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Top Management Team Heterogeneity, Strategic Change and Operational Performance*

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This study examines the role of top management team (TMT) heterogeneity in facilitating strategic change. Based on the upper echelons literature, we argue that heterogeneous management teams are better able to handle the simultaneous and conflicting demands of refocusing the organization strategically and keeping up operational performance. We expect this to be true only for teams that are heterogeneous with respect to factors directly related to job requirements, however. Data were collected from 92 full TMTs of hospitals in Spain that were confronted with institutional pressures that challenged their current strategies. In support of our hypotheses, the results show job-related TMT heterogeneity moderates the relation between strategic change and operational performance. No moderating effect is found for non-job-related TMT heterogeneity.

Introduction

Many organizations across both public and private sectors face an increasing pressure to adapt to their rapidly changing competitive or institutional environments. In order to survive and prosper they frequently enter into processes of strategic reorientation (e.g. Danneels, 2002; Jas and Skelcher, 2005). As these processes are typically complex and intrusive, however, organizations run a severe risk of degrading their operational performance as a consequence of the change process (cf. Hannan and Freeman, 1989; Kraatz and Zajac, 2001). Organizations engaging in strategic reorientation thus face a crucial managerial challenge of changing their long-term strategic focus while avoiding disruptions of ongoing operations, as these disruptions may in turn negatively affect intended strategic outcomes (cf. Kaplan and Norton, 2006; Shortell, Morrison and Friedman, 1990). Not much is known about factors that influence the ability of organizations to deal with this challenge. This paper, building on earlier studies in the upper echelon perspective, investigates whether the composition of the top management team (TMT), in particular its heterogeneity, is a good predictor of this ability.

Generally, upper echelon studies predict that the composition of the organization's TMT, which is the echelon ultimately responsible for strategic success, affects the organization's strategic and operational decision-making and its subsequent performance (Carpenter, Geletkanycz and Sanders, 2004; Finkelstein and Hambrick, 1996). Although not without its critics (see for example Hodgkinson and Sparrow, 2002), upper echelon research consistently shows that demographic characteristics of TMTs, such as age, tenure and background, which reflect underlying cognitive and affective managerial characteristics, predict the direction and effectiveness of TMT

*The research instrument used in this study is available from the authors upon request.

behaviour (Hambrick and Mason, 1984; Jackson, 1992; Papadakis and Barwise, 2002). Several studies have particularly suggested that more heterogeneous teams, which consist of managers with varying backgrounds and competences, are better suited to manage in turbulent environments (e.g. Keck, 1997; Stewart, 2006) and are more inclined to pursue strategic change (e.g. Ferrier, 2001; Finkelstein and Hambrick, 1996; Golden and Zajac, 2001). Building on this literature, we argue that heterogeneous TMTs are also better able to keep up operational performance when engaging in strategic change than homogeneous TMTs, as their larger combined set of skills, experiences and competences enables them to successfully address the organizational dynamism and environmental complexity that accompanies strategic reorientation and because they have access to more formal and informal networks in the organization to gain commitment for their ideas (e.g. Bantel and Jackson, 1989; Finkelstein and Hambrick, 1996; Wiersema and Bantel, 1992). Following recent developments in upper echelon research (e.g. Lee and Park, 2006; Simons, Pelled and Smith, 1999; Webber and Donahue, 2001) we predict this effect only exists for job-related dimensions of heterogeneity.

We conduct our study in the public hospital sector in Spain, where recent legislation puts hospitals' management teams under pressure to simultaneously improve service quality and reduce costs (Madorrán Garcia and De Val Pardo, 2004). We use survey data collected from the 884 members of the TMTs of all 218 public hospitals in Spain, for which we obtained a satisfactory response rate of 42.20% (92 complete TMTs). In addition, we use operational performance data obtained from the Spanish Regional Health Care Services (e.g. Insalud, 2003). The data were analysed using partial least squares (PLS), which allows simultaneous assessment of the measurement quality and the structural relations between variables. The results support our hypotheses.

The paper attempts to contribute to both management theory and practice, in the following respects. First, although the strategic management literature suggests that TMT characteristics affect the organization's ability to execute strategic change (e.g. Ferrier, 2001; Wally and Becerra, 2001; Wiersema and Bantel, 1992), as yet it has not explained what TMT characteristics are essential. This paper specifically predicts that job-related TMT heterogeneity is a relevant TMT characteristic. Second, this study's focus on operational performance allows a broader assessment of management's ability to manage strategic change (cf. Kaplan and Norton, 2006) than studies merely focusing on the choices made by the management team. Third, we test our predictions in a context where many similar organizations have engaged in strategic reorientation, albeit to different extents (see, for example, Carretero, 2000). This setting provides a unique opportunity to study the interactive effect of TMT heterogeneity and strategic change on performance, as it controls for heterogeneity as an antecedent of strategic turnaround processes (cf. Goodstein, Gautam and Boeker, 1994; Jackson, 1992; Zajac, Kraatz and Bresser, 2000). The remainder of this paper is structured as follows. First, we develop our hypotheses about the relationship between TMT heterogeneity, strategic change and operational performance. Next we describe the empirical study and after that present the results. The final section contains a short discussion of the findings, the conclusion and the limitations of the study and points out some directions for further research.

Literature review and hypotheses development

The complexity and intrusion of strategic change processes put great demands on organizations and their management teams, resulting in serious risks for organizations' operational performance for the change period (Kaplan and Norton, 2006; Kraatz and Zajac, 2001; Wiersema and Bantel, 1992). For many industries, however, the competitive and institutional pressures that induce strategic change also require that organizations find ways of implementing changes without disrupting day-to-day activities, and without endangering motivation and commitment of employees throughout the organization (Shortell, Morrison and Friedman, 1990; Trinh and O'Connor, 2002). While some negative effects on immediate operational performance may not be avoidable, this means that successful strategic change places strong demands on organizations' TMTs. We believe more heterogeneous teams are better able to meet these demands.

First, heterogeneity provides TMTs with different types of knowledge and decision-making styles and a greater variety of professional perspectives. This diversity is beneficial in management processes that require substantial judgement and creative thinking such as those involving strategic change (Jackson, 1992; Milliken and Martins, 1996). Differences in perspective will furthermore broaden the scope of the information collected, and stimulate diversity in the interpretation of situations and in the solutions proposed for apparent and acute problems (Keck, 1997; Knight *et al.*, 1999; Pitcher and Smith, 2001). This is in accordance with empirical evidence that under conditions of turbulence and ambiguity the benefits of heterogeneity are more profound (e.g. Carpenter, 2002; Keck, 1997; Stewart, 2006). A second argument that connects TMT heterogeneity with operational and strategic success, which is less well recognized in the upper echelon literature, stems from social identity theory. In general, social identity theory proposes that individuals categorize themselves and others into social groups, and that group identity becomes an important determinant of subsequent commitment and motivation (Haslam, 2001; Tajfel, 1969). As more heterogeneous TMTs represent a wider set of social categories (cf. Richard and Shelor, 2002; Webber and Donahue, 2001), more organizational participants are likely to identify with heterogeneous TMTs than with homogeneous TMTs and accept their strategies and action plans (cf. Ely, 1994; Li, Xin and Pillutla, 2002; Milliken and Martins, 1996). Part of this identification can be seen as a 'symbolic consequence' of diversity (see Milliken and Martins, 1996), but in addition heterogeneous TMTs also have ties to more (in)formal social networks that they may use to gain advice or to win commitment (Finkelstein and Hambrick, 1996; Jackson, 1992). Thus, heterogeneous TMTs will be better able to overcome resistance to change and to streamline the turnaround process (Leana and Barry, 2000; Pardo del Val and Martinez Fuentes, 2003; Reichers, Wanous and Austin, 1997). This is particularly valuable in large and complex organizations such as hospitals, where employees from various, often professionally defined, social categories cooperate (Desombre *et al.*, 2006; Hoff, 2001).

Although theory and empirical results seem generally supportive of positive associations of higher heterogeneity with higher strategic dynamism and success, the literature is not completely unequivocal (Carpenter, 2002; Carpenter, Geletkanycz and Sanders, 2004; Pitcher and Smith, 2001). Some studies suggest that, although heterogeneity enables TMTs to better identify strategic issues (Hambrick and Mason, 1984) and develop strategic alternatives (Bantel and Jackson, 1989; Murray, 1989), homogeneous teams may be more effective in strategy execution, where unanimous commitment to the decisions made is crucial for organizational performance (Finkelstein and Hambrick, 1996; Pitcher and Smith, 2001; Wiersema and Bird, 1993). Milliken and Martins (1996) in this respect referred to team heterogeneity as a 'double edged sword', suggesting that some dimensions of heterogeneity may be beneficial, whereas other dimensions may be harmful. The relevance of the dimensionality of heterogeneity has received some empirical support (e.g. Murray, 1989; Simons, Pelled and Smith, 1999), although it is not yet fully understood. Webber and Donahue (2001) propose to distinguish between heterogeneity dimensions that are directly relevant for the job at hand, and dimensions that are not job-related. Job-related factors are those that capture the distinct experiences, skills and perspectives that are relevant to the tasks the TMT is faced with (Lee and Park, 2006; Pelled, 1996; Simons, Pelled and Smith, 1999).

For TMTs facing strategic dynamism, their educational and functional background and organizational tenure may be more important than other factors such as age and gender. The former set of characteristics is likely to be a more important source of cognitive resources, which is the crucial benefit of heterogeneity in complex circumstances (e.g. Carpenter, 2002; Keck, 1997; Stewart, 2006). In contrast, age and gender differences are more likely to produce a variety of visions and opinions within the TMT regarding certain specific issues, fuelling conflict (Milliken and Martins, 1996). The social identity argument also suggests that job-related heterogeneity is more relevant than non-job-related heterogeneity, as individuals' educational and functional backgrounds are more likely to categorize them into specific identity sharing groups than their age or gender (Hoff, 2001;

Webber and Donahue, 2001). Based on these arguments, we propose the following two hypotheses.

H1: Strategic change is negatively related to operational performance.

H2: The relationship between strategic change and operational performance is less negative for TMTs with higher job-related heterogeneity.

Research method

We collected data for this study from all 218 public hospitals in Spain. We selected this setting for two reasons. First, hospitals have received increased attention from academics in management and strategy fields, because of their complexity and the growing dynamism and financial importance of the medical sector (e.g. Goodstein, Gautam and Boeker, 1994; Young, Charns and Shortell, 2001). Second, public hospitals, not only in Spain but also in other countries, are forced to undergo fundamental shifts towards new forms of healthcare organization (Desombre *et al.*, 2006; Goodstein, Gautam and Boeker, 1994; Shortell, Morrison and Friedman, 1990; Trinh and O'Connor, 2002). The setting thus provided a unique opportunity to study the effects of TMT heterogeneity on performance during a change process.

The TMT members' personal data were obtained from the Spanish National Catalogue of Hospitals, and were updated through Internet and telephone calls until a complete list of 884 TMT members was available. We collected performance data for the hospitals from the Spanish Regional Health Care Services (e.g. Insalud, 2003). To obtain the demographic details and data about the hospitals' strategic change, a questionnaire was developed following Dillman's (2000) tailored design method. The distribution procedure involved several steps to maximize willingness to participate. These included (1) sending a pre-notice letter, (2) sending the survey package containing the covering letter, the survey, a prepaid self-addressed envelope and a pen, (3) sending a follow-up letter to respondents, reminding them of the importance of participating, (4) sending a second copy of the survey to non-respondents and finally (5) making phone calls to non-responding managers inviting them to participate.

A satisfactory response rate was achieved, with 496 (56.11%) questionnaires returned of which 473 were deemed useful for further analysis. From these data, 92 complete TMTs could be formed (42.20%). Most TMTs consist of a CEO, a Medical Director, a Nursing Director and an Administrative–Financial Director. For testing the hypotheses we relied on the data of only those TMTs for which all members responded. The remainder of the responses was included for the validity and response-bias tests. Considering the latter, independent-samples t tests between early and late respondents, and chi-squared tests and t tests based on the hospital size, were run to examine the potential for non-response bias. The tests did not reveal any sign of bias.

Measurement of variables

Strategic change was measured with an instrument based on Miles and Snow's (1978) typology of strategy. Miles and Snow (1978) distinguish between prospector and defender organizations. Prospector organizations focus their efforts on growth, diversification and innovation. To accomplish this they stress flexibility, decentralization and coordination (Miles and Snow, 1978; Shortell and Zajac, 1990). Defenders, on the other hand, emphasize internal efficiency, predictability and control. Strategic change is the extent to which a firm is moving along the prospector/defender continuum (Miles and Snow, 1978; Shortell and Zajac, 1990; Shortell, Morrison and Friedman, 1990). Following Golden (1992) and Abernethy and Brownell (1999), managers were presented with two descriptions, one of a defender organization and another of a prospector organization.[1] They had to indicate their perception of the hospital's strategic position three years ago and its current position on a five-point Likert-type scale anchored by 'complete defender' (1) and 'complete prospector' (5). Strategic change was measured as the absolute

[1]The measurement instrument used is reproduced in the Appendix.

Table 1. Measures of hospitals' operational performance

Name	Definition	Description
Occupancy rate (use of beds)	Daily census/Number of hospital beds	Number of inpatients receiving care each day at hospitals' beds
Use of surgery rooms	Hours used at surgery room/Hours available at surgery room	Use of surgery facilities (equipment) at hospitals
Re-admission rate[a]	Returned admitted patients/ Total patients discharge	Percentage of admitted patients who return to the hospital within seven days of discharge
Length of stay[a]	Number of inpatient days/ Number of admissions	Average duration of patient stay in health facility
Mortality rate[a]	Total patients deaths/Total patients admission	Proportion of the patients at a hospital that died within 60 and 90 days of hospital admission and 30 days of hospital discharge
Waiting time[a]	Total number of days waited/ Outpatient activity	The time which elapses between the request by a general practitioner for an appointment and the attendance of the patient at the outpatients' department

[a]Reverse score used as indicator.

value of the differences between the ratings of the present and the past.[2]

To assess the appropriateness of aggregation, the within-group inter-rater reliability coefficient (rwg(j)) was computed for the measurement instrument of strategic change. Values of rwg(j) equal to 0.70 or above demonstrate high consistency within groups and justify the aggregation within that team. The rwg coefficient was higher than 0.70 (0.73), indicating good agreement among judgements made by the different team members (cf. James, Demaree and Wolf, 1984) and therefore we took the mean of the scores of the individual team members as the hospital's score for strategic change.

Operational performance was measured using objective performance data. We acquired performance data from the Spanish Regional Health Care Services (e.g. Insalud, 2003; SAS, 2003). Before collecting the data, we conducted 18 interviews in four hospitals to be able to select those performance indicators that were considered the most representative by hospital managers.[3] Table 1 shows a description of the six measures that were chosen. All six measures are important performance indicators for hospitals around the world, regardless of their strategic positioning (see Van Peursem, Pratt and Lawrence, 1995, for a review of hospital performance measurement). The measures were modelled to be manifest indicators of a latent construct called operational performance.

Job-related heterogeneity was measured as the TMT's diversity with respect to tenure and functional and educational background. Consistent with the upper echelon tradition (Finkelstein and Hambrick, 1996; Pelled, 1996), the questionnaire contained factual questions regarding management position tenure, functional background and university degrees. Tenure heterogeneity was assessed using the coefficient of variation of the score on the tenure item (standard deviation divided by the mean), which provides a direct and scale-invariant measure of dispersion (cf. Allison, 1978). Heterogeneity in functional and educational background were not amenable to the coefficient of variation measure, since they were measured as categorical variables in line with prior studies (Finkelstein and Hambrick, 1996; Wiersema and Bantel, 1992). Thus '1' represented a dominant administrative

[2]In addition, we ran our models with strategic change as a continuous variable from -4 to $+4$ to take account of the direction of movement along the defender–prospector axis. Also, following recent concerns about the measurement of strategic change (Bergh and Fairbank, 2002), we ran our model with the strategic position at t_0 and t_{-3} as control variables. These changes did not affect the direction and significance of the path coefficients.

[3]A total of four general managers, four medical directors, three nursing directors, three administration directors and four financial directors were interviewed.

(external) oriented educational or experience background (e.g. business, economics, law) and '0' represented a dominant professional (internal) oriented background (e.g. medicine, nursing, biology and chemistry) (Hitt and Tyler, 1991; Knight *et al.*, 1999; Wiersema and Bantel, 1992).[4] Blau's (1977) index of heterogeneity, which has been used extensively among TMT researchers to measure categorical variables, was also adopted in this study. The Blau heterogeneity index is calculated as $1 - \Sigma p_i^2$, where p_i is the proportion of the team in the ith educational (or functional) category. A score of zero would indicate perfect homogeneity (educational or functional). Higher scores on this index indicate more diversity in background between the members of the TMT. Job-related heterogeneity was modelled as a formative construct (cf. Diamantopoulos and Siguaw, 2006) with tenure variance and educational and functional background diversity as manifest variables.

Non-job-related heterogeneity was modelled to be a formative construct with age and gender heterogeneity as manifest variables.[5] Age diversity was measured using the coefficient of variation in TMT members' age (standard deviation divided by the mean). Blau's (1977) index of heterogeneity again was used to measure gender diversity.

Two control variables were included in the analysis. First, hospital size, measured as the number of beds, was included because, as the size of an organization grows, it becomes increasingly formalized and institutionalized, which can minimize the role of top managers in strategic decision-making (Thomas and Ramaswamy, 1996). Second, we used a dummy variable to control for hospital location.[6]

[4]Two categories were used since the vast majority of managers (89.1%) indicated that they had a degree related to either business, economics, law, or medical, nursing.

[5]We did not assess respondents' ethnic background because of a lack of variation with respect to this variable in the population under study.

[6]The inclusion of this dummy variable allowed us to distinguish between hospitals in regions with a long history of autonomy in healthcare management and hospitals in regions where autonomy was strongly increased during a 2002 government healthcare reform programme. This programme resulted in extensive and uniform autonomy for all regions.

Table 2. Descriptive statistics for variables (n = 92)

Variable	Mean	SD	Theoretical range	Actual range
1. Age diversity	0.78	0.08	0.00–1.00	0.72–0.91
2. Gender diversity	0.49	0.05	0.00–1.00	0.51–1.00
3. Tenure diversity	0.65	0.15	0.00–1.00	0.59–0.71
4. Background diversity	0.51	0.11	0.00–1.00	0.31–0.92
5. Education diversity	0.56	0.09	0.00–1.00	0.34–0.90
6. Strategic change	1.93	0.58	0.00–4.00	0.00–4.00
7. Occupancy rate (use of beds)	0.77	0.05	0.00–1.00	0.58–0.91
8. Use of surgery rooms	0.68	0.04	0.00–1.00	0.41–0.73
9. Re-admission rate	0.64	0.04	0.00–1.00	0.48–0.77
10. Length of stay	0.62	0.04	0.00–1.00	0.57–0.86
11. Mortality rate	0.56	0.02	0.00–1.00	0.45–0.68
12. Waiting time	0.61	0.03	0.00–1.00	0.47–0.75

Results

The hypotheses are analysed using PLS. Like covariance-based structural equation modelling techniques (e.g. LISREL, EQS), PLS is a second-generation statistical technique that simultaneously assesses the measurement model and the structural theoretical model. Different from covariance-based algorithms, PLS is focused on the prediction and explanation of variance in dependent variables and resembles ordinary least squares regression with regard to output and assumptions (Chin, 1998b; Hulland, 1999). PLS allows smaller sample sizes than covariance-based models and overcomes some of the theoretical and estimation problems associated with the use of such models (see for example Hulland, 1999). However, it does not report the fit of the whole model (Chin, 1998a; Chin, Marcolin and Newsted, 2003). The path coefficients in the PLS structural model are interpretable as β statistics from an ordinary least squares regression while the results of the assessment of the measurement model mirror the results of principal component analysis. In evaluating the PLS results, the procedure advocated by Hulland (1999) is followed, which suggests a separate analysis of the measurement model and the structural model.[7] Table 2 shows the descriptive statistics of the variables, Table 3 shows the

[7]The item scores were standardized, to have a mean of zero and a variance of one, before running the data in PLS (Chin, Marcolin and Newsted, 2003).

Table 3. Reliability and validity analysis (n = 92)

Variables	Items	Loadings	Composite reliability	Average variance extracted
Job-related TMT diversity	Age heterogeneity	0.707	0.811	0.655
	Gender heterogeneity	0.729		
Non job-related TMT heterogeneity	Background heterogeneity	0.835	0.784	0.603
	Education heterogeneity	0.776		
	Tenure heterogeneity	0.714		
Operational performance	Occupancy rate	0.849	0.834	0.709
	Use of surgery rooms	0.872		
	Re-admission rate	0.806		
	Length of stay	0.837		
	Mortality rate	0.885		
	Waiting time	0.874		

Table 4. Correlations from PLS model (n = 92)

	1	2	3	4
1. Job-related TMT heterogeneity	1.000			
2. Non-job-related TMT heterogeneity	0.099	1.000		
3. Strategic change	0.203[b]	0.112	1.000	
4. Operational performance	0.270[a]	−0.144	−0.206[b]	1.000

[a]Significant at 0.01 level (two tailed).
[b]Significant at 0.05 level (two tailed).

results from the reliability and validity analyses and Table 4 presents the correlations between the variables in the model.

To assess individual item reliability, we examine the loadings of the items on their constructs. Hulland (1999) suggests items with a loading of less than 0.4 should be dropped. As is clear from Table 3, no item had a loading lower than 0.7, indicating that overall item reliability is appropriate. To evaluate the constructs' convergent validity we examine the composite reliability measure developed by Werts, Linn and Jöreskog (1974) and reported by PLS on default. The interpretation of this measure is similar to that of Cronbach's alpha. Table 3 shows that the composite reliability of all constructs is well above the 0.7 that is generally considered the lower bound for acceptable levels of reliability. In addition, we also examine the average variance extracted (AVE) measure created by Fornell and Larcker (1981). The AVE indicates how much variance is shared between a latent construct and its measurement items. Chin (1998a) suggests AVE should be 0.5 or higher, meaning that at least 50% of indicator variance is accounted for by construct variance rather than error. As can be seen in Table 3, all constructs have an AVE higher than 0.6. Finally, to assess discriminant validity of the constructs, we test whether all AVEs are greater than the squares of the correlations among the constructs. As this is the case, it can be concluded that all constructs share more variance with their own block of indicators than with any other construct, implying satisfactory discriminant validity (cf. Chin, 1998a; Fornell and Larcker, 1981). In summary, the results from the assessment of the measurement model are very satisfactory.

Regarding the analysis of the hypotheses in the structural model we ran a model both without and with the interaction terms and we tested the interactive effects of job-related heterogeneity and of non-job-related heterogeneity and strategic change. The results from our analyses are reported in Table 5. This table reports the path coefficients and their significance and R-squared statistics for the dependent variable.[8] The results from the full model are also illustrated in Figure 1. All results are based on a bootstrapping procedure that used 500 samples with replacement.

Hypothesis 1 predicts a negative effect of strategic change on operational performance. The results in Table 5, part (a), show a significantly negative path from strategic change to performance (-0.187, $p = 0.059$), providing support for our hypothesis. In addition, there is a significantly positive path from job-related

[8]The control variables did not reveal any significant path with the constructs in the research model.

Table 5. Results from PLS analysis (path coefficients, n = 92)

From	To	Performance	
		Path coefficient	p value
(a) Main effects model			
Job-related TMT heterogeneity		0.228[b]	0.033
Non-job-related TMT heterogeneity		−0.129	0.206
Strategic change		−0.187[c]	0.059
		$R^2 = 0.089$	
(b) Interaction model			
Job-related TMT heterogeneity		0.277[a]	0.003
Non-job-related TMT heterogeneity		−0.160	0.117
Strategic change		−0.219[b]	0.039
Strategic change × TMT job-related heterogeneity		0.231[b]	0.022
Strategic change × TMT non-job-related heterogeneity		0.160	0.118
		$R^2 = 0.259$	

[a]Significant at 0.01 level (two tailed).
[b]Significant at 0.05 level (two tailed).
[c]Significant at 0.10 level (two tailed).

heterogeneity to operational performance (0.228, $p = 0.033$). The path from non-job-related heterogeneity to performance is negative but insignificant (-0.129, $p = 0.206$). In support of Hypothesis 2, Table 5, part (b), shows that there is a significant interaction effect of strategic change and job-related heterogeneity on performance (0.231, $p = 0.022$), while the interaction between strategic change and non-job-related heterogeneity is insignificant (0.160, $p = 0.118$). The R-squared for the main effects model is 0.089. Inclusion of the interaction terms raises the R-squared to 0.259. The additive explanatory power of the interaction model is determined by calculating Cohen's f^2 effect size measure (Chin, Marcolin and Newsted, 2003, p. 211; Cohen, 1988).[9] The effect size f^2 of including the interaction terms is 0.187, which is between a medium and large effect. To gain a better understanding of the shape of the interaction between job-related heterogeneity and strategic change, we split the sample into a high and low job-related heterogeneity subsample, based on the median heterogeneity score. We performed a separate PLS path analysis for the two subsamples. The results of this procedure are in Table 6.

Table 6 indicates that in the low job-related heterogeneity sample there is a significantly negative effect of strategic change on operational performance (-0.282, $p = 0.003$), while for the high heterogeneity sample the path from strategic change to performance is insignificant (0.144, $p = 0.254$). This confirms our results from testing the full model (Table 5, part (b)). Overall, the results support our hypotheses.

Discussion and conclusion

The purpose of this study was to analyse the effects of TMT heterogeneity on the relation between strategic change and operational performance. As the process of changing goals, responsibilities and organizational routines can easily turn into confusion and chaos at the workfloor and widespread employee resentment, operational performance may decline which may also negatively affect the strategic change process itself (Kaplan and Norton, 2006; Leana and Barry, 2000; Reichers, Wanous and Austin, 1997). At present, the literature does not provide much evidence about the factors that make TMTs more or less successful at managing strategic change. Drawing on the upper echelon perspective, we proposed team heterogeneity would be such a factor. In support of our hypotheses, the results of our study indicate that strategic change indeed poses a threat to organizations' operational performance, but that relatively heterogeneous TMTs are able to protect their organization from this threat and successfully battle operational performance downturn. This was only the case for teams that were heterogeneous in more job-related dimensions though; no moderating effect of age and gender diversity was found.

Our study provides contributions to both management theory and practice. First, it adds to the limited literature that addresses the implementation of strategy 'without disrupting the organization' (cf. Kaplan and Norton, 2006). A practical implication of our results is that, when filling management positions, organizations should try to ensure that enough diversity exists within the team. In particular, during periods of strategic change, TMT heterogeneity seems to

[9]$f^2 = (R^2$ interaction model $- R^2$ main effects model)/$(1 - R^2$ main effects model). Interaction effect sizes are small if $f^2 = 0.02$, medium if $f^2 = 0.15$ and large if $f^2 = 0.35$ (Chin, Marcolin and Newsted, 2003; Cohen, 1988).

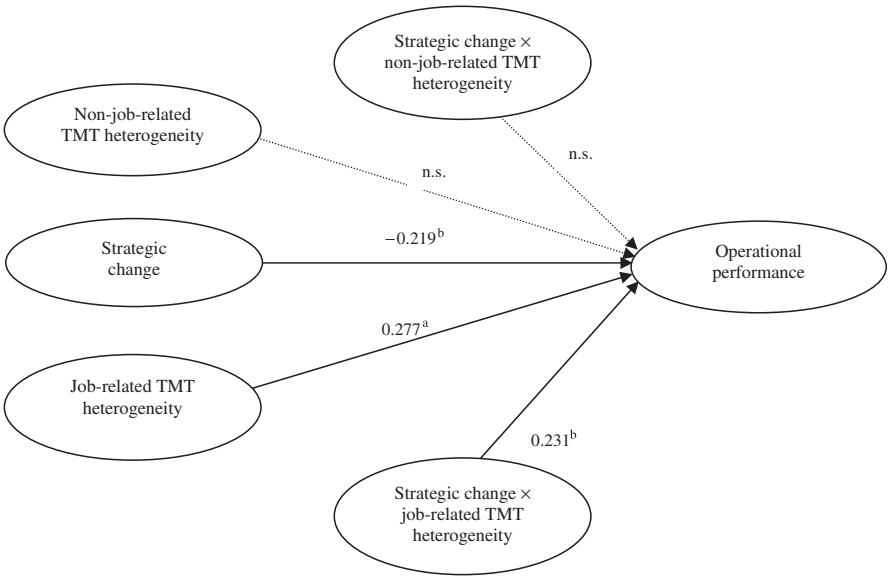

Figure 1. PLS model: TMT heterogeneity, strategic change and operational performance

[a]Significant at 0.01 level (two tailed). [b]Significant at 0.05 level (two tailed).

Table 6. Results from PLS analyses for high and low job-related heterogeneity subsamples

From	To	Performance	
		Path coefficient	p value
(a) High job-related heterogeneity sample (n = 44)			
Strategic change		0.144	0.254
Non-job-related TMT heterogeneity		−0.130	0.237
		$R^2 = 0.192$	
(b) Low job-related heterogeneity sample (n = 48)			
Strategic change		−0.282[a]	0.003
Non-job-related TMT heterogeneity		−0.147	0.251
		$R^2 = 0.184$	

[a]Significant at 0.01 level (two tailed).

have a substantial positive effect on operational performance.

In addition, our study contributes to the upper echelon literature in at least three ways. First, we show that heterogeneity interacts with situational circumstances (such as the extent of strategic change) to affect performance. In the original upper echelon theory model developed by Hambrick and Mason (1984) TMT heterogeneity was regarded as an antecedent to strategic change. Empirical studies, however, have been inconclusive about this relationship. For example, Wiersema and Bantel (1992) found hardly any support for the expected positive effects of TMT heterogeneity on strategic change. Also Tihanyi *et al.* (2000) found most forms of heterogeneity to be unrelated to firms' strategic moves. Goodstein, Gautam and Boeker (1994) even found a *negative* association between heterogeneity and change. In our study we therefore explored the interaction between heterogeneity and strategic change, which, although not incongruent with the idea of heterogeneity as an antecedent to change, contributes to the development of a more comprehensive view of the role of TMTs in strategic change processes. Indeed, our findings extend those of Keck (1997) and Carpenter (2002), who concluded that the effect of heterogeneity on performance depends on the strategic uncertainty faced by the organization. Also, our results confirm the finding of Stewart's (2006) meta-analysis that, in non-routine settings, heterogeneity has a positive effect on performance.

Second, in reaction to criticisms on the upper echelon literature (e.g. Hodgkinson and Sparrow, 2002), we followed Milliken and Martins (1996), Richard and Shelor (2002) and others and extended the traditional cognitive resources

argument to include social identity theory in predicting the effects of heterogeneity. We argued that an important benefit of heterogeneous TMTs lies in their inclusion of representatives from different social groups in the organization. Not only does this enable them to collect a broader set of information that can be used in decision-making, it also results in higher levels of motivation and commitment because of employees' identification with (a member of) the management team.

Finally, we show that it is useful to distinguish between job-related and non-job-related forms of heterogeneity. One explanation for the lack of a cohesive body of findings in the upper echelon literature is that studies have failed to identify meaningful dimensions of heterogeneity and to analyse the effects of these dimensions separately (Jackson, 1992; Webber and Donahue, 2001). Our separate analysis of job-related and non-job-related heterogeneity revealed that only job-related heterogeneity moderated the relation between strategic change and operational performance. Our theory suggests that the effects of job-related heterogeneity are more salient because both the set of valuable cognitive resources available is larger and the number of social groups represented in the TMT is higher in the case of diversity in educational and functional backgrounds and tenure than in the case of age or gender diversity.

When interpreting the findings of our study, some of its limitations should be acknowledged. As the study relied in part on a cross-sectional survey it might suffer from biases that pose a threat to the validity of the findings. We tried to limit the potential biases resulting from the limitations traditionally associated with survey studies by closely following the guidelines of Dillman (2000), and by relying on external performance data. A potential bias also lies in our focus on a single industry in one specific country (Spain). Although we believe that the hospital sector in Spain is well suited to test our hypotheses, it may contain idiosyncrasies that have been overlooked. Clearly, empirical testing of our hypotheses in a different setting could add to the external validity of the results.

Given the cross-sectional nature of our data, it is not always possible to fully rule out the existence of other cause–effect relationships than the ones we set out to explore. For example, our descriptive results show a significant correlation between job-related heterogeneity and strategic change, which may suggest that heterogeneity is also an antecedent of change. Although, as we discussed before, this is not incongruent with our theory, we have focused on a more limited model. The development of a full model, in which all relationships between heterogeneity, strategic change and performance are theoretically specified, provides an important opportunity for future research.

Moreover, such future studies may try to capture the variables of interest using methods that are different from ours. We relied on demographic features to assess TMT heterogeneity and used a perceptual measure of strategic change. Although gaining access to TMTs for research purposes is notoriously difficult, which necessitates trade-offs in method choice, we suggest that future studies may attempt to capture TMT heterogeneity with psychological constructs. Strategic change may be measured with objective data that provide proxies for the organization's strategic position at different points in time. Such data were unavailable in our case. Yet, as we measured strategic change using the pooled perceptions of the different managers in the team, we do believe that we used a reasonably accurate indication of the change process that the organizations and their TMTs went through. In addition, because our measure referred to strategic change in the three-year period preceding the moment at which we measured operational performance, we prevent a potentially confounding effect of performance as an antecedent to change.

Finally, our study does not allow us to draw any definite conclusions about the processes through which heterogeneity affects performance. Future research should continue to develop our understanding of intra-team decision-making processes and group dynamics as well as of the more symbolic effects of TMT heterogeneity on other members of the organization.

Appendix: Measurement instrument for strategic change

The following two descriptions of hospitals were given to respondents. They were asked to circle on a five-point Likert-type scale where they

would place their hospital three years ago, and where they would place the hospital now. Item (1) represented a Hospital A-type ('defender') hospital and (5) represented a Hospital B-type ('prospector') hospital.

'**Hospital A** offers a relatively stable set of services, tends to focus on a particular segment of the population and offers a more limited range of services than other hospitals of the same category. Generally Hospital A is not at the forefront of new service developments in healthcare. Developments in services tend to concentrate on current areas of operation. It believes that doing the best job possible in its existing range of services and refining existing services are of utmost importance.'

'**Hospital B** makes relatively frequent changes in, and additions to, its set of services and tends to offer a wider range of medical services compared to other hospitals of the same category. Hospital B responds rapidly to early signals of market needs or opportunities and it consistently attempts to be at the forefront of new service developments. Other hospitals often follow Hospital B in the development of these services. This type of hospital may not maintain its strength in all of the areas it enters.'

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