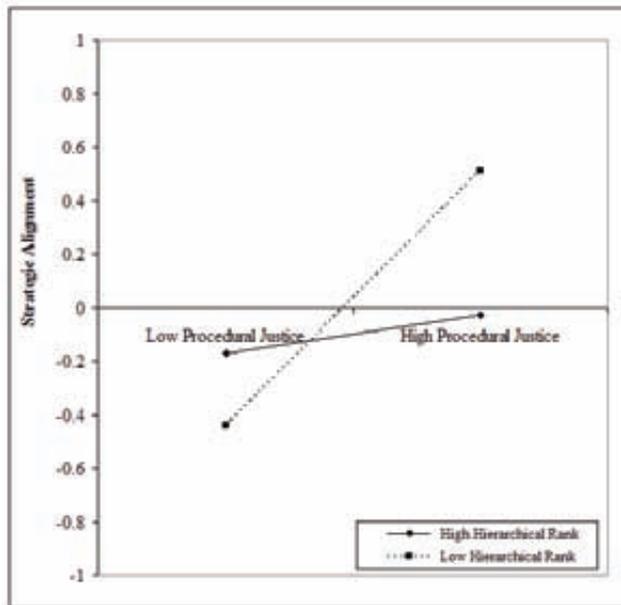
<sup>6</sup> Effect size is computed as  $f^2 = (R^2_{included} - R^2_{excluded}) / (1 - R^2_{included})$  (Henseller et al., 2009).

scores. The resulting interaction plots are depicted in Figures 9 and 10. Both figures confirm that the effect of procedural justice is lower for the higher echelon managers of the organization. When the hierarchical distance is high (i.e., when the manager is a lower level manager), procedural justice plays a more influential role in creating strategic commitment and alignment with the CEO.



**Figure 9: Interaction between procedural justice and hierarchical level on strategic commitment.**

Of the control variables, organizational identification had a positive and significant relationship with procedural justice ( $\beta=0.19$ ,  $t=3.16$ ) and strategic commitment ( $\beta=0.35$ ,  $t=4.06$ ). Tenure has a significant positive relationship with procedural justice ( $\beta=0.27$ ,  $t=2.99$ ). We observe a higher level of strategic alignment for the second organization ( $\beta=0.22$ ,  $t=1.79$ ).



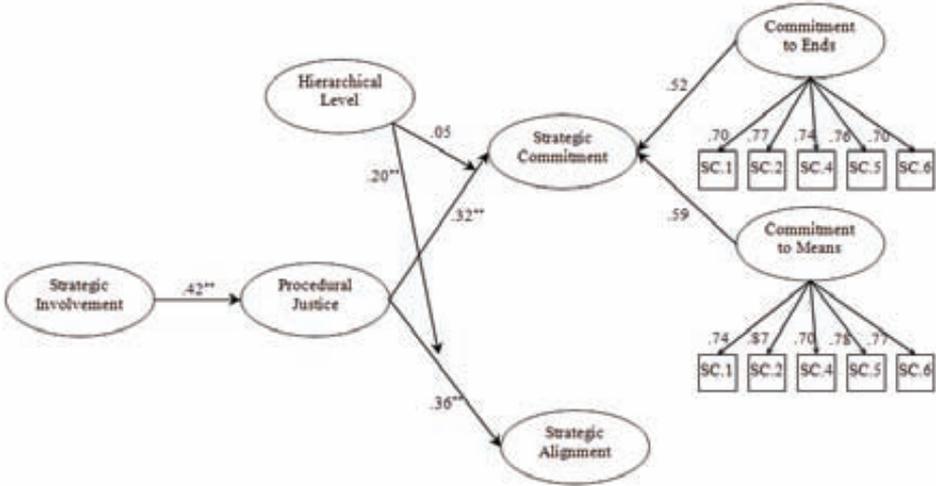
**Figure 10: Interaction between procedural justice and hierarchical level on strategic alignment with the CEO**

## Study 2

We carried out a replication study of our theoretical model. We identify three reasons to conduct a replication. First, although we ensured that both organizations in Study 1 have similar strategy processes, there might be other contextual differences. We want to rule out such differences. Second, during our interactions with company representatives we developed the insight that managers' commitment to organizational strategies may differ with respect to content (i.e., strategic means and ends). So we intend to improve our measurement model by introducing two latent constructs of commitment for ends and means that eventually form the higher order strategic commitment construct as seen in Figure 11. Third, we take into account the fact that middle managers, although they are more loosely connected compared to a lower level operational team, work in teams. There may be team level factors affecting our variables of interest. Previous setting was not appropriate to carry out such multi-level analysis. In Study 2, we also aim to explore whether there are any team level determinants of our study variables.

**Data and Context**

We collected data from a large Dutch service organization in transportation sector. We focused on the top 372 managers of the organization which constitute the senior and middle managerial levels. The target group, this time, also overlaps with the structuralist definition of middle management (i.e., managers excluding first two level supervisors). These managers were deemed appropriate for our study, since they were identified by the organization as having influence on organizational decisions and organization's strategy making process. We got response from 342 managers and left out 26 managers due to missing values which resulted in a usable sample of 316 managers. This corresponds to a response rate of 84.9%. Average age of the respondents was 46.9 (s.d = 7.48), and 16.7 percent of the managers were female. Respondents had a total working experience of 12.8 years on the average (s.d = 10.8). Independent samples t-tests revealed no difference between respondents and non-respondents with respect to their age, gender and tenure.



**Figure 11: Results of the PLS modeling analysis**

**Measurement validation**

This replication study improves upon the operationalization of strategic commitment by including separate measures for commitment to strategic ends and strategic means. These two reflective constructs form the higher order strategic commitment construct,

corresponding to Jarvis et al.'s (2003) Type II model (i.e. reflective first-order and formative second-order). We adopted a two-step approach to this model with a second order latent variable. In the first step, we assigned the indicator variables of the first order constructs also to the second order construct which produced the latent variable scores for both levels and the measurement model specifications for first order constructs. Then we reran the model with latent variable scores, because the model in the first step results in an  $R^2$  value of 1 for the second order factor, as it is perfectly explained by the very same indicators of its first order factors. This step produces the path coefficients for the structural model.

One single indicator –the very same ones as in study 1– from procedural justice, commitment to ends and commitment to means with loadings of less than 0.7 are eliminated to ensure item reliability. Two items are eliminated from organizational identification for the same reason. The Cronbach's alpha, composite reliability and AVE indicate satisfactory convergent validity (see Table A.2 in the appendix). For formative constructs, there was no indication of multicollinearity present in the data (see Table A.3 in the appendix). Table 12 demonstrates satisfactory discriminant validity. The cross loadings of items are satisfactory (see Table A.4 in the appendix). We conclude that the measured constructs have good reliability and convergent and discriminant validity.

**Table 12 : Correlations and discriminant validity on the construct level (Study 2)**

	1	2	3	4	5	6	7	8	9
1. Procedural Justice	<b>0.67</b>								
2. Strategic Alignment	0.41	n.a							
3. Commitment to Ends	0.42	0.42	<b>0.73</b>						
4. Commitment to Means	0.36	0.44	0.60	<b>0.77</b>					
5. Strategic Involvement	0.47	0.25	0.26	0.22	n.a				
6. Hierarchical Level	-0.22	-0.11	-0.15	-0.18	-0.02	n.a			
7. Organizational Identification	0.29	0.30	0.36	0.33	0.25	-0.15	<b>0.73</b>		
8. Tenure	-0.05	-0.05	-0.11	-0.10	-0.02	0.26	-0.05	n.a	
9. Gender	-0.07	0.09	0.07	0.08	-0.12	0.04	0.01	-0.14	n.a

### *Common Method Variance*

Regarding common method variance, post-hoc tests report no threat. Harman's single-factor test does not suggest a severe method bias. A single unrotated principal component explains only 29.4 % of the variance which is less than the threshold 50% level. The unmeasured

latent methods factor test results in a ratio of method variance to substantive variance of 1:35.4, again suggesting that the common method is unlikely to be a critical factor for this study (see Table A.5. in the appendix). Finally, the modified marker variable analysis indicates that the marker variable does not have a significant influence on the endogenous latent variables (largest  $t$ -value was 1.190, between the marker and procedural justice) and that the results remain qualitatively the same. As a result, we conclude that the results of the second study are not threatened by common method bias.

### ***Goodness of Fit***

Our analysis reveals a GoF of 0.364 which is just at the suggested cut-off value of 0.36. This value still suggests a good quality of the overall structural model. The blindfolding results of the Stone-Geisser test indicate high quality for our measurement model and strong overall predictive power, as all the corresponding values are positive (See Table A.6 in the appendix).

### ***Testing the structural model***

Table 13 shows the results of the PLS estimation. The  $R^2$  values (0.251 – 0.289) indicate satisfactory explanatory power for our model. The table provides similar evidence as Study 1, that is, the strategic involvement positively influences procedural justice ( $\beta=0.42$ ,  $t=7.97$ ), and procedural justice positively influences strategic commitment ( $\beta=0.32$ ,  $t=5.54$ ) and strategic alignment ( $\beta=0.36$ ,  $t=6.21$ ). The bootstrapped significance of the indirect effect supports our mediation hypothesis (H1a and H1b). We obtained  $t$ -statistics of 4.55 for strategic commitment and 4.87 for strategic alignment where both suggest the significant indirect effect of involvement on outcome variables through the procedural justice (bootstrapped standard deviations are 0.029 and 0.031 respectively). In this study, the interaction term is significant only for strategic alignment which supports H2b. The effect size of the interaction term is 6%. The Aiken and West simple slopes plot is depicted in Figure 12. Unlike Study 1, we did not find empirical support that the hierarchical level of the manager moderates the relationship between procedural justice and strategic commitment. This might be because the second study focused only the top 350 middle managers and left out any middle managers

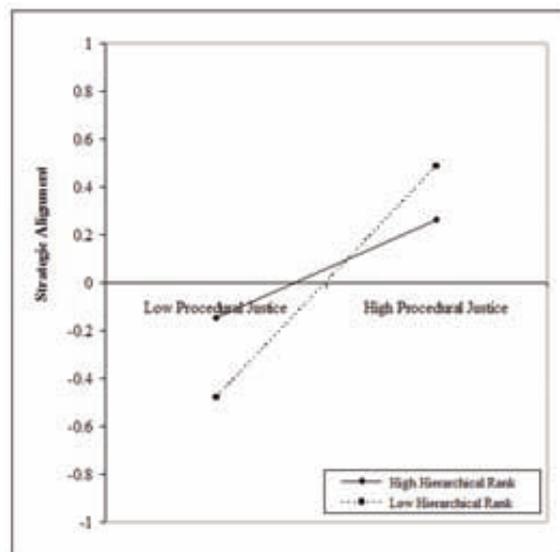
below that level. Therefore, the effect of hierarchical level procedural justice interaction might not yet start to kick in at this higher level sample.

**Table 13 : Path Estimates and Bootstrapping t-statistics**

	Procedural Justice	Strategic Alignment	Strategic Commitment
Strategic Involvement	0.42 (7.97**)	0.07 (1.15)	0.07 (1.11)
Procedural Justice		0.36 (6.21**)	0.32 (5.54**)
Hierarchical Level		-0.001 (0.03)	-0.07 (1.25)
Procedural Justice × Hierarchical Level		0.20 (3.12**)	0.05 (0.87)
<i>Control Variables</i>			
Organizational Identification	0.18 (3.59**)	0.18 (2.94**)	0.27 (4.33**)
Tenure	-0.04 (0.77)	0.01 (0.12)	-0.06 (1.23)
Gender	-0.03 (0.47)	0.13 (2.88**)	0.11 (2.51*)
$R^2$	25.10%	25.80%	28.90%

Bootstrapped  $t$ -statistics in parentheses, \*  $p < .05$ , \*\* $p < .01$

We observe the significant effect of organizational identification on all of our endogenous variables. This time, gender has also significant relationships with outcome variables. Female middle managers are more committed to and aligned with organizational strategy.



**Figure 12: Interaction between procedural justice and hierarchical level on strategic alignment with the CEO (Study 2)**

### ***Complementary Multi-level Analysis***

One of the reasons we run a replication was to explore the team level determinants of our study variables: Procedural Justice, Strategic Alignment and Strategic Commitment. Because individual middle managers are embedded in managerial teams, team level factors can also play a role in influencing individual managers' perceptions, attitudes and behaviors. To this end, we carried out a Hierarchical Linear Modelling (HLM) analysis.

The teams of interest here are middle management teams which form the most top layers of the organizational hierarchy. They do not work closely with each other on a daily basis like an operational team does and some of them are even geographically dispersed in different locations of the organization, but they report to a common supervisor. These are the managers of different administrative and operational units, which at least have two levels of management within the unit. So apart from the individual level variables previously mentioned, we identified several team level variables that could be influential to our theoretical model. These variables are the degree of strategic consensus within the team on strategic ends and on strategic means, team manager's alignment with the higher echelons of the organization on strategic ends and on strategic means, team size and consistency of strategic involvement within the team.

Strategic consensus, is defined as the shared understanding of organizational strategies among team members (Kellermanns, et al. 2005) and is relevant in our context because it leads to commitment by increasing the belief that individual efforts will lead to implementation success (Riggs and Knight, 1994, Dooley and Fryxell, 1999). It is operationalized as the mean of standard deviations of the team members' scores for each strategy item multiplied by -1 (Bourgeois III, 1980, Bourgeois III, 1985, West Jr and Schwenk, 1996, Colbert *et al.*, 2008). We obtained two strategic consensus scores for each team, one representing the degree of agreement on strategic ends, and the other one on strategic means. Team Manager's alignment with CEO may play an influential role as managers are an important source of strategy relevant information for subordinates (Mintzberg, (1975). Thus we included team manager's alignment with the higher echelons with respect to strategic means and ends as two relevant factors to our outcome variables. This variable is operationalized with the negative Euclidean distance between strategy ratings of the team's manager and the CEO, just like the strategic alignment measure. Team size, simply measured by the number of team members, is relevant,

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because when the span of control is larger for the team manager, it may be more difficult to communicate with and ensure the commitment of team members.

Finally, we included the consistency of strategic involvement within the team as a relevant exploratory factor, because individuals are sensitive to how others are treated within their team (Rupp, Bashshur, Liao, 2007). We conceptualize the consistency of strategic involvement as the similarity of strategic involvement patterns among peers in a team. To operationalize strategic involvement consistency of a team, we benefit from our current strategic involvement measure. The coefficient of variation of the scores that correspond to these five forms of involvements provides an index for the team's disparity in each strategic involvement item. A higher disparity in an item means that some of the team members are involved in that particular aspect of strategy formation to a high extent, but some other members to a low extent. The team level variable, consistency of strategic involvement, is then operationalized as the mean of involvement disparity of each strategic involvement item for a team. A high consistency means that the managers in the team are treated similar to each other in terms of involvement to strategy formation. A low consistency, on the other hand, means the patterns of involvement are not similar between the individual managers in the team. For instance, some managers are involved by identifying problems and proposing strategic objectives, while some of their peers are just developing details about options.

After this brief explanation of the relevant team level variables, we run several the multi-level hierarchical linear models to explore the influential factors. Please note that this our approach resonate with the inductive theory building approach advocated by Locke (2007), where we reserve our theory building efforts after the results are established.

Descriptive statistics and correlations of individual level variables are provided in Tables A.2, and A.3 and 6. Table 14 displays the descriptive statistics and correlations among team level variables.

**Table 14 : Descriptive statistics and correlations of team level variables**

Variable	Mean	SD	1	2	3	4	5	6
1. Team Size	6.46	2.71						
2. Strategic Consensus on Ends	-0.70	0.14	-0.18					
3. Strategic Consensus on Means	-0.72	0.13	-0.09	0.52**				
4. Consistency of Strategic Involvement	0.14	0.06	0.19	-0.25	-0.04			
5. Hierarchical Level	3.82	0.90	-0.05	0.20	0.08	0.00		
6. Manager's alignment on Ends	-3.14	1.07	0.22	-0.03	0.25	-0.12	0.16	
7. Manager's alignment on Means	-3.50	0.98	-0.04	0.05	0.16	-0.05	0.08	0.51**

Note:  $N=56$ , except for Manager's alignment on Ends ( $N=48$ ) and Manager's alignment on Means ( $N=48$ ) correlations. \* $p<.05$ , \*\* $p<.001$

Hierarchical linear models were constructed and tested using statistics software package HLM 7.01 (Raudenbush, Bryk, Congdon, 2004). The first step of HLM is to run a null model into which no predictors were entered in order to decompose variance in two terms: residual error at the team level and residual error at the individual level. The null model tests the hypothesis that the individuals in the same group aren't more alike than individuals in different groups (Ho:  $\sigma_{u0}^2 = 0$ ). The null model also allows us to obtain ICC<sup>7</sup> statistics which represents the proportion of variance in the outcome variable that resided between groups (Liao & Rupp, 2005). Table 15 displays the null models.

**Table 15 : Null models**

	Commitment to Ends	Commitment to Means	Alignment on Ends	Alignment on Means	Procedural Justice
$\sigma_{u0}^2$	0.002	0.002	0.045	0.004	0.037
$\sigma_e^2$	0.254	0.357	1.050	1.272	0.327
$\chi^2$	58.009	54.451	66.139	53.358	88.239
$p$ -value	0.365	>0.500	0.145	>0.500	0.003
ICC1	0.68%	0.48%	4.13%	0.29%	10.04%

d.o.f = 57,  $Y_{ij}$  denotes the dependent variable.

Level 1:  $Y_{ij} = \beta_{0j} + e_{ij}$

Level 2:  $\beta_{0j} = \gamma_{0j} + u_{0j}$

Analyses of null models revealed only procedural justice construct possessed a significant amount of variance that resides between teams. 10.04 % of the variance of procedural justice

$${}^7 \text{ ICC} = \sigma_{u0}^2 / (\sigma_{u0}^2 + \sigma_e^2)$$

is to be explained by the team level variables. Other study variables have very low ICC values, so we should not perform multi-level analyses with them. They are better suited to be analysed at the individual level. This finding also supports our earlier individual level of analysis approach, as individual managers in the same team are not more alike than the individual managers in different groups (i.e., no dependency in data)<sup>8</sup>.

To identify the team level determinants of procedural justice in addition to the individual level determinants (i.e., strategic involvement and organizational identification), we run several HLM models. The findings of our final model is reported at Table 16. First, regarding the individual level variables inline with our earlier PLS results, the HLM analysis display similar findings. Both strategic involvement ( $\beta_1=0.318$ ,  $p<0.001$ ) and organizational identification ( $\beta_2=0.158$ ,  $p=0.01$ ) have positive significant effects on procedural justice. Second, at the team level, we found that hierarchical level ( $\gamma_{01}=-0.11$ ,  $p <0.001$ ) and consistency of strategic involvement ( $\gamma_{02} = -1.150$ ,  $p =0.003$ ) significantly explains intercept variance. We did not observe any cross-level interactions which means none of the variables significantly explained any slope variance. The model ( $\sigma_{u0}^2=0.00052$ ,  $\sigma_e^2=0.25115$ ) explains 23.3 % of the variance at the 1<sup>st</sup> level, and 98.6 % of the variance at the 2<sup>nd</sup> level, adding up a 30.9% of the total variance of procedural justice. Compared to our previous PLS model solely at the individual level ( $R^2 =25.1$  %), the multi-level model provides more explanatory power, as it includes team level variables as well.

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<sup>8</sup> Actually, we first ran the null multi-level models and ensured that there is no variance residing between teams, before we performed our PLS analysis at the individual level.

**Table 16 : Results of HLM analysis**

Fixed Effect	Coefficient	Standard Error	t-ratio	Approx. d.o.f.	p-value
<b>For Intercept, <math>\beta_0</math></b>					
Intercept, $\gamma_{00}$	2.788	0.028	100.016	53	<0.001
HIER, $\gamma_{01}$	-0.109	0.028	-3.839	53	<0.001
CON_INV, $\gamma_{02}$	-1.150	0.372	-3.090	53	0.003
<b>For 'INV' slope, <math>\beta_1</math></b>					
Intercept, $\gamma_{10}$	0.318	0.036	8.865	251	<0.001
<b>For 'ORG_ID' slope, <math>\beta_2</math></b>					
Intercept, $\gamma_{20}$	0.158	0.061	2.589	251	0.01
Level 1:	$PROJUST_{ij} = \beta_{0j} + \beta_{1j} * INV_{ij} + \beta_{2j} * ORG\_ID_{ij} + r_{ij}$				
Level 2:	$\beta_{0j} = \gamma_{00} + \gamma_{01} * HIER_j + \gamma_{02} * CON\_INV_j + u_{0j}$				
	$\beta_{1j} = \gamma_{10}$				
	$\beta_{2j} = \gamma_{20}$				

where *HIER* is hierarchical level, *INV* is strategic involvement, *ORG\_ID* is organizational identification, and *CON\_INV* is consistency of strategic involvement.

In this exploratory phase of our analysis, the fact that we run several models on our data might have inflated the probability that we encounter a false positive result (i.e. reporting a significant effect when the effect is not present). Reporting the significance levels without considering all the tests run would be grossly inappropriate, as it is well recognized that when a researcher tests  $n$  independent null hypothesis at a significance level  $a'$ , the generalized Type-I error probability  $a$  is typically much in excess of  $a'$  (i.e. the repeated testing problem) (Holland and Copenhaver, 1988). Therefore, we applied a Bonferonni correction which is the most conservative method among many methods to control for the repeated testing problem (Benjamini and Yekutieli, 2001). We tested a total of 14 models, where we examined the effects of our 7 team level variables on the intercept variance and the slope variance of strategic involvement. We want that the family wise error rate to be 0.05, so the threshold level of  $\alpha$  for an individual test must be  $(0.05/14)$  0.0035. Because the  $p$ -values at Table 16 are less than this threshold value, except for organizational identification, we are confident about our findings about the rest of the variables.

The main result of our exploratory phase is that consistency of strategic involvement in middle management teams matters for individual managers' perceptions of procedural justice. This finding is inline with procedural justice theory, as multiple focus, multiple target view suggests that people can differ in evaluating different source, focus, and targets when

forming their justice perceptions and are sensitive to how others are treated as well (Rupp, Bashshur, Liao, 2007). In the next section, we further theorize on this finding through an inductive theory building approach and suggest future research directions.

## Discussion

It has been more than two decades since Wooldridge and Floyd (1990) first introduced strategic involvement as an important strategy process variable and stated that “there is much to learn about the nature of involvement and how best to manage it” (p.239). Ahearne et al. (2013) contributed to our understanding of the concept by validating a curvilinear effect of strategy involvement reflecting a control-flexibility paradox. In the search of an optimum mix of top management purpose and middle management initiative to resolve the control-flexibility paradox, this study tries to shed light on the psychological underpinnings of strategic involvement by adopting a justice and power perspective. We established the pivotal role of procedural fairness perceptions of middle managers about the strategy making process in transmitting the effect of strategic involvement in to managers’ commitment to organizational strategies and into their strategic alignment. We also demonstrated that the effect of intraorganizational power differences in this process such that higher level middle managers who possess more formal power are less influenced by the positive procedural justice perceptions than their counterparts who are in the lower ranks of the organizational hierarchy. Finally, we unearthed the effect of the consistency of a strategic involvement pattern among peers that indicates that in forming their own procedural justice perceptions middle managers also care about how others are treated during the strategy making process.

Our findings hold several theoretical implications. First, we showed that middle managers’ procedural justice perceptions play a key role in enhancing their commitment to and alignment with the organizational strategy. Our approach expands Kim and Mauborgne’s (1998) conceptualization of procedural justice of the strategy process for the top managers into a larger scope of managers. Their findings regarding the commitment of top managers (Kim and Mauborgne, 1991) and managers’ strategic alignment with higher echelons (i.e., compliance of subsidiary top managers with the global head office; Kim and Mauborgne, 1993) also hold for middle managers in our research context. Therefore, we stress the importance of procedural justice of strategy making that is the perceived fairness of the

process through which organizational strategies are generated, as an essential strategy process variable across organizational levels. This finding also contributes to the burgeoning research on multi foci, multi target justice perspective (Rupp, Bashshur, Liao, 2007) by introducing and validating another focus (i.e., organizational strategy making process) and target (i.e., middle managers) combination.

Second, we demonstrated that managers' power determine the extent that managers respond to procedural fairness of strategy process. Our results revealed that the positive effect of managers' procedural justice perceptions on their commitment and alignment is larger when power is low than when power is high. This may be due to both the liberating effect of power that relieves individuals from social and normative pressures (Galinsky, Magee, Gruenfeld, Whitson, & Liljenquist, 2008) and the resources available to higher ranked managers enhancing their ability to influence strategic decisions. Even if the strategy formulation is not perceived to be fair by the higher level managers, they may still cope with the unfairness through their egocentric orientation to social encounters (Fiske, 2010). High power individuals adopt a promotion orientation (Galinsky et al., 2003), so they may set aside the fairness of the procedures, as they regard it as peripheral to achievement of their goals. They are already equipped with the formal authority and the resources of their positions, so they can still take active part in strategy formulation, communicate their views to CEO and involve in the integrative bargaining process. Moreover, as they are more accountable for the results of the strategic decisions than their counterparts at the lower hierarchical levels, they are more incentivized to fulfill their strategic roles, even under the unfair strategy making procedures. This grants them the necessary interaction with the top management to be aligned and the potential to be committed to organizational strategies.

In contrast to higher ranked middle managers, middle managers at the lower levels have less means to influence organizational strategies, if the strategy making process is procedurally unjust. Their dissatisfaction with the process can lead negative emotions. These emotions may not only hamper not their efforts towards implementing organizational strategy, but also may diffuse and influence their peers' efforts toward strategy implementation (Huy, 2001). Moreover because low power individual have a tendency to overestimate their negative emotions toward their high power managers (Anderson and Berdahl, 2002), when such negative emotions combine with the seek for retributive justice, they may even involve in involve in self-serving interpretations of the strategy which may

lead to destructive interventions (Meyer, 2006), opportunism and linguistic influencing of the strategic initiatives (Sillince and Mueller, 2007), foot-dragging or sabotaging the strategy implementation (Guth and MacMillan, 1986). In sum, the resulting lack of commitment and alignment when perceived procedural justice is low may indicate a hindrance against organizational strategies.

Finally, we discovered the effect of consistency of strategic involvement within a team as an influential factor for middle managers' justice perceptions of strategy making. We find that middle managers do not only take into account their own involvement in the strategy process, but also are sensitive to the involvement of their teammates in constructing their justice perceptions. They interpret a disparity in their peers' strategic involvement as an indication of unfair strategy process. Such reasoning resonates with Colquit's (2004) teammates' justice concept where he reported that individual members' own justice perceptions interacts with the justice experienced by other team members, such that higher levels of role performance occurs when justice was consistent within the team (Colquit, Zapata-Phelan, Roberson, 2005).

### ***Resolving the deadlock in the control-flexibility paradox***

When interpreted under the light of control-flexibility paradox which suggest that the middle managers' autonomous strategic behaviors needs to be balanced with senior managers control, our findings signal a threat of a potential deadlock at the extreme control state. Senior managers at the higher ranks of the organization are less sensitive to fairness of the strategy making, yet they are the ones charged with creating the justice perceptions in the first place (Blader and Chen, 2012). Because power liberates individuals from social and normative pressures, high power managers would be less attentive to others (Blader and Chen, 2012). This provides a rationale for our finding that high power managers would also be less attentive to the needs of lower level middle managers who constitute a large portion of stratified pyramid shape organizational structure –as there are fewer people at the top than at the bottom– regarding the design of a fair strategy process.

Such a deadlock in the control state would have several negative consequences for the strategy process. While powerful members may withhold information to protect and increase their power (Edmondson et al., 2003), less powerful middle managers may be reluctant to

share information and to engage in a critical discussion when they fear negative consequences for their organizational positions or when they see little chance for acceptance of their ideas (Guth & MacMillan, 1986; Schilit & Paine, 1987). These impediments in information flow pose a threat to responding the discontinuities in the environment thereby lessening the adaptive capabilities of the organizational strategies.

Even in the contexts where social value of the extended scope of involvement is loudly pronounced, high power parties may still view such social targets in more critical and devaluing ways and focus the instrumentality of those targets (Blader and Chen, 2012). For instance, Galinsky (2006) found that high power individuals are less likely to consider another person's perspective and less likely to take into account that the other person might lack knowledge to which they had privileged access. This may lead to perceptions of pretended involvement and lessened justice perceptions due to the differences in applications by the high power managers leading to an inconsistent pattern of involvement.

All in all, we identify a potential deadlock for the organizations at the control state which represents an increased tendency to stay at and a strong resistance to leave the control state because of the high power managers' orientations towards others' need for justice. This is important because hierarchies exist in all organizations, and thus the power differences (Magee and Galinsky, 2009). Even if lessening the hierarchy is aimed through several forms of social organizing (Fiske, 1992), it is never absent and inevitably emerges in the premise of giving order and coordination to the organization (Magee and Galinsky, 2009). In the absence of fair strategy making systems, voluntary cooperation, commitment and alignment of a large portion of the organization would not be extracted leaving the organization in a less effective strategy implementation phase and with lower quality strategies.

### ***Implications for practice***

Our findings hold several implications for middle managers and upper echelons of the firm. Top managers may have several reasons to limit middle manager involvement in strategy process. They may want to limit the potential conflict and the political behavior that may be exerted in the strategy process by middle managers whose careers or organizational units' interests may be negatively affected by a new strategic initiative, or to avoid leakage of valuable strategy information due to high middle manager turnover rates in some industries

(Wooldridge and Floyd, 1990). Involvement also costs time, energy and, maybe more importantly distracted top management attention which may be detrimental to strategic effectiveness in fast paced industries where rapid response to environment is critical. However, our research underscores the positive effect of middle managers' strategy involvement for their commitment to and alignment with organizational strategies which are very important for successful strategy implementation.

One of the lessons that managers can learn from our findings is that the key to solve this dilemma builds upon the mediating role of procedural justice. As the perceived fairness of the way that organizational strategic decisions are made determines whether strategic involvement leads to enhanced commitment to and alignment with organizational strategic direction, managers must pay particular attention to create a positive perception about this process. Strategy involvement engages individuals in the decisions that affect them by giving them a chance to have a say, and even a chance contradict with the decisions, and such engagement is essential for fairness perceptions (Kim and Mauborgne, 1998). However fairness perceptions due to involvement can also be triggered by explanation and expectation clarity (Kim and Mauborgne, 2003). Making middle managers aware of why strategic decisions are made as they are will ensure that the needs and outlooks of the parties affected by the decision is represented in the process which will yield fairness perceptions (Leventhal, 1980). Similarly, making middle managers know up front about the new standards that they will be judged on would lessen their concerns regarding the fairness of the decision making (Kim and Mauborgne, 2003). Yet we warn practitioners to avoid pretended forms of involvement as Wooldridge and Floyd (1990) reported that managers can tell apart the real and the feigned involvement. Such actions would not only harm the fairness perceptions and associated benefits of involvement, but also may lead managers seeking retributive justice in compensation for the disrespect (Kim and Mauborgne, 2003).

The significance of consistency of the pattern of involvement in middle management teams signals the importance of designing well structured strategy involvement for managers. Varying applications by senior managers causing a scattered form of involvement among peers of middle managers may lead to impaired justice perceptions. Therefore, it is not only important for organizations to set up a mechanism of involvement enabling bottom up communication, but also to ensure that equal opportunity of involvement is provided throughout peers of managers.

Our findings also hold implications to resolve the deadlock at the extreme control state of the control-flexibility paradox, and help organizations to steer into a more balanced mix of top management thrust and middle management involvement. Most organizations, especially small to medium size organizations and family firms start their journey of strategy making from the extreme control state, and it would take effort to evolve into a more balanced state involving middle managers to differing extents. This would mean a loose of power for high power managers as they need to share the control of a valuable resource exclusive to them, that is, the access to top managers. Although loose of control over valuable resources, by definition, means lose of power which may be perceived as a threat by the high power managers, it actually would not pose a serious problem, because high power managers are already equipped with not only other valuable resources of their formal position, but also with the psychological mechanisms to cope with the information over flow due to the increased scope of involvement. High power individuals are less influenced and constrained by salient information in the environment than others without power (Galinsky et al., 2008), and high power managers are reported to be able to stay focused on their goals even in the presence of obstacles and distracting goal irrelevant information (Whitson, Galinsky, Magee, Lijtenquist & Gruenfeld, 2009). Therefore, we advocate that powerful managers do not have much to afraid or need to feel reluctant to share some of the control they poses in favor of the less powerful. We specifically suggest high power managers should let their low power counterparts to involve in strategy making and more importantly be aware of and attend their need for procedurally just ways of determining organizational strategies.

### ***Limitations and Future Research***

We acknowledge some limitations of our study as well. First, although we based our rationale on the organizational justice and intra-organizational power theories and the empirical findings from the strategy process research, because the variables are collected simultaneously, we are not able to specify the causal direction of the relationships in our model, as in any cross-sectional study. Second, the moderation between procedural justice and commitment is supported only in one of the studies. Although we refer this to the higher level focus of the second study so that the moderating effect of hierarchical level may not be triggered yet, this assertion needs to be tested empirically. Third, the link from strategic

commitment and alignment to strategy related performance is an important topic that requires further research endeavor. Future research can also focus on different strategy process contexts, and more importantly link content of strategies to strategy process variables.

## **Conclusion**

We shed light on the psychological underpinnings of middle managers' strategy involvement through a justice-power perspective. Our behavioral strategy approach allowed us to identify the underlying psychological mechanisms and boundary conditions of how strategy involvement translates into middle managers' commitment to and alignment with the organizations' strategy. This study has important theoretical and managerial implications for the strategy process and middle managers literature, identifying the differences among middle managers at different ranks and clarifying the essence of their justice perceptions.

## Appendix

Table A.1. Item cross loadings for Study 1

	<b>Strategic Alignment</b>	<b>Organizational Identification</b>	<b>Procedural Justice</b>	<b>Strategic Commitment</b>	<b>Strategic Involvement</b>
Alignment on Ends	<b>0.99</b>	0.24	0.38	0.40	0.34
Alignment on Means	<b>0.68</b>	0.20	0.23	0.27	0.20
OrgID.2	0.21	<b>0.72</b>	0.25	0.43	0.31
OrgID.3	0.19	<b>0.74</b>	0.29	0.41	0.18
OrgID.4	0.18	<b>0.77</b>	0.34	0.47	0.30
OrgID.5	0.16	<b>0.74</b>	0.40	0.43	0.25
OrgID.6	0.16	<b>0.68</b>	0.20	0.34	0.27
PJ.1	0.26	0.26	<b>0.86</b>	0.36	0.46
PJ.2	0.36	0.28	<b>0.84</b>	0.42	0.57
PJ.3	0.27	0.32	<b>0.75</b>	0.43	0.35
PJ.5	0.30	0.39	<b>0.84</b>	0.55	0.42
PJ.6	0.34	0.29	<b>0.82</b>	0.40	0.53
PJ.7	0.28	0.44	<b>0.70</b>	0.48	0.40
SC.1	0.29	0.48	0.35	<b>0.74</b>	0.39
SC.2	0.37	0.38	0.46	<b>0.85</b>	0.52
SC.4	0.31	0.40	0.36	<b>0.77</b>	0.45
SC.5	0.26	0.46	0.44	<b>0.75</b>	0.40
SC.6	0.35	0.54	0.55	<b>0.84</b>	0.47
SI.1	0.32	0.34	0.51	0.54	<b>0.92</b>
SI.2	0.31	0.29	0.53	0.48	<b>0.89</b>
SI.4	0.31	0.30	0.54	0.47	<b>0.89</b>
SI.5	0.32	0.32	0.51	0.52	<b>0.90</b>

Table A.2. Validity checks for the reflective constructs (Study 2)

Items	Mean	s.d	Item loading	Cronbach's alpha	Composite Reliability	AVE
<b>Procedural Justice</b>				0.75	0.83	0.45
Item 1	2.52	1.18	0.73			
Item 2	2.03	0.99	0.63			
Item 3	2.56	0.78	0.63			
Item 4 <sup>a</sup>	2.89	1.07	-			
Item 5	3.19	0.87	0.71			
Item 6	2.53	1.10	0.69			
Item 7	3.70	0.90	0.63			
<b>Commitment to Ends</b>				0.78	0.85	0.54
Item 1	3.85	0.81	0.70			
Item 2	3.63	0.76	0.77			
Item 3 <sup>a</sup>	4.35	0.69	-			
Item 4	4.25	0.67	0.74			
Item 5	3.96	0.65	0.75			
Item 6	3.39	0.85	0.70			
<b>Commitment to Means</b>				0.83	0.88	0.60
Item 1	3.75	0.85	0.74			
Item 2	3.55	0.82	0.87			
Item 3 <sup>a</sup>	4.13	0.81	-			
Item 4	4.15	0.67	0.70			
Item 5	3.65	0.83	0.77			
Item 6	3.31	0.89	0.76			
<b>Organizational Identification</b>				0.70	0.82	0.53
Item 1 <sup>a</sup>	3.27	1.01	-			
Item 2	3.94	0.70	0.63			
Item 3	4.36	0.71	0.73			
Item 4	3.97	0.67	0.79			
Item 5	4.09	0.65	0.74			
Item 6 <sup>a</sup>	3.41	0.98	-			

<sup>a</sup> Eliminated due to low loading score ( $< 0.6$ )

**Table A.3. Validity checks for the formative constructs (Study 2)**

<b>Items</b>	<b>Mean</b>	<b>s.d</b>	<b>Item weight</b>	<b>VIF</b>
<b>Strategic Involvement</b>				
Item1	3.36	1.10	0.39	2.08
Item2	3.15	1.11	0.12	2.81
Item3	3.00	1.07	0.29	2.50
Item4	3.45	1.01	0.19	1.79
Item5	3.73	0.95	0.27	1.59
<b>Strategic Alignment with the CEO</b>				
Item1	-3.10	1.05	0.20	1.497
Item2	-3.66	1.13	0.87	1.497

Table A.4. Item cross loadings for Study 2

	Strategic Alignment	Organizational Identification	Procedural Justice	Commitment to Ends	Commitment to Means	Strategic Involvement
Alignment on Ends	<b>0.72</b>	0.14	0.31	0.38	0.31	0.21
Alignment on Means	<b>0.98</b>	0.31	0.39	0.39	0.43	0.24
OrgID.2	0.27	<b>0.63</b>	0.18	0.17	0.18	0.12
OrgID.3	0.24	<b>0.73</b>	0.23	0.27	0.27	0.23
OrgID.4	0.19	<b>0.79</b>	0.23	0.35	0.33	0.22
OrgID.5	0.17	<b>0.74</b>	0.19	0.21	0.15	0.14
PJ.1	0.18	0.13	<b>0.73</b>	0.23	0.20	0.38
PJ.2	0.13	0.09	<b>0.63</b>	0.18	0.17	0.42
PJ.3	0.24	0.19	<b>0.63</b>	0.17	0.17	0.26
PJ.5	0.40	0.21	<b>0.71</b>	0.37	0.32	0.22
PJ.6	0.32	0.18	<b>0.69</b>	0.30	0.25	0.32
PJ.7	0.29	0.31	<b>0.63</b>	0.38	0.31	0.30
SCEnds.1	0.26	0.38	0.32	<b>0.70</b>	0.51	0.23
SCEnds.2	0.34	0.29	0.32	<b>0.77</b>	0.43	0.29
SCEnds.4	0.34	0.29	0.36	<b>0.74</b>	0.49	0.11
SCEnds.5	0.26	0.18	0.28	<b>0.76</b>	0.37	0.17
SCEnds.6	0.33	0.17	0.26	<b>0.71</b>	0.38	0.17
SCMeans.1	0.31	0.34	0.26	0.56	<b>0.74</b>	0.20
SCMeans.2	0.35	0.27	0.33	0.54	<b>0.87</b>	0.22
SCMeans.4	0.30	0.27	0.18	0.40	<b>0.69</b>	0.02
SCMeans.5	0.36	0.19	0.31	0.40	<b>0.78</b>	0.21
SCMeans.6	0.37	0.20	0.31	0.38	<b>0.77</b>	0.18
SI.1	0.19	0.18	0.39	0.20	0.17	<b>0.84</b>
SI.2	0.12	0.20	0.38	0.19	0.14	<b>0.82</b>
SI.3	0.18	0.18	0.40	0.20	0.15	<b>0.85</b>
SI.4	0.18	0.19	0.34	0.18	0.15	<b>0.73</b>
SI.5	0.29	0.26	0.34	0.27	0.25	<b>0.73</b>

**Table A.5. Common method variance analysis with the unmeasured latent methods factor for Study 2**

<b>Item</b>	<b>Construct Loading</b>	<b>CL<sup>2</sup></b>	<b>Method-Factor Loading (MFL)</b>	<b>MFL<sup>2</sup></b>
SI.1 <sup>a</sup>	0.791	0.626	0.002	0.000
SI.2	0.899	0.808	-0.059	0.003
SI.3	0.888	0.789	-0.044	0.002
SI.4	0.769	0.591	-0.19	0.036
SI.5	0.623	0.388	0.142	0.020
PJ.1	0.874	0.764	-0.131	0.017
PJ.2	0.726	0.527	-0.075	0.006
PJ.3	0.736	0.542	-0.128	0.016
PJ.5	0.603	0.364	0.09	0.008
PJ.6	0.7	0.490	-0.001	0.000
PJ.7	0.36	0.130	0.281	0.079
SCEnds.1	0.49	0.240	0.244	0.060
SCEnds.2	0.752	0.566	0.04	0.002
SCEnds.4	0.692	0.479	0.042	0.002
SCEnds.5	0.913	0.834	-0.184	0.034
SCEnds.6	0.814	0.663	-0.128	0.016
SCMeans.1	0.586	0.343	0.187	0.035
SCMeans.2	0.834	0.696	0.048	0.002
SCMeans.4	0.798	0.637	-0.141	0.020
SCMeans.5	0.814	0.663	-0.039	0.002
SCMeans.6	0.827	0.684	-0.066	0.004
OrgID.2	0.655	0.429	-0.057	0.003
OrgID.3	0.671	0.450	0.069	0.005
OrgID.4	0.792	0.627	0.099	0.010
OrgID.5	0.852	0.726	-0.122	0.015
<b>Average</b>	0.738	0.562	-0.005	0.016

SI: Strategic Involvement, PJ: Procedural Justice, SCEnds: Strategic Commitment to Ends, SCMeans: Strategic Commitment to Means, OrgID: Organizational Identification. a: to ensure interpretability of the results strategic involvement was modeled as a reflective construct when we assessed the common method bias.

**Table A.6. Blindfolding results: cv-communality and cv-redundancy for study 2**

	Cv-Communality	Cv-Redundancy
Procedural Justice	0.423	0.105
Strategic Alignment	0.289	0.155
Strategic Commitment	0.459	0.458
Strategic Involvement	0.642	-
Organizational Identification	0.550	-



## Chapter 5

# REMEDIES FOR COMPROMISED STATISTICAL TESTS AND FLAWED THEORIES: A RESPONSE TO BETTIS

### Introduction

The importance of theory to scientific endeavor cannot be overstated (Colquitt and Zapata-Phelan, 2007). However, the validity of theories is seriously threatened by the epidemic portions of false positives in peer reviewed academic journals (Ioannidis, 2005, 2011, Bettis, 2012). False positives are considered to be the most costly errors in management research (Simmons, Nelson and Simonsohn, 2011), because once a significant coefficient is found as a result of a true hypothesis being rejected by chance, and appears in a publication, then it is immediately considered as a ‘proven’ theoretical claim (Bettis, 2012). This has serious consequences especially for strategic management, because advice based on empirically tested strategic management theories shapes the decisions of policy makers on crucial issues regarding the fate of corporations, industries and nations as well.

Researchers usually explore various analytical alternatives in order to make improvements to a theory. It is common that they search for a combination of variables that yields statistical significance and then report only what ‘worked’ (Simmons, Nelson and Simonsohn, 2011). This gives rise to the very serious repeated testing problem because of the increased likelihood of obtaining a falsely positive result. The acceptable level of false positives at the 5 percent level is severely violated and the reported significance levels are greatly exaggerated when several analytical models are considered in the data set. Therefore, singling out the statistically significant inferences for emphasis and support of conclusions when multiple

inferences are pursued is very wrong, and threatens the validity of empirically tested theory and credibility of the scientific advice to practitioners.

The repeated testing problem is already well-known in the statistics literature and several remedies have been offered, dating back to Bonferroni (1935). However, in strategic management, the core of the problem is not only a matter of statistical correction. Repeated testing is a multi-dimensional problem that involves several stakeholders and is also driven by individual, technical, and institutional reasons. This complex nature of the problem has made academics in strategic management reluctant to act upon the issue, and has led them stay in the safe waters of common practice by simply neglecting it, despite its severe negative implications to theory and practice.

Bettis (2012) recently created awareness for the repeated testing problem in strategic management. In this study, we complement Bettis (2012) in increasing the recognition of repeated testing, and respond to his concerns by further proposing realistic and applicable solutions for the problem. We posit that the solutions to the repeated testing problem depend on the theory building approach of the research (deductive vs. inductive), and we propose both normative and statistical guidelines. The remedies we suggested are displayed in Table 17. We acknowledged the trends in this matter on a larger domain including psychology and medicine. We also recommend strategies to journal editors, authors and the research audience for the institutionalization of repeated testing remedies in strategic management research.

**Table 17 : Remedies for repeated testing problem**

Hypothetico–deductive approach	Inductive approach
<ul style="list-style-type: none"> <li>• More critical appraisal of the conceptual analysis</li> <li>• Stronger emphasis on programmatic research</li> <li>• Greater appreciation of within–paper replication</li> </ul>	<ul style="list-style-type: none"> <li>• A proper adoption of inductive research with sound repeated testing corrections                             <ul style="list-style-type: none"> <li>○ False Discovery Rate</li> <li>○ Split Samples</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Tolerance for imperfect results and appreciation of honest disclosure</li> <li>• Encouragement for the use of Open Science Practices</li> </ul>	

The problem is urgent and the ubiquitous. False positives keep being proposed as confirmed theory in strategic management every day. Therefore we focus our attention on

short to mid-term solutions to repeated testing, although we promote the long-term focused solutions currently developing in other fields too. This paper contributes to raising awareness for the repeated testing problem and provides key insights to overcome the problem in order to reach better and truthful strategic management theories. It will help push forward the discipline of strategic management scholarship by enhancing the reliability of the answers we provide.

### Repeated Testing Problem

Management theories are of great importance to management scholars, as theories allow researchers to make sense of the phenomena surrounding them in organizations and help them to synthesize the insights they gain from their observations and imaginations (Edwards, 2010). However simply overlooking the number of tests conducted when reaching a publishable model severely threatens the validity of empirically tested theories.

Repeated testing problem is defined as the reporting of grossly inappropriate significance levels without considering all the tests that have been run. It is well recognized that when a researcher tests  $n$  independent null hypotheses at a significance level  $\alpha'$ , the generalized Type-I error probability  $\alpha$  is typically much in excess of  $\alpha'$  (Holland and Copenhaver, 1988). This makes the rejection of at least one true null hypothesis very likely<sup>9</sup>, which will then end up in a publication as an empirically 'confirmed' or 'proven' result. The publication bias against non-findings and replications in top tier management journals leaves very little, if any, incentive for researchers to attempt them (Simmons, Nelson and Simonsohn, 2011). Even if exact replications take place and fail to find the same relation, the non-findings are considered to have several possible causes and will not be conclusive or probative. Therefore, the false positives are difficult to falsify and they permanently remain in the literature (Ferris, Hochwarter and Buckley, 2012). These false results will not only waste future researchers' precious time to investigate non-existing theoretical claims, but also attract investments for fruitless research programs which may eventually lead to ineffective policy changes (Simmons, Nelson and Simonsohn, 2011, John, Loewenstein and Prelec,

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<sup>9</sup> When we assume each of the  $n$  hypothesis is tested on a separate subset of data, the probability of rejecting at least one true null hypothesis is  $p = 1 - (1 - \alpha)^n$ . When  $n = 100$  and  $\alpha = 0.05$ ,  $p$  becomes 0.9941 which means and we are almost certain to reject a true null.

2012). All in all, false positives threaten the whole strategic management field to lose its credibility.

Despite its serious threat to theory and practice, management scholars remain reluctant to act upon repeated testing problem due to several reasons such as the ticking tenure clock together with ambitious publication requirements for tenure for the junior faculty (Bettis, 2012), the researchers' degree of freedom in several analytical choices coupled with the self-serving interpretations of ambiguity (Simmons, Nelson and Simonsohn, 2011), or the incurred loss of power for the traditional repeated testing corrections (e.g., Bonferonni) (Benjamini and Yekutieli, 2001). Among all reasons, we contend that two institutional features of the field are essential sources of the inertia for taking action against repeated testing. First, even when a researcher is aware of the problem, the fact that editors and reviewers are not asking for it, that there are no standards to report such issues, and that the honest disclosure would raise further questions about the reliability of the results are all serious disincentives. The perceived loss of value and contribution to theory due to the lessened credibility of the analytical findings leads to wholly ignoring the problem. Publishing is already a very difficult and competitive job, disclosing the repeated tests run would make the dialogue between the author and the reviewers even harder. Therefore the researchers prefer to follow common practice by simply overlooking the number of tests they run until they reach a publishable model.

Second, the dominant research approach for quantitative empirical papers is the hypothetico-deductive approach that is routinely supported by journal editors. However, hypothetico-deductive approach is criticized for demanding premature theorizing and even leading researchers to make up their hypotheses after the fact (Locke, 2007). Similarly, the expectation of journals that the theory building and testing take place at the same paper — following the common hypothetico-deductive structure — creates agency problems for reporting the analytical process truly (Bettis, 2012). Therefore, the hypothetico-deductive tradition partly contributes to the problem of wholly ignoring the repeated testing.

The remedies we propose to overcome the repeated testing problem targets these two institutional features of the field, as we believe the solutions have more to do with institutional features and incentive systems than researchers' integrity or statistical corrections.

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## Solutions to Repeated Testing Problem

### *Normative guidelines*

We contend that the solution to repeated testing problem hinges on the theory building approach adopted by a researcher: deductive versus inductive. Deductive approach goes from the general to the particular and is a top–down approach. It starts with a theory, makes deductions from the theory, and then tests the deductions with observations to confirm the theory. Induction, on the other hand, is a bottom–up approach and moves from specific observations to broader generalizations. Inductive studies do not include a priori hypotheses as a starting point like their deductive counterparts; instead, they start with stating what is known about the phenomenon of interest, and focus on how the current study will go beyond what is already known.

In the hypothetico–deductive approach, even ‘ex post tuning of ex ante models’ (e.g., dropping some insignificant variables, or trying a few additional control variables to improve results after the data have been analyzed in terms of ex ante model) is pronounced as troubling (Bettis, 2012: 110). Data snooping (i.e., searching for asterisks) is completely unacceptable. The core problem caused by repeated testing here is that the statistically significant empirical findings which do not make much sense conceptually or theoretically are published, and the authors falsely claim that they predicted them.

We propose three strategies to cope with this problem for hypothetico–deductive research. First, a more critical appraisal of the conceptual analysis needs to be conducted. Academic writers are skillful in combining distinct theories from different subfields of disparate literature to generate a particular functional form between their constructs of interest (i.e. a research model), yet the assumptions among these theories may be incongruent or even contradicting with each other (Bettis, 2012). These contradictions have to be detected throughout the revision process and the studies that create a contrived feel needs to be singled out by the journal editor and reviewers.

Second, a greater appreciation of programmatic research is required. Programmatic research refers to a series of research projects around a conceptual theme. Such longitudinal research programs may also encompass small pieces of research or little cross–sectional studies that help clarifying different aspects of the guiding framework of the program. The

contribution of each piece is comprehended better when it is considered as an integral aspect of a greater whole (Strowig and Farwell, 1966). Paradoxically, the papers that build directly on earlier work are disqualified as making 'incremental' contributions. This prioritizes papers that have no strong connection with earlier work and that get no follow-up, thus making it easier to publish what happens to be statistically significant even when it makes not much sense conceptually. In contrast, programmatic research is much clearer on what should be expected, as the research findings accumulate around a research framework. The consistent support for the framework provides credibility to the findings of each new study that is in line with the model. This prevents the selling of statistically significant empirical results that are the outcome of a fishing expedition as predicted research findings.

Consequently we suggest journal editors devote more journal space for programmatic research in journals. Although the contribution of some empirical pieces may seem incremental, they should be evaluated by the contribution to the overall program. Therefore, articles must make clear whether or not the study is part of a larger program of research and how it is linked to the previously reported studies. This explanation should not simply take the form of a review of the relevant literature, but it should explicitly report, for instance, that the current study is a direct extension of a certain previous study in such certain ways and that both studies are part of this specific overall research program (Strowig and Farwell, 1966).

Third, a greater appreciation of within-paper replication is required. Although the importance of replication studies is well established (Tsang and Kwan, 1999), replications are not very common in strategic management research. Researchers are not motivated to run replications of previous research, because it is difficult to publish replicated results or non-results (i.e., failure to replicate). Although electronic publications open up new outlets for researchers to share their replication results (Bettis, 2012), we do not foresee that this will change the current trend of not running replications, because replications are perceived as making 'incremental' contributions. Therefore, we propose that journal editors should put a greater emphasis on within-paper replications. Once promoted, replications within a given paper, over samples and ideally over methods, would bring additional reliability to empirical results. Non-results will also get a chance to be reported in such within-paper replications, because they will only partially impact the credibility of the findings, yet the honest

disclosure, on the other hand, would increase the trust of the editor and reviewers to the empirical results.

As the core problem repeated testing causes in hypothetico–deductive approach is to detect something that authors falsely claim, the strategies to cope with this problem have to be corrective and preventive in nature. Therefore, our suggestions put the pressure more on the shoulders of journal editors and reviewers. On the other hand, the core problem in inductive approach is, in fact, statistical. There is nothing wrong with exploring the analytical alternatives in a data set, and then reporting the findings. The core problem, here, stems from the exaggerated levels of significance granted to an empirical finding because of the unreported high number of tests run.

Although the inductive studies are considered to be mostly in qualitative forms, such as theory building from cases, grounded theory, and ethnography studies, a quantitative empirical paper that is subject to the repeated testing problem — as we discussed above — also qualifies for an inductive study due to its exploratory character. Providing that the appropriate statistical remedies have taken place in the analysis phases — which are discussed in the next subsection —, we suggest authors adopt an inductive approach instead of a deductive approach when their studies are exploratory. More importantly, we stress that journal editors should create room for high quality inductive research in management journals.

The structure of an inductive paper is quite different from that of a deductive paper. Researchers and the research audience need to familiarize themselves with the differences. In an inductive paper, the front end of the paper (i.e. introduction and theory) would be much shorter compared to the lengthy front ends of deductive papers, because the author would not need to make long argumentations for justification of the study hypotheses. It must just be clear that the phenomenon under investigation is important, and then the author can simply pose questions (Locke, 2007). The author can still draw on existing theory, but this time to trigger the research question (Colquitt and Zapata-Phelan, 2007). In the discussion section, the author would link the findings of the study with the previous literature and what was previously known about the phenomena (i.e., inductive integration). Much of the material formerly stated in the front end of the paper would be mentioned here, and most importantly the author would justify the contribution of the study by demonstrating how it moved the field forward (Locke, 2007). Stating implications of the study would be optional,

because requiring researchers to make them encourages unwarranted speculation. Finally, a limitations section would remain as it is in a typical discussion section, and Locke (2007) suggests more emphasis should be placed on the issue of causality in that section. We propose that this structure is better suited to convey the results of an exploratory research where repeated testing might have occurred.

### *Statistical guidelines*

We propose the adoption of two statistical remedies for the repeated testing problem: (i) controlling for false discovery rate, and (ii) splitting the sample. These procedures are applicable both in inductive and deductive settings.

The first solution is the statistical correction for repeated testing. Several correction procedures have been in frequent use since the early 1950s (see reviews by Shaffer, 1995, Hsu, 1996, Tamhane, 1996). As the undisclosed use of single-inference procedures results in greatly increased false positive rates, the traditional repeated testing procedures aim to control the probability of committing any Type I error in a family of tests under simultaneous consideration. The control of the family wise error at some level  $\alpha$  requires each of the individual tests to be conducted at lower levels (Benjamini and Yekutieli, 2001). However, such a control is very strong and results in substantially less power (i.e., more Type II errors) (Benjamini and Hochberg, 1995).

Keeping in mind that the cost paid for the control of the multiplicity need not be large, Benjamini and Hochberg (1995) introduced a new point of view on the repeated testing problem which controls for the False Discovery Rate (FDR). While traditional procedures focused on and controlled for whether any error was made, FDR controls for the expected proportion of errors among the rejected hypotheses. This small twist brings in a huge gain in power, because the expected proportion of falsely rejected hypotheses is inversely related to the number of all hypotheses rejected. If all tested hypotheses are true, controlling the FDR controls the traditional family wise error. But when many of the tested hypotheses are rejected, indicating that many hypotheses are not true, the error from a single erroneous rejection is not always as crucial for drawing conclusions from the group tested, and the proportion of errors is controlled instead. This makes researchers ready to bear with more errors when many hypotheses are rejected, but with less when fewer are rejected (Benjamini

and Hochberg, 1995). So the potential for increase in power is larger when more hypotheses are non-true. This means if the researcher collects high quality data in terms of reliability and validity, and forms good hypotheses based on valid theories — so that many can be rejected — which leads more non-true hypotheses in the data set, this method provides substantial increase in power. Benjamini and Hochberg (1995) also provide further evidence for the substantial gain in power with a simulation where they compare FDR controlling procedure with the traditional procedures.

The FDR controlling procedure is already available in several statistical packages such as SAS and R; even so it is also very simple to be performed through basic arithmetic operations. First, a descending ordered list of  $p$ -values is obtained, and then each entry of this list is compared to  $p$  times the row number of the entry divided by total number of tests. When the former is smaller than the latter, all hypotheses with smaller  $p$ -values can be rejected at that certain FDR. More formally, let the ordered array of the  $p$  values from smallest to largest<sup>10</sup> are denoted the by  $p_{(1)} \leq p_{(2)} \leq \dots \leq p_{(m)}$  where  $m$  denotes the total number of repeated tests and the corresponding hypothesis are denoted as  $H_{(1)}, H_{(2)}, \dots, H_{(m)}$ .

Let  $k$  be the largest  $i$  for which  $P_{(i)} \leq i\alpha/m$ ;

reject all  $H_{(i)}$   $i = 1, \dots, k$ .

This procedure has been used successfully in some very large problems that include high numbers of repeated tests, because it is robust to increasing number of null hypothesis (Yekutieli and Benjamini, 1999). Therefore, we assert that the adoption of FDR controlling procedure is an appropriate way to cope with the repeated testing problem. It is not only useful in inductive studies, but can also be used in ‘ex post tuning of ex ante models’ phase of deductive studies. Researchers may simply run FDR correction when trying a few additional control variables and dropping some insignificant variables. Such application of FDR will keep the disclosure honest and true while improving the results after the data have been analyzed in terms of the ex ante model.

The second methodological remedy we propose is the cross-validation of findings through split sample procedure. The procedure can be applied as follows. For each hypothesis tested, first, a random subsample is extracted from the whole data set (i.e., the discovery sample), then it is checked whether the null-hypothesis is rejected in this first sample. If the null-hypothesis is also rejected in the mutually exclusive second sub-sample

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<sup>10</sup> Tied  $p_i$  can be ordered arbitrarily.

(i.e., test-sample), then it is not considered as a false positive. It means that there is evidence that the null-hypothesis is actually false and not rejected merely by chance in the discovery-sample. If the null-hypothesis is not rejected in the test-sample, then it can be concluded that the null hypothesis happened to be rejected in the discovery-sample due to chance and thus was a false positive. There is no need for any multiple testing correction for this approach, as researchers simply make statistical discoveries in the discovery-sample and validate their findings at the test-sample. In the implementation of this approach, some loss of power is expected due to reduced sample sizes in the discovery-sample as it is necessarily smaller than the original sample. An ideal case would include making the statistical discovery using the whole sample, and then collecting additional data (i.e., a second sample) and do a replication study. This ideal approach also resonates with our previous suggestion on within-paper replications for deductive studies.

### *Open science practices*

We also promote open science practices as a long term solution to repeated testing. Open Science Practices aims for making the scientific process more transparent. It involves practices such as registry of research design and analysis plan by time-stamping the materials that certifies what was done in advance to data collection and analysis, and making the research data and materials publicly available that is necessary to reproduce the reported results. To ensure wide adoption of these practices, Center for Open Science endorse the Open Science Framework, which is a cloud-based online research platform that benefits researchers by making documentation and archiving of the research material easy, and by providing tools for collaborative work ([openscienceframework.org](https://openscienceframework.org)). The center further encourages journals, funders and research societies to provide incentives for researchers to make their data and materials public, or to register their research designs, hypotheses, and analysis plans in advance of data collection or observation, which we wholeheartedly affirm, too.

The open science initiative is getting recognized especially in medicine and psychology fields. There are already some success stories. For instance, Open Science Framework is hosting a reproducibility project which targets to replicate 2008 issues of three prominent

psychology journals<sup>11</sup> in order to obtain an estimate for the overall reproducibility rate of published empirical psychology literature. This open collaboration project is continuing with the involvement of more than 150 scientists around the world and already replicated 30 published research findings (Spies *et al.*, 2013). Another success is announced at the open letter signed by more than 80 prominent scientists where they call for pre–registry of research efforts before the results are in (Chambers *et al.*, 2013). After stressing that our current publishing culture is toxic to science, they exemplify three journals<sup>12</sup> that successfully offer a new type of publication opportunity to researchers, called a registered report. The gist of this type of publication is that the study is peer reviewed before the data collection takes place, and if it passes the review process at this stage then it is offered an ‘in–principle acceptance’ regardless of its results (e.g. it will also get published even when non–results are obtained).

These developments are more than promising, and we support the open science practices. We suggest journal editors and reviewers show more tolerance to imperfect and less elegant statistical results, and appreciate efforts of honest disclosure of research findings including open science practices. Yet, we believe that open science will be effective in the long run. Because the current reward, recognition and incentive systems of science needs substantial alterations. Open science is taking the necessary steps that will eventually bring the scientific process at the verge of a major paradigm change; however determining the standards and best practice procedures will take further time, just like dissemination of these practices in to other fields will take. Given that the repeated testing problem is urgent and it requires immediate action as false positives keep accumulating as established research findings, we refer to our normative and statistical guidelines as short to mid–term solutions for false positives resulting from repeated testing.

## Discussion

This paper attempts to raise the awareness of repeated testing problem and its severe implications in an effort to respond to Bettis’ (2012) call for research. To overcome this

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<sup>11</sup> Journal of Personality and Social Psychology, Psychological Science, and Journal of Experimental Psychology: Learning, Memory, and Cognition.

<sup>12</sup> Cortex journal, Attention, Perception & Psychophysics, and Perspectives on Psychological Science.

problem, we propose two set of solutions with respect to the research approach adopted in the study. In hypothetico–deductive research, we propose a more critical appraisal of the conceptual analysis, a stronger emphasis on programmatic research, and a greater appreciation of within–paper replication. We further suggest the adoption of an inductive research approach when the research is actually exploratory in nature. Researchers should frankly disclose their analysis process and report the remedies taken for repeated testing, such as correcting for false discovery rates and applying split sample procedures. Furthermore, we promote open science practices as the long term solution to repeated testing.

Bettis (2012) reports that the vast majority of empirical researchers may be involved in repeated testing one way or the other: (i) they may be using the same databases together with numerous researchers at the same time, (ii) they may be ‘tuning’ their ex ante model with some additional tests after the planned analyses, or (iii) they may be indefensibly ‘searching for significant relations’ in their data set in search of a publishable model and report only what worked. In this study, we propose alternatives for researchers to prevent each of the modes of repeated testing. The disclosure and collaborative tools provided by Open Science Framework will help distant researchers to orchestrate their research efforts in the same data set. Tuning models can be correctly carried out by applying the false discovery rate. The data snooping problem can be eliminated through the inductive research approach suggested for exploratory quantitative research. None of the solutions would overcome the willful deception of results; however, providing a honest way out for each case —supported by journal editors and the research community— would substantially deter the common misconduct, as it is assumed that the researchers are sincerely motivated to conduct sound scientific research (Simmons, Nelson and Simonsohn, 2011, John, Loewenstein and Prelec, 2012).

Our solutions not only mitigate the repeated testing concerns, but also contribute to overcoming the publication bias against replications and non–results in management research. For deductive settings, our emphasis on within–paper replication will give non–results a chance to be considered for publication in the form of a failed replication within a paper. Similarly, when a non–result is part of programmatic research, its importance can be better established through its contribution to the guiding research framework. For a research program, it may be more important to know what did not work and why, and the fact that

something did not work can trigger fertile research ideas. For inductive settings, our suggestions on benefiting from the false discovery rate correction or split sample procedure accompanied by the frank disclosure of the whole analysis process ensures the reporting of non–results. Finally pre–registered articles assure publication of non–findings, as they are peer reviewed and accepted prior to the data collection, and reproducibility attempts provide new outlets for replication studies. Therefore our solutions will help to the accumulation of very important evidence for empirically based theory.

The adoption of inductive research approach instead of hypothetico–deductive research when the research is, in fact, exploratory in nature is central to overcoming the problem, because ‘claiming to have predicted an unexpected finding’ is among the most prevalent types of questionable research practices together with only ‘reporting what worked’ (John, Loewenstein and Prelec, 2012). The alleged theories resulting from repeated tests in hypothetico–deductive research never grow into ‘full–fledged theories’ (Locke, 2007). We recommend journal editors to provide room for good inductive studies, and reward honestly reported analyses with fewer expectations towards perfection. Without journal editors’ appreciation and emphasis on inductive research, neither raising the awareness of researchers nor encouraging them to conduct inductive studies will prevent the common misconduct of overlooking the repeated testing problem, thereby seriously compromising the trustworthiness of strategic management theories.

Editors should further help determining the standards and clarifying the routines of high quality inductive studies for quantitative empirical papers as well. Inductive studies are mostly associated with qualitative work, and the academic audience is more oriented towards hypothetico–deductive approach for quantitative papers. Researchers doing quantitative empirical work, thereby, are heavily exposed to the hypothetico–deductive tradition from the very beginning of their academic career. They get used to the deductive paper structure that serves a functional purpose when communicating their research findings to the audience. The audience, for instance, knows that the reason ‘why you would expect what you found’ is build up in the theory section which makes it easy to grasp the core idea in the paper swiftly. Researchers and the audience are also well informed about the standards and well equipped with the routines of good hypothetico–deductive research. On the other hand, there is not one single, but a set of competing hypotheses in exploratory research. Simply omitting the hypotheses which are failed to be rejected — tough indefensibly wrong — could have saved

a lot of space and writing effort. Therefore, the standards of reporting the inductive findings must be established which will ease the process for researchers. The academic audience, then, should get familiar with these structure, routines and standards, so that they can make informed decisions about the credibility of the candidly reported findings and also comprehend the articles quickly like deductive ones.

We believe inductive studies in the form of quantitative empirical work will be more widely conducted in management research because of the frequent rise of new business concepts and new management practices in parallel to the increasing pace of developments especially in information and communication technologies. There are important questions about these new concepts and practices which are of practical and theoretical importance, yet the current state of theory might be lacking to suggest a relationship between the new phenomena of interest and essential organizational outcomes. Therefore, the typical hypothetico-deductive approach may remain inadequate to explain the new phenomena. Moreover several gadgets, devices, RFID tags, and software logs, etc. collect immense amounts of data in organizations which was previously only common in fields like genomics and meteorology. The exploration of these huge data sets may be more suitable with the inductive approach. Consequently, we contend that the inductive theory building advocated in this study will further reach its full potential in the future.

## Conclusion

One may still argue that the researchers have enormous disincentives to honestly disclose their whole analysis process. However, there we rely on both the integrity of authors and the support of editors and reviewers for our solutions. When editors and reviewers are more concerned about repeated testing, the common practice of simply neglecting the issue will turn from *'inconsequential sins of omission (leaving out inconvenient facts) into consequential, potentially career-ending sins of commission (writing demonstrably false statements)'* (Simmons, Nelson and Simonsohn, 2011: 1364). Our solutions substantially mitigate the repeated testing concerns; yet they impose a minimal burden on authors, reviewers, and audience. We strongly believe that authors, editors, reviewers and audience should embrace our solutions, because the credibility of the whole field depends on true strategic management theories.

## Chapter 6

# MODFIND: A TOOL FOR STATISTICALLY DISCOVERING MODERATORS

### Introduction

In the previous chapter, we proposed the adoption of two statistical remedies for the repeated testing problem: (i) controlling for false discovery rate, and (ii) splitting the sample. These solutions have been around for decades; however they were not widely adopted in practice not only due to researchers' lack of awareness of the repeated testing problem and their familiarity with these methods, but also due to a lack of easy and accessible implementation of these techniques in popular data analysis programs. The manual computation of these techniques can be very laborious and difficult without the proper acquaintance with these methods and especially when the number of analytical alternatives starts to increase. This short research note aims to provide researchers with a tool that facilitates application of these repeated testing remedies. We developed an SPSS macro, called MODFIND, which illustrates the application of these techniques in a statistical moderator discovery context. The macro facilitates the analysis of discovering moderators and is freely available at <https://sites.google.com/site/modfindmacro/>.

### Statistically Discovering Moderators

In strategic management, queries about the effect of a focal independent variable on a dependent variable of interest often answered as 'it depends'. It is very less likely that an effect is totally independent of any other variables, such as situational, contextual or individual difference factors. To advance theory, it is of primary importance to identify the variables that a

relationship depends on: What weakens or strengthens the relationship? What are the boundary conditions of the effect, in other words, for whom or under which circumstances the effect exists and for whom and when it does not (Hayes and Matthes, 2009)? Answering these questions leads to a more comprehensive understanding of the phenomenon under investigation (Hayes, 2013), and such questions are answered through the discovery of moderators of that effect.

We particularly chose the statistical discovery of moderators context to illustrate our repeated testing remedies, because it fits in well both with inductive and deductive settings. By drawing from a set of theoretically relevant moderators, a researcher may be investigating several moderation hypotheses between the independent and the dependent variable as in a deductive setting. Alternatively he/she may be systematically testing moderating effects of each variable in the data set on the relationship between the independent and the dependent variable as in an inductive setting. If relevant, three-way moderations can also be considered by our macro.

Our macro holds promising implications for both research approaches. For exploratory research, looking into the data set for influential moderators can be very useful, because if not tested the researcher will be reporting just the total effect of  $X$  on  $Y$ , and some very influential contextual variables might be ignored. It can also be the case that the researcher fails to confirm the theorized relationship between  $X$  and  $Y$  (i.e., an insignificant total effect), because of some ignored factors suppressing the relationship. When the researcher is not sure about the nature of the effect of  $X$  on  $Y$ , he/she may adopt an exploratory approach and just want to see the influential moderators that exist in the data set. We contend that it is beneficial to check for these potential moderators; otherwise influential moderators that may lead to essential insights about the phenomenon of interest may go unnoticed. Similar arguments also hold for already theorized moderation effects. There may as well be ignored factors that affect the size or direction of the moderating effect of  $M$  between  $X$  and  $Y$ . Therefore, testing three-way interactions can also lead to useful insights. The appendix presents some fundamental information on two-way and three-way moderators.

---

**The MODFIND Macro**
*Input*

MODFIND is an aide for discovering interactions between a focal independent variable (*focvar*) and a dependent variable (*dep*). Given a set of moderator variables (*modvarlist*), it estimates model coefficients and standard errors of all the two-way interaction models. Each two-way interaction model includes the predictor variable *focvar*, one of the moderating variables from *modvarlist*, the product of *focvar* and the selected moderating variable, and (if specified) any additional control variables in *covarlist* to estimate dependent variable *dep*. The generic input syntax of the SPSS macro is illustrated in Figure 13.

```

MODFIND Y=dep/ X=focvar/ M=modvarlist
        [/C      = covarlist{none**}]
        [/THREWAY = {t} {0**}]
        [/METHOD  = {m} {5**}]
        [/ALPHA  = {f} {0.05**}]
        [/SPLIT  = {s} {0**}]

```

**Figure 13: The generic input syntax of MODFIND**

The subcommands and the variables in the brackets are optional, and the values indicated with two asterisks (i.e., \*\*) in the curly brackets are the default values, if the subcommand is omitted. The `/THREWAY` subcommand is enabled by setting the `{t}` value to 1. When enabled, the macro also estimates all the three-way interactions. Each three-way interaction model includes the predictor variable *focvar*, two of the moderating variables from *modvarlist* (e.g. *modvar1* and *modvar2*), the products of *focvar* and the selected two moderating variables, the product of two moderating variables, the product of all three independent and moderating variables, and (if specified) any additional variables in *covarlist* to estimate dependent variable *dep*.

The `/METHOD` subcommand refers to the repeated testing correction that will be implemented to the findings of the interaction models. It can take values from 1 to 5, where 5,

as the default value, denotes the FDR correction which we suggest as the most appropriate method (Benjamini and Hochberg, 1995). Other methods from 1 to 4 stand for the Bonferonni correction, Holm's (1979), Hochberg's (1988), and Hommel's (1988)(1988) procedures, respectively. The computational details of these methods are provided at Appendix-B.

The `/ALPHA` subcommand is the significance level. It defines the family wise Type I error rate (i.e., the rate of falsely rejecting a true hypothesis among all hypotheses) for the first four methods, and the false discovery rate (the rate of false rejected hypotheses among all rejected hypotheses) for the fifth method. The default value is the traditional threshold 0.05.

Finally, `/SPLIT` subcommand, when it is activated by setting `{s}` value to 1, implements the split sample procedure. The output of this option is two regression analyses run on mutually exclusive subsamples for each interaction model.

### ***Output***

The output of the macro first presents a summary of the input parameters so that the user can confirm the specified parameters of the input syntax. A sample of the summary of the input parameters is illustrated in Figure 14.

For the repeated testing correction option, a table with the  $p$  values of all interaction models is displayed where the last column (i.e., `rej`) represents whether a model can be rejected at the predefined alpha level. A sample of this output is shown in Figure 15. Only the models that qualify with respect to the repeated testing correction criteria are displayed in the following section of the output. So following the output in Figure 15, the regression results of models 1, 3, 5, 12 and 15 will be presented, because only these 5 models satisfied the repeated testing correction. Although it is possible that the user can see all models by simply setting `/ALPHA = 1`; this situation is accompanied by a warning message that invites the researcher to be cautious in interpreting the results.

```

Run MATRIX procedure:

SPSS Macro for Discovering Two-Way and Three-Way Interactions in
OLS

Outcome Variable:
dep

Focal Predictor Variable:
ind

Moderator Variables:
m1
m2
m3
m4
m5

Control Variables:
c1
c2

Summary of Input
N  no.mods no.conts
60      5      2

The procedure you specified is:
FDR

The significance level that is controlled for (ALPHA) is:
.0500

```

**Figure 14: The summary of the input parameters**

Repeated Testing	Correction Results				
model no	p-val	rank	criteria	satisfie	rej
1.0000	.0000	1.0000	.0033	1.0000	1.0000
2.0000	.0903	8.0000	.0267	.0000	.0000
3.0000	.0006	2.0000	.0067	1.0000	1.0000
4.0000	.0602	7.0000	.0233	.0000	.0000
5.0000	.0071	5.0000	.0167	1.0000	1.0000
6.0000	.4750	12.0000	.0400	.0000	.0000
7.0000	.1717	9.0000	.0300	.0000	.0000
8.0000	.3908	11.0000	.0367	.0000	.0000
9.0000	.2259	10.0000	.0333	.0000	.0000
10.0000	.9673	15.0000	.0500	.0000	.0000
11.0000	.0321	6.0000	.0200	.0000	.0000
12.0000	.0030	3.0000	.0100	1.0000	1.0000
13.0000	.6212	13.0000	.0433	.0000	.0000
14.0000	.8810	14.0000	.0467	.0000	.0000
15.0000	.0068	4.0000	.0133	1.0000	1.0000

You can reject the hypothesis at the reject column which have values of 1

**Figure 15: The repeated testing corrections for the moderation analyses.**

In the split samples option, all models are shown in the output. When the interaction is significant in both of the subsamples, researcher can conclude that the moderator is influential.

The output does not only present the models where the interactions were significant in both sub samples but presents all models; this allows for the judgment of the researcher in evaluating the evidence for other cases which can be important for inductive theory building.

When an interaction is found (two way or three way), it should be probed in order to better understand under which conditions (i.e., the values of the moderator) the relationship between the focal predictor and the outcome is strong versus weak, positive versus negative, and existing versus non-existing (Hayes and Mattes, 2009). For this purpose, we refer to Hayes and Mattes' (2009) MODPROBE and Hayes' (2013) PROCESS macros which are advanced tools specialized in probing moderations.

Appendix C includes two examples of syntax with explanation and their output. The sample data can also be downloaded from <https://sites.google.com/site/modfindmacro/>. The code for MODFIND macro is given in the Appendix-D of this chapter. One can copy and paste it to an SPSS syntax file, and run the macro. Alternatively, the .sps syntax file of the macro is available at the website too.

### **Conclusion**

This research note complements the previous chapter of the dissertation by providing a computational aide that is capable of addressing the repeated testing problem caused by simultaneous tests in discovering statistical moderators. It provides researchers with the easy implementation of the repeated testing remedies.

---

**Appendix**
***Statistical Moderators***

A moderator is a variable that the size or the direction of the relationship between two variables is dependent on. Moderators reveal themselves statistically as interaction effects between two variables of interest. The moderator ( $M$ ) interacts with the independent variable ( $X$ ) in predicting the dependent variable ( $Y$ ) in such a way that the coefficient of the dependent variable on independent variable varies as a function of the moderator. The typical assessment of moderation is carried out with the regression equation:

$$Y = b_0 + b_1X + b_2M + b_3XM + e.$$

When re-expressed, this equation is clear about how the simple slope (i.e., the conditional effect) of  $Y$  regressed on  $X$  is a function of the moderator:

$$Y = b_0 + b_2M + (b_1 + b_3M)X + e.$$

The statistical significance of the estimated  $b_3$  implies that the moderation effect exists, and is interpreted as change in the effect of  $X$  on  $Y$  when  $M$  changes by one unit (Hayes and Mattes, 2009).

Another very common moderation case is that (i) when the size of the interaction between  $X$  and  $M$  on  $Y$  changes with a third moderator variable ( $Z$ ), or in different words (ii) when the effect of  $X$  on  $Y$  varies as a function of the interaction of  $M$  and  $Z$ . This is called a three-way interaction. A three-way interaction is typically estimated with the equation below:

$$Y = b_0 + b_1X + b_2M + b_3Z + b_4MZ + b_5XM + b_6XZ + b_7XZM + e.$$

Re-arranging the terms helps with both interpretations where the statistical significance of the estimated  $b_7$  implies a three-way moderation effect exists (Hayes, 2013).

$$(i) \quad Y = b_0 + b_1X + b_2M + b_3Z + b_4MZ + b_6XZ + (b_5 + b_7Z)XM + e$$

$$(ii) \quad Y = b_0 + (b_1 + b_5M + b_6Z + b_7ZM)X + b_2M + b_3Z + b_4MZ + e.$$

***Repeated Testing Corrections***

Below we explain the five widely applied repeated testing procedures. Although, in our study, we propose the adoption of FDR, other procedures are also included in our SPSS macro MODFIND. Because we contend that our target audience is more familiar with the previous procedures, especially with the Bonferonni Correction, than the FDR procedure. Including the traditional procedures not only enable that the users of our macro will be able to compare their

results under different procedures, but also ensure that our audience will be easily link the application of the macro with repeated testing where the widely known Bonferonni correction serves as a mental hook.

Below we explain the five widely applied repeated testing procedures. Although, in our study, we propose the adoption of FDR, other procedures are also included in our SPSS macro MODFIND.

In all the procedures below, first an ordered array of the  $p$  values from smallest to largest is obtained and the ordered  $\{p_j\}$  are denoted the by  $P_{(1)} \leq P_{(2)} \leq \dots \leq P_{(m)}$  where  $m$  denotes the total number of repeated tests. Tied  $p_j$  can be ordered arbitrarily. The corresponding hypotheses are denoted as  $H_{(1)}, H_{(2)}, \dots, H_{(m)}$ .

*Bonferonni correction (1935)*

Reject  $H_{(i)}$  when, for all  $j = 1, \dots, i$

$$P_{(j)} \leq \alpha/m.$$

*Holm's Procedure (1979)*

Reject  $H_{(i)}$  when, for all  $j = 1, \dots, i$

$$P_{(j)} \leq \alpha/(m - j + 1).$$

*Hochberg's Procedure (1988)*

For any  $i = m, m - 1, \dots, 1$ , if

$$P_{(i)} \leq \alpha/(m - i + 1),$$

reject all  $H_{(i^*)}$  where  $i^* \leq i$ .

*Hommel's Procedure (1988)*

Compute  $j = \max \{i \in \{1, \dots, m\} : P_{(m-i+k)} > ka / i \text{ for } k = 1, \dots, i\}$ .

If the maximum does not exist, reject all  $H_{(i)}$  ( $i = 1, \dots, m$ ),

otherwise reject all  $H_{(i)}$  with  $P_{(i)} \leq \alpha/j$ .

*False Discovery Rate Procedure (Benajmini and Hochberg, 1995)*

Let  $k$  be the largest  $i$  for which  $P_{(i)} \leq i\alpha/m$ ;

reject all  $H_{(i)}$   $i = 1, \dots, k$ .

**Sample Applications**

*Syntax 1:*

```
MODFIND Y=ind / X=dep / M=m1 m2 m3 m4 m5 / C=c1 c2 / THREEWAY=1 / METHOD=5 /ALPHA=0.05.
```

*Explanation 1:*

In this syntax, `ind` is the focal independent variable and `dep` is the dependent variable. The set of moderator variables are `m1`, `m2`, `m3`, `m4`, and `m5`. `c1` and `c2` are control variables. The macro estimates all two-way and three-way interaction models and controls for the fifth repeated testing method (i.e. False Discovery Rate) where the family wise error alpha (i.e. false discovery rate in this case) is 0.05. The macro yields the output below which only displays those models that qualify with respect to the repeated testing correction criteria. In the output below, a total of 15 models ( $5 + C(5,2)$ ) is run. Only five of these models passed the criteria and thus are displayed in the output.

*Output 1:*

Run MATRIX procedure:

SPSS Macro for Discovering Two-Way and Three-Way Interactions in OLS

Version 1.0, 27 August 2013

Outcome Variable:  
dep

Focal Predictor Variable:  
ind

Moderator Variables:  
m1  
m2  
m3  
m4  
m5

Control Variables:  
c1  
c2

Summary of Input  
N no.mods no.conts  
60 5 2

The procedure you specified is:  
FDR

The significance level that is controlled for (ALPHA) is:  
.0500

## Repeated Testing Correction Results

model no	p-val	rank	criteria	satisfie	rej
1.0000	.0000	1.0000	.0033	1.0000	1.0000
2.0000	.0903	8.0000	.0267	.0000	.0000
3.0000	.0006	2.0000	.0067	1.0000	1.0000
4.0000	.0602	7.0000	.0233	.0000	.0000
5.0000	.0071	5.0000	.0167	1.0000	1.0000
6.0000	.4750	12.0000	.0400	.0000	.0000
7.0000	.1717	9.0000	.0300	.0000	.0000

Discovering Moderators

8.0000	.3908	11.0000	.0367	.0000	.0000
9.0000	.2259	10.0000	.0333	.0000	.0000
10.0000	.9673	15.0000	.0500	.0000	.0000
11.0000	.0321	6.0000	.0200	.0000	.0000
12.0000	.0030	3.0000	.0100	1.0000	1.0000
13.0000	.6212	13.0000	.0433	.0000	.0000
14.0000	.8810	14.0000	.0467	.0000	.0000
15.0000	.0068	4.0000	.0133	1.0000	1.0000

You can reject the hypothesis at the reject column which have values of 1

MODELS

MODEL

1

Interaction is defined as:

ind X m1

Complete Model Regression Summary

R-sq	F	df1	df2	p	n
.8364	55.1971	5.0000	54.0000	.0000	60.0000

	b	se	t	p
constant	.0260	.0345	.7546	.4537
ind	.3805	.0380	10.0072	.0000
m1	.1868	.0389	4.8075	.0000
interact	-.3988	.0554	-7.1951	.0000
c1	.0044	.0265	.1661	.8687
c2	.5047	.0615	8.2066	.0000

MODEL

3

Interaction is defined as:

ind X m3

Complete Model Regression Summary

R-sq	F	df1	df2	p	n
.7567	33.5899	5.0000	54.0000	.0000	60.0000

	b	se	t	p
constant	.0945	.0447	2.1136	.0392
ind	.2952	.0435	6.7789	.0000
m3	.1181	.0598	1.9741	.0535
interact	-.2889	.0787	-3.6716	.0006
c1	-.0028	.0321	-.0883	.9300
c2	.4288	.0823	5.2125	.0000

MODEL  
5

Interaction is defined as:  
ind X m5

Complete Model Regression Summary

R-sq	F	df1	df2	p	n
.7250	28.4668	5.0000	54.0000	.0000	60.0000

	b	se	t	p
constant	.1018	.0559	1.8214	.0741
ind	.3071	.0561	5.4736	.0000
m5	.0895	.0606	1.4764	.1456
interact	-.2519	.0901	-2.7970	.0071
c1	.0064	.0353	.1824	.8560
c2	.3796	.0905	4.1950	.0001

MODEL  
12

First moderator (m1) is:  
m2

Second moderator (m2) is:  
m5

3-way Interaction (x\*m1\*m2) is defined as:  
ind X m2 X m5

Complete Model Regression Summary

R-sq	F	df1	df2	p	n
.7831	20.0573	9.0000	50.0000	.0000	60.0000

	b	se	t	p
constant	.2423	.0890	2.7221	.0089
ind	-.0060	.1134	-.0530	.9579
m2	-.2797	.1306	-2.1418	.0371
m5	-.2477	.1425	-1.7388	.0882
x*m1	.3909	.1532	2.5518	.0138
x*m2	.1310	.1674	.7829	.4374
m1*m2	.4269	.1846	2.3119	.0249
x*m1*m2	-.4052	.1298	-3.1220	.0030
c1	.0158	.0328	.4818	.6320
c2	.6520	.1303	5.0045	.0000

MODEL  
15

First moderator (m1) is:  
m4

Second moderator (m2) is:  
m5

3-way Interaction (x\*m1\*m2) is defined as:  
ind X m4 X m5

=====  
Complete Model Regression Summary

	R-sq	F	df1	df2	p	n
	.7745	19.0764	9.0000	50.0000	.0000	60.0000

=====  

	b	se	t	p
constant	.2403	.0867	2.7699	.0079
ind	.0729	.1140	.6389	.5258
m4	-.2113	.1088	-1.9421	.0578
m5	-.2491	.1272	-1.9581	.0558
x*m1	.1499	.1384	1.0826	.2842
x*m2	.1650	.1627	1.0146	.3152
m1*m2	.3915	.1555	2.5185	.0150
x*m1*m2	-.3188	.1130	-2.8219	.0068
c1	.0084	.0337	.2483	.8049
c2	.5722	.1316	4.3476	.0001

=====

----- END MATRIX -----

*Syntax 2:*

MODFIND Y=dep/ X=ind /M=m1 m2 m3 m4 m5/C=c1 c2/ split=1.

*Explanation 2:*

In this syntax, ind is the focal independent variable and dep is the dependent variable. The set of moderator variables are m1, m2, m3, m4, and m5. The control variables are c1 and c2. The macro estimates all two-way interaction models and applies split samples procedure. The output below presents all five models. The interaction effect is significant in both of the subsamples in Model 1, so the researcher can conclude that there is in fact moderation. Moreover the interaction effect is significant in the first subsample of Model 3 ( $p=0.356$ ), and it is around 10% level in the second subsample. In this case, the researcher should make the judgment in evaluating the evidence and whether to collect additional data to test this model.

*Output 2:*

Run MATRIX procedure:

SPSS Macro for Discovering Two-Way and Three-Way Interactions in OLS

Version 1.0, 27 August 2013

Outcome Variable:

dep

---

Focal Predictor Variable:

ind

Moderator Variables:

m1  
m2  
m3  
m4  
m5

Control Variables:

c1  
c2

Summary of Input

N	no.mods	no.conts
60	5	2

MODEL

1

Interaction is defined as:

ind        X            m1

=====

Complete Model Regression Summary for the FIRST split sample

R-sq	F	df1	df2	p	n
.9169	52.9849	5.0000	24.0000	.0000	30.0000

Complete Model Regression Summary for the SECOND split sample

R-sq	F	df1	df2	p	n
.6350	8.3494	5.0000	24.0000	.0001	30.0000

=====

Regression Coefficients of FIRST split sample

	b	se	t	p
constant	-.0298	.0562	-.5307	.6005
ind	.4502	.0529	8.5064	.0000
m1	.2182	.0616	3.5419	.0017
interact	-.4678	.0861	-5.4325	.0000
c1	-.0028	.0385	-.0730	.9424
c2	.5715	.0945	6.0454	.0000

Regression Coefficients of SECOND split sample

	b	se	t	p
constant	.0742	.0454	1.6356	.1150
ind	.3805	.1224	3.1079	.0048
m1	.2522	.1051	2.4004	.0245
interact	-.4725	.1869	-2.5288	.0184
c1	.0331	.0418	.7922	.4360
c2	.2526	.2224	1.1359	.2672

=====

MODEL

2

Interaction is defined as:

ind        X            m2

Discovering Moderators

```

=====
Complete Model Regression Summary for the FIRST split sample
      R-sq      F      df1      df2      p      n
      .8075    20.1410    5.0000    24.0000    .0000    30.0000
  
```

```

Complete Model Regression Summary for the SECOND split sample
      R-sq      F      df1      df2      p      n
      .6754     9.9884    5.0000    24.0000    .0000    30.0000
  
```

```

=====
Regression Coefficients of FIRST split sample
      b      se      t      p
constant  .1520  .0927  1.6394  .1142
ind       .3111  .0835  3.7275  .0010
m2       .0201  .1038  .1939   .8478
interact -.1018  .1510  -.6741  .5067
c1       -.0111  .0585  -.1899  .8510
c2       .2077  .1590  1.3057  .2040
  
```

```

Regression Coefficients of SECOND split sample
      b      se      t      p
constant  .0530  .0598  .8854   .3847
ind       .0551  .0684  .8062   .4281
m2       .0659  .0761  .8653   .3955
interact  .0811  .1178  .6885   .4977
c1       .0454  .0392  1.1574  .2585
c2       .7170  .1380  5.1975  .0000
  
```

```

=====
MODEL
  3
  
```

```

Interaction is defined as:
  ind      X      m3
  
```

```

=====
Complete Model Regression Summary for the FIRST split sample
      R-sq      F      df1      df2      p      n
      .8384    24.9062    5.0000    24.0000    .0000    30.0000
  
```

```

Complete Model Regression Summary for the SECOND split sample
      R-sq      F      df1      df2      p      n
      .5876     6.8383    5.0000    24.0000    .0004    30.0000
  
```

```

=====
Regression Coefficients of FIRST split sample
      b      se      t      p
constant  .0226  .0922  .2451   .8085
ind       .3773  .0769  4.9070  .0001
m3       .1840  .1128  1.6313  .1159
interact -.3484  .1565  -2.2265  .0356
c1       -.0054  .0519  -.1041  .9179
c2       .4465  .1639  2.7240  .0118
  
```

```

Regression Coefficients of SECOND split sample
      b      se      t      p
constant  .0736  .0531  1.3852  .1787
  
```

ind	.1900	.0732	2.5967	.0158
m3	.1129	.0880	1.2822	.2120
interact	-.2175	.1306	-1.6654	.1088
c1	.0617	.0458	1.3484	.1901
c2	.5953	.1593	3.7370	.0010

=====

MODEL

4

Interaction is defined as:

ind X m4

=====

Complete Model Regression Summary for the FIRST split sample

R-sq	F	df1	df2	p	n
.8453	26.2315	5.0000	24.0000	.0000	30.0000

Complete Model Regression Summary for the SECOND split sample

R-sq	F	df1	df2	p	n
.5510	5.8904	5.0000	24.0000	.0011	30.0000

=====

Regression Coefficients of FIRST split sample

	b	se	t	p
constant	.1627	.0776	2.0961	.0468
ind	.3085	.0691	4.4678	.0002
m4	-.0287	.1029	-.2785	.7830
interact	-.1304	.1394	-.9350	.3591
c1	-.0267	.0502	-.5315	.5999
c2	.2996	.1529	1.9594	.0618

Regression Coefficients of SECOND split sample

	b	se	t	p
constant	.1521	.0750	2.0291	.0537
ind	.0315	.0871	.3615	.7209
m4	-.0751	.0902	-.8326	.4133
interact	.1046	.1486	.7041	.4881
c1	.0433	.0469	.9246	.3644
c2	.6578	.1617	4.0675	.0004

=====

MODEL

5

Interaction is defined as:

ind X m5

=====

Complete Model Regression Summary for the FIRST split sample

R-sq	F	df1	df2	p	n
.8234	22.3799	5.0000	24.0000	.0000	30.0000

Complete Model Regression Summary for the SECOND split sample

R-sq	F	df1	df2	p	n
.5379	5.5872	5.0000	24.0000	.0015	30.0000

Discovering Moderators

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Regression Coefficients of FIRST split sample

	b	se	t	p
constant	.1509	.0960	1.5719	.1291
ind	.3165	.0857	3.6934	.0011
m5	-.0130	.1003	-.1299	.8977
interact	-.1132	.1503	-.7533	.4586
c1	.0045	.0593	.0755	.9405
c2	.2314	.1435	1.6126	.1199

Regression Coefficients of SECOND split sample

	b	se	t	p
constant	.1045	.0667	1.5666	.1303
ind	.0941	.1133	.8306	.4144
m5	.0013	.0987	.0130	.9898
interact	-.0108	.1782	-.0605	.9522
c1	.0489	.0472	1.0369	.3101
c2	.6694	.1694	3.9511	.0006

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----- END MATRIX -----

## Chapter 7

### CONCLUSION

‘Middle managers are central to explaining key organizational outcomes’ (Wooldridge, Schmid and Floyd, 2008: 1191). This dissertation particularly focuses on middle managers while bringing together topics from strategic cognition, strategy process and behavioral strategy. Apart from the theoretical and managerial contributions to several subfields of strategic management - as mentioned within each chapter-, this dissertation also makes contributions to middle management research. This chapter discusses these contributions, summarizes general limitations, and addresses future research directions.

#### **Contributions to Middle Management Research**

The birth of middle management is as old as birth of the ‘modern business enterprise’. By late 1840, there were no middle managers in United States (Chandler, 1977). When the traditional single-unit enterprise –that handled only one economic function, had a single production line, and operated in one geographic area– was replaced with the multi-unit modern business enterprise –that has many distinct operating units, serves multiple economic functions, and operates in a widely dispersed area–, a hierarchy of managers taken over the role of market mechanism in coordinating the activities of the economy. Adam Smith’s invisible hand of market forces was replaced with the visible hand of middle managers (Chandler, 1977). Middle managers soon became the most influential group of economic decision makers in the economy, until the revolutionary innovations in communication and information technologies changed the way organizations work drastically. After that, it did not take much time until middle managers built a bad reputation as ‘inflexible, unimaginative bureaucrats’ who defend

the status quo and are at the center of organizational politics (Huy, 2001: 73). The mid 90's recession triggered the era of middle manager layoffs, as organizations strive for leaner organizational structures. The resulting new model of organization was flatter and more entrepreneurial than the classical form and was now competing in knowledge-intensive environments (Wooldridge, Schmid and Floyd, 2008). Therefore the role middle managers, once narrowly focused on control and coordination of functional/geographical units, are redefined in terms of their contribution to strategy process, such as championing new strategic initiatives, managing the entrepreneurial process, nesting experimental programs, and facilitating organizational adaptability (Floyd and Lane, 2000).

In parallel to the evolving roles of middle managers, a substantial amount of research on middle managers had been accumulated in the literature. Wooldridge, Schmid and Floyd (2008) synthesized the past 25 years of middle managers research and introduced 'a middle managers' perspective' on strategy process. This perspective is not placed as an alternative to Hambrick and Mason's (Hambrick and Mason, 1984) upper echelons perspective, but it aims to complement it by unraveling the black box of making and implementing strategies. Wooldridge and colleagues identified high priority research issues in middle management research, and this dissertation aims to address several of those issues to differing extents.

Wooldridge, Schmid and Floyd (2008) call for research that highlights the varieties of mental models at different levels and in different divisions within large, complex organizations. This is important because middle managers' has a sound perspective regarding the organizational capabilities and the uncertainties surrounding the organization (King and Zeithaml, 2001). Wooldridge et al. (2008: 1214) particularly raise this question: 'How ... does mental model similarity within a team and similarities or differences between the team and other units (e.g., top management) influence enactment of roles and subsequent success or failure of an initiative?'. Chapter 2 of this dissertation addresses this issue by developing a method that is capable of measuring and visualizing the mental models within middle management teams and also across divisions at various levels of the organization. The Strategic Consensus Mapping enables researchers to investigate how shared strategic thinking of middle managers evolve over time and whether significant changes occur, and also to probe how middle managers' thinking complements and/or conflicts with managerial perceptions and cognitions at other levels of the organization. In addition, Chapter 3 demonstrates how the similarity between the manager and the top management (i.e., CEO) influences the subsequent failure or success of strategy implementation.

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Wooldridge, Schmid and Floyd (2008) also call for establishing the links between shared understanding and the strategic behavior of middle managers, both in teams and as cohorts of individuals, in an effort to create bridges between cognitive and behavioral approaches. Chapter 3 conceptualizes consensus and commitment separately, as the shared understanding of strategy does not necessarily mean acceptance of strategy and without acceptance sharedness is not likely to lead successful execution of strategy (Dess, 1987, Wooldridge and Floyd, 1989). We incorporated shared commitment to strategy in our research as a proxy closer behavior and eventually to strategy related performance than strategic consensus. Moreover, because the advantages of mental model similarity is more emphasized in environments characterized by high degrees of complexity, such as strategy making, than less uncertain operating environments, the investigation of psychological antecedents of strategic alignment in Chapter 4 contributes to bridging the gap between psychology and strategic management.

Another call for research is to examine the middle managers' resistance against organizational strategy in an effort to extend the works of Ketokivi and Castaner (2004) and Guth and MacMillan (1986) (Wooldridge, Schmid and Floyd, 2008). Empirical findings in Chapter 3 address this call by indicating a hindrance against organizational strategies when the transformational leadership of the manager interacts with the mis-alignment with the organizational direction. Moreover, in Chapter 4, we identify middle managers' low levels of fairness perceptions about organization's strategy process as a driver of diminished alignment with and commitment to organizational strategies. When interpreted in the light of the findings of chapter 3, this study also contributes to determining the potential causes of resistance against organizational strategies.

A fundamental call for research is for multilevel investigation of linkages between managers' perceptions, behaviors and outcomes (Wooldridge, Schmid and Floyd, 2008). In that regard, Chapter 4 attempts to fulfill this call by revealing that when middle managers are constructing their justice perceptions about the strategy process, they do not only take into account their own involvement in the strategy process, but also are sensitive to the involvement of their teammates (i.e., a disparity in their peers' strategic involvement is perceived as an indication of unfair strategy process). The complementary multi-level analysis in Chapter 4 can be considered as an initial step in this direction.

Finally, the general call for more rigorous methods in order to reach truthful theories (Wooldridge, Schmid and Floyd, 2008) is attended –tough not exclusive to middle management research– by our concerns on repeated testing problem in Chapter 5 of this dissertation. The

solutions we propose in Chapter 5 and the tool we developed in Chapter 6 responds to this call by raising awareness on wrong practices and by paving the path to building more truthful theories.

### **Limitations and Future Research Directions**

This dissertation is not without limitations as any research endeavor. One of the limitations of this dissertation is that each chapter made a comprehensive analysis of one or a limited number of organizations. Although this approach provided analytical advantages because the organizational context is an essential factor that is needed to be controlled for, and although our results are replicated also in a third organization in chapter 4, we still restate the possible concern about generalizability. Future research should extend the scope of middle management research by investigating across organizational boundaries. Another limitation is that we focused on intermediate outcomes, e.g., soft outcomes (Hutzschenreuter and Kleindienst, 2006) in strategy process, because of the problematic nature of identifying relevant outcomes at the organizational level (Wooldridge, Schmid and Floyd, 2008). Our outcomes, strategic consensus, commitment and alignment imply middle managers' strategy related performance; yet future research should shift the focus from intermediate outcomes to holistic level outcomes such as sub unit performance or preferably the economic performance of the firm. Identifying and linking middle manager cognition, perception and behavior to strategy related performance is a challenging task due to the lack of clarity in multi-level scaling/aggregation of middle managers' impact. Finally, causality cannot be guaranteed because of the cross-sectional nature of our research designs. Future research should involve longitudinal designs and experimental studies in to the spectrum of middle management research as well.

There are several directions for future research. A comparison of the proposed consensus-mapping method in Chapter 2 with a variety of existing methods, and a computational tool that makes the use of the new method available to researchers will be of great value to further integrate academic effort around shared cognition. In addition, examining the evolution of shared cognition of a broad group of managers within an organization throughout different phases of strategy process or as they go through disruptive events (i.e., making use of the longitudinal significance testing feature of the proposed method), and rescaling the application of the method at an industry-level and investigating the formations of strategic groups (i.e., making use of the between-group quantifications and visualizations feature of the method) are

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two research opportunities provided by strategic consensus mapping.

Future research should also explore the relationship between managers' strategic cognition and their strategic role fulfillment. Strategic roles of middle managers are closer proxies to strategy-related performance at an individual level. Theory at the individual level can be enriched by delving into the cross-level determinants of roles, preferably including team contextual variable together with individual level psychological characteristics of managers as well. In that regard, individual motivational orientations of the middle managers are very relevant, because it is argued that strategic behavior has a large voluntary component and beyond the scope of the formal coordination mechanisms within organizations (Floyd and Lane, 2000).

Finally, future research should keep building the psychological foundations of middle management behavior, and broaden its scope by drawing on the rich theories of organizational psychology. This dissertation already based its arguments on transformational leadership, power and organizational justice theories, and left many more to be further explored.



## REFERENCES

- Ahearne M, Lam SK, Kraus F. 2013. Performance impact of middle managers' adaptive strategy implementation: The role of social capital. *Strategic Management Journal* **35** (1): 68-87.
- Aiken LS, West SG, Reno RR. 1991. *Multiple Regression: Testing and Interpreting Interactions*. Sage: Newbury Park, CA.
- Allen NJ, Stanley DJ, Williams HM, Ross SJ. 2007. Assessing the impact of nonresponse on work group diversity effects. *Organizational Research Methods* **10** (2): 262-286.
- Amason AC. 1996. Distinguishing the effects of functional and dysfunctional conflict on strategic decision making: Resolving a paradox for top management teams. *Academy of Management Journal* **39** (1): 123-148.
- Anderson C, Spataro SE, Flynn FJ. 2008. Personality and organizational culture as determinants of influence. *Journal of Applied Psychology* **93** (3): 702-710.
- Aquino K, Tripp TM, Bies RJ. 2006. Getting even or moving on? Power, procedural justice, and types of offense as predictors of revenge, forgiveness, reconciliation, and avoidance in organizations. *Journal of Applied Psychology* **91** (3): 653-668.
- Balogun J, Johnson G. 2004. Organizational restructuring and middle manager sensemaking. *Academy of Management Journal* **47** (4): 523-549.
- Barney J. 1991. Firm resources and sustained competitive advantage. *Journal of management* **17** (1): 99-120.
- Baron RM, Kenny DA. 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* **51** (6): 1173-1182.
- Bass BM. 1985. *Leadership and Performance Beyond Expectations*. Free Press: New York.
- Bass BM, Riggio RE. 2006. *Transformational Leadership*. Lawrence Erlbaum: Mahwah, NJ.
- Bass BM, Steidlmeier P. 1999. Ethics, character, and authentic transformational leadership behavior. *The leadership quarterly* **10** (2): 181-217.
- Begley TM, Lee C, Hui C. 2006. Organizational level as a moderator of the relationship between justice perceptions and work-related reactions. *Journal of Organizational Behavior* **27** (6): 705-721.
- Benjamini Y, Hochberg Y. 1995. Controlling the false discovery rate: a practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society. Series B (Methodological)* : 289-300.

- Benjamini Y, Yekutieli D. 2001. The control of the false discovery rate in multiple testing under dependency. *Annals of statistics* : 1165-1188.
- Berson Y, Avolio BJ. 2004. Transformational leadership and the dissemination of organizational goals: A case study of a telecommunication firm. *Leadership Quarterly* **15** (5): 625-646.
- Bertrand M, Schoar A. 2003. Managing with style: The effect of managers on firm policies. *The Quarterly Journal of Economics* **118** (4): 1169-1208.
- Bettis RA. 2012. The search for asterisks: Compromised statistical tests and flawed theories. *Strategic Management Journal*, **33** (1): 108-113.
- Beyer JM. 1999. Taming and promoting charisma to change organizations. *The Leadership Quarterly* **10** (2): 307-330.
- Bliese PD. 2000. Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions*. Klein KJ and Kozlowski SWJ (eds). Jossey-Bass: San Francisco, CA; 349-381
- Boal KB, Hooijberg R. 2000. Strategic leadership research: Moving on. *Leadership Quarterly* **11** (4): 515-549.
- Bonferroni CE. 1935. *Il calcolo delle assicurazioni su gruppi di teste*. Tipografia del Senato: In: Studi in Onore del Professore Salvatore Ortu Carboni (ed Carboni SO), pp. 13–60. Tipografia del Senato, Rome.
- Bono JE, Judge TA. 2003. Self-Concordance at work: Toward understanding the motivational effects of transformational leaders. *Academy of Management Journal* **46** (5): 554-571.
- Borg I, Groenen PJF. 2005. *Modern Multidimensional Scaling: Theory and Applications*. Springer Verlag: New York.
- Boswell WR. 2006. Aligning employees with the organization's strategic objectives: out of 'line of sight', out of mind. *International Journal of Human Resource Management* **17** (9): 1489-1511.
- Bourgeois III L. 1985. Strategic goals, perceived uncertainty, and economic performance in volatile environments. *Academy of Management Journal* **28** (3): 548-573.
- Bourgeois III L. 1980. Performance and consensus. *Strategic Management Journal* **1** (3): 227-248.
- Burgelman RA. 1983. A process model of internal corporate venturing in the diversified major firm. *Administrative Science Quarterly* **28** (2): 223-244.
- Burgelman RA. 1991. Intraorganizational ecology of strategy making and organizational adaptation: Theory and field research. *Organization science* **2** (3): 239-262.

- Cannella AA, Monroe MJ. 1997. Contrasting perspectives on strategic leaders: Toward a more realistic view of top managers. *Journal of Management* **23** (3): 213-237.
- Cannon-Bowers JA, Salas E, Converse S. 2001. Shared mental models in expert team decision making. In *Individual and Group Decision Making*, Castellan NJ (ed). Lawrence Erlbaum: Hillsdale, NJ; 221-246
- Chandler AD. 1977. *The visible hand: The managerial revolution in American business*. Harvard University Press: Cambridge.
- Chin WW. 1998. The partial least squares approach for structural equation modeling. In *Modern methods for business research. Methodology for business and management*, Marcoulides GA (ed). Lawrence Erlbaum Associates Publishers: Mahwah, NJ; 295-336
- Chin WW, Marcolin BL, Newsted PR. 2003. A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. *Information Systems Research* **14** (2): 189-217.
- Clegg S, Courpasson D, Phillips N. 2006. *Power and Organizations*. Sage: London.
- Cohen A, Doveh E, Eick U. 2001. Statistical properties of the  $r_{WG}(I)$  index of agreement. *Psychological methods* **6** (3): 297-310.
- Cohen-Charash Y, Spector PE. 2001. The role of justice in organizations: A meta-analysis. *Organizational Behavior and Human Decision Processes* **86** (2): 278-321.
- Colbert AE, Kristof-Brown AL, Bradley BH, Barrick MR. 2008. CEO transformational leadership: The role of goal importance congruence in top management teams. *Academy of Management Journal* **51** (1): 81-96.
- Collier N, Fishwick F, Floyd SW. 2004. Managerial involvement and perceptions of strategy process. *Long Range Planning* **37** (1): 67-83.
- Colquitt JA. 2001. On the dimensionality of organizational justice: A construct validation of a measure. *Journal of Applied Psychology* **86** (3): 386-400.
- Colquitt JA, Conlon DE, Wesson MJ, Porter CO, Ng KY. 2001. Justice at the millennium: A meta-analytic review of 25 years of organizational justice research. *Journal of Applied Psychology* **86** (3): 425-445.
- Colquitt JA. 2004. Does the justice of the one interact with the justice of the many? Reactions to procedural justice in teams. *Journal of Applied Psychology* **89** (4): 633.
- Colquitt JA, Zapata-Phelan CP. 2007. Trends in theory building and theory testing: A five-decade study of the Academy of Management Journal. *Academy of Management Journal* **50** (6): 1281-1303.

- Cook TD, Campbell DT, Day A. 1979. *Quasi-experimentation: Design & analysis issues for field settings*. Houghton Mifflin : Boston
- Cropanzano R, Byrne ZS, Bobocel DR, Rupp DE. 2001a. Moral virtues, fairness heuristics, social entities, and other denizens of organizational justice. *Journal of Vocational Behavior* **58** (2): 164-209.
- Cropanzano R, Rupp DE, Mohler CJ, Schminke M. 2001b. Three roads to organizational justice. In *Research in Personnel and Human Resources Management*, Ferris GR (ed). Elsevier: Greenwich, CT; 1-123
- Currie G, Procter SJ. 2005. The antecedents of middle managers' strategic contribution: The case of a professional bureaucracy. *Journal of Management Studies* **42** (7): 1325-1356.
- Cyert RM, March J. 1963. A behavioral theory of the firm. *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*
- DeChurch LA, Hiller NJ, Murase T, Doty D, Salas E. 2010. Leadership across levels: Levels of leaders and their levels of impact. *Leadership Quarterly* **21** (6): 1069-1085.
- Dess GG. 1987. Consensus on strategy formulation and organizational performance: Competitors in a fragmented industry. *Strategic Management Journal* **8** (3): 259-277.
- Dess GG, Origer NK. 1987. Environment, structure, and consensus in strategy formulation: A conceptual integration. *Academy of Management Review* : 313-330.
- Diamantopoulos A, Winklhofer HM. 2001. Index construction with formative indicators: An alternative to scale development. *Journal of Marketing Research* **38** (2): 269-277.
- Donald KF, Goldsby MG. 2004. Corporate entrepreneurs or rogue middle managers? A framework for ethical corporate entrepreneurship. *Journal of Business Ethics* **55** (1): 13-30.
- Dooley RS, Fryxell GE. 1999. Attaining decision quality and commitment from dissent: The moderating effects of loyalty and competence in strategic decision-making teams. *Academy of Management Journal* **42** (4): 389-402.
- Dooley RS, Fryxell GE, Judge WQ. 2000. Belaboring the not-so-obvious: Consensus, commitment, and strategy implementation speed and success. *Journal of Management* **26** (6): 1237-1257.
- Dutton JE, Ashford SJ. 1993. Selling issues to top management. *Academy of Management Review* **18** (3): 397-428.
- Dutton JE, Ashford SJ, O'neill RM, Hayes E, Wierba EE. 1997. Reading the wind: How middle managers assess the context for selling issues to top managers.

- Dyson R, Foster M. 1982. The relationship of participation and effectiveness in strategic planning. *Strategic Management Journal* **3** (1): 77-88.
- Earley PC, Lind EA. 1987. Procedural justice and participation in task selection: The role of control in mediating justice judgments. *Journal of Personality and Social Psychology* **52** (6): 1148-1160.
- Edwards JR, Lambert LS. 2007. Methods for integrating moderation and mediation: A general analytical framework using moderated path analysis. *Psychological Methods* **12** (1): 1-22.
- Edwards JR. 2010. Reconsidering theoretical progress in organizational and management research. *Organizational Research Methods* **13** (4): 615-619.
- Efron B, Tibshirani R, Storey JD, Tusher V. 2001. Empirical Bayes analysis of a microarray experiment. *Journal of the American Statistical Association* **96** (456): 1151-1160.
- Efron B, Tibshirani R. 1993. *An introduction to the bootstrap*. CRC press: Boca Raton.
- Eisenhardt KM, Bourgeois III L. 1988. Politics of strategic decision making in high-velocity environments: Toward a midrange theory. *Academy of Management Journal* **31** (4): 737-770.
- Evans MG. 1985. A Monte Carlo study of the effects of correlated method variance in moderated multiple regression analysis. *Organizational Behavior and Human Decision Processes* **36** (3): 305-323.
- Ferris GR, Hochwarter WA, Buckley MR. 2012. Theory in the organizational sciences How will we know it when we see it? *Organizational Psychology Review* **2** (1): 94-106.
- Finkelstein S, Hambrick DC. 1990. Top-management-team tenure and organizational outcomes: The moderating role of managerial discretion. *Administrative Science Quarterly* **35** (3)
- Floyd SW, Lane PJ. 2000. Strategizing throughout the organization: Managing role conflict in strategic renewal. *Academy of Management Review* **25** (1): 154-177.
- Floyd SW, Wooldridge B. 1997. Middle management's strategic influence and organizational performance. *Journal of Management Studies* **34** (3): 465-485.
- Floyd SW, Wooldridge B. 1992. Middle management involvement in strategy and its association with strategic type: a research note. *Strategic Management Journal* **13** (S1): 153-167.
- Fornell C, Bookstein FL. 1982. Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research* **19** (4): 440-452.
- Fornell C, Larcker DF. 1981. Structural equation models with unobservable variables and measurement error. *Journal of Marketing Research* **18** (1): 39-50.

- French J, Raven B. 1959. The bases of social power. In *Studies in Social Power*, Cartwright D (ed). Institute for Social Research: Ann Arbor, MI; 150-167.
- Gerbing DW, Hamilton JG, Freeman EB. 1994. A large-scale second-order structural equation model of the influence of management participation on organizational planning benefits. *Journal of Management* **20** (4): 859-885.
- Gerstner CR, Day DV. 1997. Meta-Analytic review of leader–member exchange theory: Correlates and construct issues. *Journal of Applied Psychology* **82** (6): 827-844.
- Glisson C, James LR. 2002. The cross-level effects of culture and climate in human service teams. *Journal of Organizational Behavior* **23** (6): 767-794.
- González-Benito J, Aguinis H, Boyd BK, Suárez-González I. 2012. Coming to Consensus on Strategic Consensus A Mediated Moderation Model of Consensus and Performance. *Journal of Management* **38** (6): 1685-1714.
- Good P. 2005. *Permutation, parametric and bootstrap tests of hypotheses*. Springer Series in Statistics.
- Gower JC. 1996. *Biplots*. CRC Press: Boca Raton.
- Graham JW. 1991. Servant-leadership in organizations: Inspirational and moral. *Leadership Quarterly* **2** (2): 105-119.
- Gruber M, Heinemann F, Brettel M, Hungeling S. 2010. Configurations of resources and capabilities and their performance implications: an exploratory study on technology ventures. *Strategic Management Journal* **31** (12): 1337-1356.
- Guth WD, MacMillan IC. 1986. Strategy implementation versus middle management self-interest. *Strategic Management Journal* **7** (4): 313-327.
- Hambrick DC. 1981. Environment, strategy, and power within top management teams. *Administrative Science Quarterly* **26** (2): 253-275.
- Hambrick DC, Cannella Jr AA. 1989. Strategy implementation as substance and selling. *Academy of Management Executive* **3** (4): 278-285.
- Hambrick DC, Mason PA. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review* **9** (2): 193-206.
- Hambrick DC, Cho TS, Chen M. 1996. The influence of top management team heterogeneity on firms' competitive moves. *Administrative Science Quarterly* : 659-684.
- Hayes AF, Matthes J. 2009. Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behavior Research Methods* **41** (3): 924-936.

- Hayes AF. 2013. *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.
- Herold DM, Fedor DB, Caldwell S, Liu Y. 2008. The effects of transformational and change leadership on employees' commitment to a change: A multilevel study. *Journal of Applied Psychology* **93** (2): 346-357.
- Hesterberg T, Moore DS, Monaghan S, Clipson A, Epstein R. 2005. *Bootstrap Methods and Permutation Tests*. WH Freeman: New York.
- Hitt MA, Tyler BB. 1991. Strategic decision models: Integrating different perspectives. *Strategic Management Journal* **12** (5): 327-351.
- Hochberg Y. 1988. A sharper Bonferroni procedure for multiple tests of significance. *Biometrika* **75** (4): 800-802.
- Hodgkinson GP. 2005. *Images of Competitive Space: A Study of Managerial and Organizational Strategic Cognition*. Palgrave Macmillan: New York.
- Hodgkinson GP. 2002. Comparing managers' mental models of competition: Why self-report measures of belief similarity won't do. *Organization Studies* **23** (1): 63-72.
- Hodgkinson GP. 1998. Points or vectors? A comment on Irwin et al.'s 'Risk perception and victim perception: the judgment of HIV cases'. *Journal of Behavioral Decision Making* **11** (1): 73-78.
- Hodgkinson GP. 1997. Cognitive inertia in a turbulent market: The case of UK residential estate agents. *Journal of Management Studies* **34** (6): 921-945.
- Hodgkinson GP, Healey MP. 2008a. Cognition in organizations. *Annual Review of Psychology* **59** : 387-417.
- Hodgkinson GP, Healey MP. 2008b. Toward a (pragmatic) science of strategic intervention: design propositions for scenario planning. *Organization Studies* **29** (3): 435-457.
- Hodgkinson GP, Johnson G. 1994. Exploring the mental models of competitive strategists: The case for a processual approach. *Journal of Management Studies* **31** (4): 525-552.
- Hodgkinson GP, Whittington R, Johnson G, Schwarz M. 2006. The role of strategy workshops in strategy development processes: Formality, communication, co-ordination and inclusion. *Long range planning* **39** (5): 479-496.
- Hoffman BJ, Bynum BH, Piccolo RF, Sutton AW. 2011. Person-Organization Value Congruence: How Transformational Leaders Influence Work Group Effectiveness. *Academy of Management Journal* **54** (4): 779-796.

- Holland BS, Copenhaver MD. 1988. Improved Bonferroni-type multiple testing procedures. *Psychological bulletin* **104** (1): 145.
- Holm S. 1979. A simple sequentially rejective multiple test procedure. *Scandinavian journal of statistics* : 65-70.
- Hommel G. 1988. A stagewise rejective multiple test procedure based on a modified Bonferroni test. *Biometrika* **75** (2): 383-386.
- Hrebiniak LG, Joyce WF. 1984. *Implementing strategy*. Macmillan, New York.
- Hsu JC. 1996. *Multiple comparisons: theory and methods*. Chapman & Hall/CRC.
- Huff JO, Huff AS, Thomas H. 1992. Strategic renewal and the interaction of cumulative stress and inertia. *Strategic Management Journal* **13** (S1): 55-75.
- Hulland J. 1999. Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic Management Journal* **20** (2): 195-204.
- Hutzschenreuter T, Kleindienst I. 2006. Strategy-process research: What have we learned and what is still to be explored. *Journal of Management* **32** (5): 673-720.
- Huy QN. 2001. In praise of middle managers. *Harvard business review* **79** (8): 72-9, 160.
- Ioannidis JPA. 2011. An epidemic of false claims. *Scientific American* **304** (6): 16-16.
- Ioannidis JPA. 2005. Why most published research findings are false. *PLoS medicine* **2** (8): e124.
- James LR, Demaree RG, Wolf G. 1984. Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology* **69** (1): 85-98.
- John LK, Loewenstein G, Prelec D. 2012. Measuring the prevalence of questionable research practices with incentives for truth telling. *Psychological science* **23** (5): 524-532.
- Jones CL. 1983. A note on the use of directional statistics in weighted Euclidean distances multidimensional scaling models. *Psychometrika* **48** (3): 473-476.
- Judge TA, Fluegge Woolf E, Hurst C, Livingston B. 2006. Charismatic and transformational leadership. *Zeitschrift für Arbeits-und Organisationspsychologie* **50** (4): 203-214.
- Judge TA, Piccolo RF. 2004. Transformational and transactional leadership: a meta-analytic test of their relative validity. *Journal of Applied Psychology* **89** (5): 755-768.
- Judge TA, Piccolo RF, Ilies R. 2004. The forgotten ones? The validity of consideration and initiating structure in leadership research. *Journal of Applied psychology* **89** (1): 36-51.

- Kaplan S. 2011. Research in cognition and strategy: reflections on two decades of progress and a look to the future. *Journal of Management Studies* **48** (3): 665-695.
- Kark R, Shamir B. 2002. The dual effect of transformational leadership: Priming relational and collective selves and further effects on followers. In *Transformational and charismatic leadership: The road ahead*, Avolio BJ and Yammarino FJ (eds). Elsevier Science: Oxford, UK; 67-91
- Kark R, Shamir B, Chen G. 2003. The two faces of transformational leadership: Empowerment and dependency. *Journal of Applied Psychology* **88** (2): 246-255.
- Kellermanns FW, Walter J, Floyd SW, Lechner C, Shaw JC. 2011. To agree or not to agree? A meta-analytical review of strategic consensus and organizational performance. *Journal of Business Research* **64** (2): 126-133.
- Kellermanns FW, Walter J, Lechner C, Floyd SW. 2005. The lack of consensus about strategic consensus: Advancing theory and research. *Journal of Management* **31** (5): 719-737.
- Kellermanns FW, Floyd SW, Pearson AW, Spencer B. 2008. The contingent effect of constructive confrontation on the relationship between shared mental models and decision quality. *Journal of Organizational Behavior* **29** (1): 119-137.
- Keltner D, Gruenfeld DH, Anderson C. 2003. Power, approach, and inhibition. *Psychological review* **110** (2): 265.
- Kenny DA, Kashy DA, Bolger N. 1998. Data analysis in social psychology. In *The handbook of social psychology*, Gilbert D, Fiske S and Lindzey G (eds). McGrawHill: Boston; 233-265.
- Ketokivi M, Castaner X. 2004. Strategic planning as an integrative device. *Administrative Science Quarterly* **49** (3): 337-365.
- Kiesler S, Sproull L. 1982. Managerial response to changing environments: Perspectives on problem sensing from social cognition. *Administrative Science Quarterly* **27** (4): 548-570.
- Kilduff M, Angelmar R, Mehra A. 2000. Top management-team diversity and firm performance: Examining the role of cognitions. *Organization Science* : 21-34.
- Kim WC, Mauborgne R. 1998. Procedural justice, strategic decision making, and the knowledge economy. *Strategic Management Journal* : 323-338.
- Kim WC, Mauborgne RA. 1993. Effectively conceiving and executing multinationals' worldwide strategies. *Journal of International Business Studies* : 419-448.
- Kim WC, Mauborgne RA. 1991. Implementing global strategies: The role of procedural justice. *Strategic Management Journal* **12** (S1): 125-143.

- King AW, Zeithaml CP. 2001. Competencies and firm performance: examining the causal ambiguity paradox. *Strategic Management Journal* **22** (1): 75-99.
- Konovsky MA. 2000. Understanding procedural justice and its impact on business organizations. *Journal of Management* **26** (3): 489-511.
- Korsgaard MA, Schweiger DM, Sapienza HJ. 1995. Building commitment, attachment, and trust in strategic decision-making teams: The role of procedural justice. *The Academy of Management Journal* **38** (1): 60-84.
- Kozlowski SWJ, Bell BS. 2003. Work groups and teams in organizations. *Handbook of Psychology* : 333-375.
- Kozlowski SWJ, Klein KJ. 2000. A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes. In *Multilevel theory, research, and methods in organizations*, Klein KJ and Kozlowski SWJ (eds). Jossey-Bass: San Francisco; 3-90
- Kramer RM. 1991. Intergroup Relations and Organizational Dilemmas-The role of categorization processes. *Research in organizational behavior* **13** : 191-228.
- Laamanen T, Wallin J. 2009. Cognitive dynamics of capability development paths. *Journal of Management Studies* **46** (6): 950-981.
- Lee Rodgers J, Nicewander WA. 1988. Thirteen ways to look at the correlation coefficient. *The American Statistician* **42** (1): 59-66.
- Leventhal G. 1980. What should be done with equity theory? New approaches to the study of justice in social relationships. In *Social exchange: Advances in theory and research*, Gergen K, Greenberg M and Willis R (eds). Plenum: New York; 27-55
- Liao H, Chuang A. 2007. Transforming service employees and climate: A multilevel, multisource examination of transformational leadership in building long-term service relationships. *Journal of Applied Psychology* **92** (4): 1006-1019.
- Linting M, Meulman JJ, Groenen PJF, van der Kooij AJ. 2007. Nonlinear principal components analysis: Introduction and application. *Psychological methods* **12** (3): 336.
- Locke EA. 2007. The Case for Inductive Theory Building†. *Journal of Management* **33** (6): 867-890.
- Lowe KB, Kroeck KG, Sivasubramaniam N. 1996. Effectiveness correlates of transformational and transactional leadership: A meta-analytic review of the MLQ literature. *Leadership Quarterly* **7** (3): 385-425.
- March JG, Simon HA. 1958. *Organizations*. Wiley : New York. 2<sup>nd</sup> ed. 1993, Blackwell: Cambridge, MA.

- Markoczy L. 2001. Consensus formation during strategic change. *Strategic Management Journal* **22** (11): 1013-1031.
- Markowski CA, Markowski EP. 1990. Conditions for the effectiveness of a preliminary test of variance. *The American Statistician* **44** (4): 322-326.
- Marks MA, Mathieu JE, Zaccaro SJ. 2001. A temporally based framework and taxonomy of team processes. *Academy of Management Review* : 356-376.
- McFarlin DB, Sweeney PD. 1992. Distributive and procedural justice as predictors of satisfaction with personal and organizational outcomes. *Academy of Management Journal* **35** (3): 626-637.
- Meyer CB. 2006. Destructive dynamics of middle management intervention in postmerger processes. *The Journal of applied behavioral science* **42** (4): 397-419.
- Meyer JP, Becker TE, Vandenberghe C. 2004. Employee commitment and motivation: A conceptual analysis and integrative model. *Journal of Applied Psychology* **89** (6): 991-1007.
- Milgram S. 1974. *Obedience to Authority*. Harper and Row: New York.
- Mintzberg H, 1975. *Impediments to the use of management information*. National Association of Accountants, Society of Industrial Accountants of Canada: Hamilton, Ont.
- Mintzberg H, Waters J. 1985. Of strategies, deliberate and emergent. *Strategic Management Journal* **6** (3): 257-272.
- Mohammed S, Klimoski R, Rentsch JR. 2000. The measurement of team mental models: We have no shared schema. *Organizational Research Methods* **3** (2): 123-165.
- Mohammed S, Ferzandi L, Hamilton K. 2010. Metaphor no more: A 15-year review of the team mental model construct. *Journal of Management* **36** (4): 876-910.
- Mowday RT, Steers RM, Porter LW. 1979. The measurement of organizational commitment. *Journal of Vocational Behavior* **14** (2): 224-247.
- Narayanan V, Zane LJ, Kemmerer B. 2011. The cognitive perspective in strategy: an integrative review. *Journal of Management* **37** (1): 305-351.
- Naumann SE, Bennett N. 2000. A case for procedural justice climate: Development and test of a multilevel model. *Academy of Management Journal* **43** (5): 881-889.
- Nelson RR. 1991. Why do firms differ, and how does it matter? *Strategic Management Journal* **12** (S2): 61-74.

- Noble CH. 1999. The eclectic roots of strategy implementation research. *Journal of Business Research* **45** (2): 119-134.
- Nonaka I. 1994. A dynamic theory of organizational knowledge creation. *Organization Science* **5** (1): 14-37.
- Nutt PC. 1999. Surprising but true: Half the decisions in organizations fail. *The Academy of Management Executive* **13** (4): 75-90.
- O'Reilly III CA, Caldwell DF, Barnett WP. 1989. Work group demography, social integration, and turnover. *Administrative Science Quarterly* **34** (1): 21-37.
- O'Reilly CA, Caldwell DF, Chatman JA, Lapid M, Self W. 2010. How leadership matters: The effects of leaders' alignment on strategy implementation. *Leadership Quarterly* **21** (1): 104-113.
- Pappas JM, Wooldridge B. 2007. Middle Managers' Divergent Strategic Activity: An Investigation of Multiple Measures of Network Centrality. *Journal of Management Studies* **44** (3): 323-341.
- Peteraf M, Shanley M. 1997. Getting to know you: a theory of strategic group identity. *Strategic Management Journal* **18**: 165-186.
- Piccolo RF, Colquitt JA. 2006. Transformational leadership and job behaviors: The mediating role of core job characteristics. *Academy of Management Journal* **49** (2): 327-340.
- Podsakoff PM, MacKenzie SB, Lee JY, Podsakoff NP. 2003. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology* **88** (5): 879-903.
- Podsakoff PM, MacKenzie SB, Moorman RH, Fetter R. 1990. Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviors. *Leadership Quarterly* **1** (2): 107-142.
- Powell TC, Lovallo D, Fox CR. 2011. Behavioral strategy. *Strategic Management Journal* **32** (13): 1369-1386.
- Preacher KJ, Rucker DD, Hayes AF. 2007. Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research* **42** (1): 185-227.
- Priem RL. 1990. Top management team group factors, consensus, and firm performance. *Strategic Management Journal* **11** (6): 469-478.
- Quinn JB. 1980. *Strategies for Change: Logical Incrementalism*. Macmillan: New York.
- Raes AML, Heijltjes MG, Glunk U, Roe RA. 2011. The interface of the top management team and middle managers: A process model. *Academy of Management Review* **36** (1): 102-126.

- Rafferty AE, Griffin MA. 2004. Dimensions of transformational leadership: Conceptual and empirical extensions. *Leadership Quarterly* **15** (3): 329-354.
- Rapert MI, Velliquette A, Garretson JA. 2002. The strategic implementation process: evoking strategic consensus through communication. *Journal of Business Research* **55** (4): 301-310.
- Reave L. 2005. Spiritual values and practices related to leadership effectiveness. *Leadership Quarterly* **16** (5): 655-687.
- Resick CJ, Murase T, Bedwell WL, Sanz E, Jiménez M, DeChurch LA. 2010. Mental model metrics and team adaptability: A multi-facet multi-method examination. *Group Dynamics: Theory, Research, and Practice* **14** (4): 332.
- Riggs ML, Knight PA. 1994. The impact of perceived group success-failure on motivational beliefs and attitudes: A causal model. *Journal of Applied Psychology* **79** (5): 755.
- Ringle CM, Wende S, Will A. 2005. *SmartPLS 2.0 (beta)*. <http://www.smartpls.de>: Hamburg.
- Rumelt RP, Schendel D, Teece DJ. 1991. Strategic management and economics. *Strategic Management Journal* **12** (S2): 5-29.
- Rupp DE, Bashshur M, Liao H. 2007. Justice Climate: Consideration of Source, Target, Type, Specificity, and Emergence. in Fred Dansereau, Francis J. Yammarino (ed.) *Multi-Level Issues in Organizations and Time (Research in Multi Level Issues, Volume 6)*, Emerald Group Publishing Limited, pp.439-459.
- Rupp DE. 2011. An employee-centered model of organizational justice and social responsibility. *Organizational Psychology Review* **1** (1): 72-94.
- Salancik GR, Pfeffer J. 1974. The bases and use of power in organizational decision making: The case of a university. *Administrative Science Quarterly* **19**: 453-473.
- Shaffer JP. 1995. Multiple hypothesis testing. *Annual Review of Psychology* **46** (1): 561-584.
- Shamir B, House RJ, Arthur MB. 1993. The motivational effects of charismatic leadership: A self-concept based theory. *Organization Science* **4** (4): 577-594.
- Shamir B, Howell JM. 1999. Organizational and contextual influences on the emergence and effectiveness of charismatic leadership. *Leadership Quarterly* **10** (2): 257-283.
- Sillince J, Mueller F. 2007. Switching strategic perspective: the reframing of accounts of responsibility. *Organization Studies* **28** (2): 155-176.

- Simmons JP, Nelson LD, Simonsohn U. 2011. False-positive psychology undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychological science* **22** (11): 1359-1366.
- Stowig RW, Farwell GF. 1966. Programmatic research. *Review of Educational Research* **36** (2): 327-334.
- Sweeney PD, McFarlin DB. 1993. Workers' evaluations of the "ends" and the "means": An examination of four models of distributive and procedural justice. *Organizational Behavior and Human Decision Processes* **55** (1): 23-40.
- Tamhane AC. 1996. 18 Multiple comparisons. *Handbook of statistics* **13** : 587-630.
- Tarakci M, Ates NY, Porck JP, van Knippenberg D, Groenen PJ, de Haas M. 2013. Strategic consensus mapping: A new method for testing and visualizing strategic consensus within and between teams. *Strategic Management Journal*, forthcoming
- Teece DJ, Pisano G, Shuen A. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal* **18** (7): 509-533.
- Tenenhaus M, Vinzi VE, Chatelin YM, Lauro C. 2005. PLS path modeling. *Computational Statistics & Data Analysis* **48** (1): 159-205.
- Thibaut J, Walker L. 1975. *Procedural justice: A psychological analysis*. L. Erlbaum Associates:
- Torgerson WS. 1952. Multidimensional scaling: I. Theory and method. *Psychometrika* **17** (4): 401-419.
- Tsang EW, Kwan K. 1999. Replication and theory development in organizational science: A critical realist perspective. *Academy of Management review* **24** (4): 759-780.
- Tyler T. 1999. Why do people help organizations? Social identity and pro-organizational behavior. In *Research in organizational behavior*, Staw BM and Sutton R (eds). JAI Press: Greenwich, CT; 201-246.
- Van Dijke M, De Cremer D, Mayer DM. 2010. The role of authority power in explaining procedural fairness effects. *Journal of Applied Psychology* **95** (3): 488-502.
- Van Knippenberg D, Hogg MA. 2003. *Leadership and Power: Identity Processes in Groups and Organizations*. Sage: London.
- Van Knippenberg D. 2003. Intergroup relations in organizations. *International handbook of organizational teamwork and cooperative working* : 381-399.

- Vancouver JB, Schmitt NW. 1991. An exploratory examination of person-organization fit: Organizational goal congruence. *Personnel Psychology* **44** (2): 333-352.
- Vilà J, Canales JI. 2008. Can strategic planning make strategy more relevant and build commitment over time? The case of RACC. *Long Range Planning* **41** (3): 273-290.
- Walsh JP. 1988. Selectivity and selective perception: An investigation of managers' belief structures and information processing. *Academy of Management Journal* **31** (4): 873-896.
- Walsh JP. 1995. Managerial and organizational cognition: Notes from a trip down memory lane. *Organization Science* **6** (3): 280-321.
- West Jr CT, Schwenk CR. 1996. Top management team strategic consensus, demographic homogeneity and firm performance: A report of resounding nonfindings. *Strategic Management Journal* **17** (7): 571-576.
- Wooldridge B, Floyd SW. 1990. The strategy process, middle management involvement, and organizational performance. *Strategic Management Journal* **11** (3): 231-241.
- Wooldridge B, Floyd SW. 1989. Strategic process effects on consensus. *Strategic Management Journal* **10** (3): 295-302.
- Wooldridge B, Schmid T, Floyd SW. 2008. The middle management perspective on strategy process: contributions, synthesis, and future research. *Journal of Management* **34** (6): 1190-1221.
- Woolley AW, Gerbasi ME, Chabris CF, Kosslyn SM, Hackman JR. 2008. Bringing in the experts: How team composition and collaborative planning jointly shape analytic effectiveness. *Small Group Research* **39** (3): 352.
- Yammarino FJ, Dionne SD, Uk Chun J, Dansereau F. 2005. Leadership and levels of analysis: A state-of-the-science review. *Leadership Quarterly* **16** (6): 879-919.
- Yekutieli D, Benjamini Y. 1999. Resampling-based false discovery rate controlling multiple test procedures for correlated test statistics. *Journal of Statistical Planning and Inference* **82** (1): 171-196.
- Yukl G. 2010. *Leadership in Organizations*. Prentice Hal: Englewood Cliffs, NJ.
- Yukl G. 1999. An evaluation of conceptual weaknesses in transformational and charismatic leadership theories. *Leadership Quarterly* **10** (2): 285-305.
- Yukl G, Falbe CM. 1991. Importance of different power sources in downward and lateral relations. *Journal of Applied Psychology* **76** (3): 416-423.



# EXECUTIVE SUMMARIES

## Summary in English

Organizations must get middle managers on board in order to successfully put strategy into action. Middle managers are key strategic players in organizations due their close connection to daily operations and their reach to higher echelons. Unless these managers develop a shared understanding of and are committed to the organizational strategic goals, organizations are unlikely to realize their strategies. This dissertation focuses on the psychological foundations of middle managers' contribution to the strategy process by investigating their strategic cognitions, leadership and fairness perceptions.

In this dissertation, we develop a new method that provides a more comprehensive analysis of strategic consensus within and between organizational units (chapter 2), challenge the popular perception of managers' transformational leadership as a solely positive phenomenon in strategy implementation (chapter 3), and examine the drivers of middle managers' strategic alignment and commitment (chapter 4). Our results equip researchers with the necessary tools for integrative theory building in managerial and organizational cognition, reveal the dark-side of transformational leadership that is contingent upon the strategic alignment of the manager, and highlight the importance of middle managers' fairness perceptions about strategy making. We also look into the repeated testing problem and recommend strategies and tools to cope with this problem (chapters 5 and 6). Consequently, this dissertation extends the reach of organizational psychology and organizational behavior in strategy research by contributing to the strategy process, managerial cognition and behavioral strategy research streams.

## Summary in Dutch

Organisaties moeten hun 'middle managers' aan boord krijgen om strategie succesvol om te zetten in actie. Middle managers zijn belangrijke strategische spelers in organisaties vanwege hun nauwe betrokkenheid bij de dagelijkse activiteiten en hun connectie met de hogere echelons. Tenzij de managers een gedeeld begrip ontwikkelen van en zich in zetten voor de organisatie strategische doelen, is het onwaarschijnlijk dat de organisatie zijn strategieën zal realiseren. Dit proefschrift richt zich op de psychologische fundamenten van middle manager' bijdrage aan het strategieproces door het onderzoeken van hun strategische cognities, leiderschap en rechtvaardigheidspercepties.

In dit proefschrift ontwikkelen we een nieuwe methode die een meer uitgebreide analyse van strategische consensus biedt binnen en tussen organisatie-eenheden (hoofdstuk 2), gaan we in tegen de populaire perceptie dat managers' transformationeel leiderschap een uitsluitend positief fenomeen is in de strategie-implementatie (hoofdstuk 3), en tonen het belang van middle managers' strategische afstemming en betrokkenheid (hoofdstuk 4). Onze resultaten bieden onderzoekers de nodige instrumenten voor integratieve theorievorming in leidinggevende en organisatorische kennis, onthullen de donkere kant van transformationeel leiderschap, welke afhankelijk is van de strategische afstemming van de manager, en tonen het belang van middle managers' rechtvaardigheidspercepties over strategievorming. We kijken ook naar het herhaalde testen probleem en bieden strategieën en gereedschappen om te gaan met dit probleem (hoofdstuk 5 en 6). Zodoende breidt dit proefschrift het bereik van onderzoek van organisatiepsychologie en gedrag in organisaties in de strategie uit, door bij te dragen aan onderzoek over het strategie proces, bestuurlijke cognitie en strategisch gedrag.

## Summary in Turkish

Organizasyonel stratejilerin başarılı bir şekilde hayata geçirilmesi için orta düzey yöneticiler gözardı edilemez bir öneme sahiptirler. Bu yöneticiler organizasyondaki günlük operasyonel işler ile organizasyonun üst düzey stratejik hedefleri arasında köprü görevi görürler ve bu iki ayrı dünyayı birleştirirler. Eğer orta düzey yöneticiler organizasyonun stratejik önceliklerini paylaşmıyorlarsa ve stratejik hedeflere bağlı değillerse, stratejilerin etkin bir şekilde uygulanması mümkün değildir. Bu doktora tezi, orta düzey yöneticilerin bilişsel süreçlerine, liderlik şekillerine ve hakkaniyet algılarına odaklanarak, orta düzey yöneticilerin strateji süreçlerine olan katkısının psikolojik temellerini incelemektedir.

Bu tez 5 farklı çalışmadan oluşmaktadır. Giriş bölümünden sonra yer alan ikinci bölümde, organizasyonel birimlerin içindeki ve birimler arasındaki stratejik konsensus'u kapsamlı bir şekilde kavramsallaştıran, sayısallaştıran ve görselleştiren yeni bir metod geliştirilmiştir. Bu metod yöneticilerin ve organizasyonların bilişsel süreçlerini inceleyen araştırmacılara bütünlük teoriler inşa etme fırsatı sunmaktadır. Üçüncü bölümde, stratejilerin uygulanma safhasındaki dönüşümsel liderliği sadece pozitif bir fenomen olarak ele alan popüler görüş eleştirilmiştir. Bu bölüm, üst yönetimin stratejik görüşleriyle uyumlu olmadığı zaman yöneticilerin dönüşümsel liderliğinin karanlık yönünü su yüzüne çıkarmaktadır. Dördüncü bölümde ortadüzy yöneticilerin üst yönetimin stratejik görüşleri ile uyumu ve organizasyonel stratejilere olan bağlılıklarını sağlayan etmenler incelenmiştir. Bu bölüm, stratejilerin oluşturulma sürecinin yöneticiler tarafından adil olarak algılanmasının, farklı organizasyonel seviyelerde stratejik uyum ve bağlılık üzerindeki koşullu etkisine işaret etmektedir. Beşinci ve altıncı bölümlerde ise ampirik araştırma sonuçlarının geçerliliği açısından çok önemli etkiye sahip olan ve maalesef çoğunlukla gözardı edilen tekrarlı test problemlerine odaklanılmıştır. Bu bölümler tekrarlı test problemlerine normatif ve istatistiksel çözüm stratejileri önermekte, ve çözümlerin uygulanmasını sağlayan bir de araç sunmaktadırlar. Sonuç olarak, bu doktora tezi organizasyonel davranış ve organizasyonel psikoloji alanlarındaki teorilerin stratejik yönetim alanındaki erişimini derinleştirmekte ve bu sayede strateji süreci, yönetsel ve organizasyonel bilişim, ve davranışsal strateji araştırma alanlarına katkıda bulunmaktadır.



## ABOUT THE AUTHOR



Nüfer Yasin Ateş obtained his Bachelor's degree with Honors from Istanbul Technical University, Istanbul/Turkey in Industrial Engineering. He received his Masters' degrees in Industrial Engineering from Bogazici University and in Engineering Management from Istanbul Technical University. Prior to his PhD at Erasmus School of Economics, he worked as a research assistant at Istanbul Technical University.

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## THE STRATEGY PROCESS A MIDDLE MANAGEMENT PERSPECTIVE

Organizations must get middle managers on board in order to successfully put strategy into action. Middle managers are key strategic players in organizations due their close connection to daily operations and their reach to higher echelons. Unless these managers develop a shared understanding of and are committed to the organizational strategic goals, organizations are unlikely to realize their strategies. This dissertation focuses on the psychological foundations of middle managers' contribution to the strategy process by investigating their strategic cognitions, leadership and fairness perceptions.

In this dissertation, we develop a new method that provides a more comprehensive analysis of strategic consensus within and between organizational units (chapter 2), challenge the popular perception of managers' transformational leadership as a solely positive phenomenon in strategy implementation (chapter 3), and examine the drivers of middle managers' strategic alignment and commitment (chapter 4). Our results equip researchers with the necessary tools for integrative theory building in managerial and organizational cognition, reveal the dark-side of transformational leadership that is contingent upon the strategic alignment of the manager, and highlight the importance of middle managers' fairness perceptions about strategy making. We also look into the repeated testing problem and recommend strategies and tools to cope with this problem (chapters 5 and 6). Consequently, this dissertation extends the reach of organizational psychology and organizational behavior in strategy research by contributing to the strategy process, managerial cognition and behavioral strategy research streams.

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