Top management demographic characteristics and company performance

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Abstract

Purpose – The importance of the performance of a firm and the essential role played by the management in their accomplishment has been discussed and recognised by many researchers from Drucker to Upper Echelon Theory. Nonetheless, currently, anybody has been able to determine the precious and reliable parameters which let the firm achieve required-level performance. The confusion around this objective is still sufficient and the controversial has being growing widely over time, being the findings achieved contradictory, insufficient, imprecise and unreliable. Regarding the demographical literature findings focus on the premises previous related to Upper Echelon Theory. The purpose of this paper is to go further and try to test how, not only the level, but also the diversity of constructs like top management teams (TMT)'s demographic characteristics influence the firm performance accomplished by the managers by applying a Hierarchical Linear Regression Model.

Design/methodology/approach – Based on primary data from two Spanish databases – SABI, CNMV – and secondary data, a sample size of 147 TMTs in large companies from 18 industries sector with headquarters in Spain over a four years period (2004-2007) were obtained. The analysis focused on the total TMT for each firm. To test the relationship between the company performance and the demographic constructs, a more recent methodology based on hierarchical linear models (HLMs) using a longitudinal dataset of multinational big firms with headquarters in Spain was applied.

Findings – After applying the statistical techniques the results show a partial confirmation of the hypotheses formulated in the theoretical model proposed. First, the analysis evidences that company size is both highly correlated with TMT size and their demographic variables in terms of diversity. Second, the HLM shows that TMT's education-level diversity has a negative and significant impact on corporate performance and no significant effects for functionality and education background diversity have been found. Based on the accomplished findings, organisations appear to be more concerned about the employee's education level rather than their education background. Moreover, the model further supports that companies seem to be more aware of industry experience diversity than functionality diversity, also confirming a greater influence of the more international experience diversity of TMT on corporate performance.

Originality/value – This study offers a significant contribution not only by specifying a three-level hierarchical regression models regarding diverse approaches to measure the performance variable as dependent variable but also by considering as predictors not only the level of the demographic variables but also their diversity. This knowledge is relevant for entrepreneurial purposes since it highlights the achievement of high performance. The results allow us to explain which constructs influence the achievement of firm performance. Thus, this knowledge could be relevant to the entrepreneurs to encourage the firm survival and growth. Furthermore, focused on an ambitious purpose, it reveals the parameters needed to achieve to get the optimums performance level. Hence, the present study contributes an attempt to advance the literature on TMT composition by applying multi-level theory given the nested structure of the data set. The paper is one of few studies which apply panel data to analyse the influences of TMT characteristics on corporate performance and one of the first focused on Spanish entrepreneurial context.

Keywords Performance, Demographic characteristics, Top management team, Upper echelon theory

Paper type Research paper

1. Introduction
The effectiveness of top management and its association with firm performance has always been a central focus in most research work in strategic management (Marimuthu and Kolandaisamy, 2009a, b). Penrose (1959) argued that top managers are firm's entrepreneurial resources that affect its performance. In the same way, Hambrick and Mason (1984), in their Upper Echelon Theory, provided a boost to the empirical research by arguing that top management teams (TMT)'s demographic characteristics (e.g. age, education, tenure, diversity) are good proxies for the underlying traits and cognitive processes of the top executives (Srivastava and Lee, 2008). Furthermore, these authors manifested that the organisation's performance is a consequence of these constructs.

The Upper Echelon Theory, focusing on this premise, has generated a deep controversy involving the scientific community. Theory and controversy not only still coexist but has also been enriched over time.

Most TMT's research has supported results which identify both the TMT's teams and their demographic characteristics, as concluded by Cohen and Bailey (1997) after reviewing TMT's literature. However, apart from the criticism involving this theory (i.e. Priem *et al.*, 1999), the pattern underlining their premises has influenced almost all the research conducted on TMT of large corporations (Srivastava and Lee, 2008; Finkelstein *et al.*, 2008, 2009).

According to the evolution from the Upper Echelon Theory, two research lines appear in the literature. The first groups of research defend the level of the demographic characteristics as determinants of the highest rank of company performance (i.e. Wiersema and Bird, 1996; Auden *et al.*, 2006; Kroll *et al.*, 2007, Lin and Kuo, 2007; Hutzschenreuter and Horstkotte, 2013; Li and Tan, 2013; Lin and Cheng, 2013), while the later support diversity (i.e. Jehn *et al.*, 1999; Pitcher and Smith, 2001; Roberson and Park, 2007; Liang *et al.*, 2007; Marimuthu and Kolandaisamy, 2009a, b; Nielsen and Nielsen, 2013) as an explanatory factor of that performance. Two approaches, therefore, which have reinforced the polemic around the Upper Echelon Theory. Consequently, the organisational demography black box seems to not have a solid explanation. This result is attributed to the methodological weakness of the papers (Murray, 1989).

The demographic characteristics have been analysed in the majority of studies related to top management by descriptive statistical analysis (Child, 1974; Díaz Fernández, 2004). Only a few works include those characteristics using statistical and econometric techniques (Araujo and García, 1999). This methodological weakness is translated into demographic indicators which highly depend on the data and the sample design and therefore are not valid enough (Rosenger, 1968).

This paper constitutes a part of the research line which is being carried out regarding the Upper Echelon Theory, and focuses on the controversy between the demographic characteristics in their level and diversity as determinants of company performance. Hence, the main goal is to determine the "real" incidence of the top management demographic characteristics in the vital aspects of the enterprise, such as performance. The goal of the paper is added to the great interest manifested for many researchers to continue investigating the characteristics of TMT and their impact on firm performance (Dahya and Travlos, 2000; Carson *et al.*, 2004; Auden *et al.*, 2006; Huang and Lin, 2006; Kakabadse and Kakabadse, 2006; Kakabadse *et al.*, 2006; Kroll *et al.*, 2007; Roberson and Park, 2007; Allen *et al.*, 2008; Gigliotti, 2013). Factors such as the lack of reliability of the findings achieved together with the contradictory empirical results drawn from the studies (Srivastava and Lee, 2008), enhance our aim. Moreover, the scientific community remains unclear over whether demographical

characteristics level and diversity could significantly impact strategic magnitudes as firm performance. As Nielsen and Nielsen (2013) currently manifest: "Top management teams have become increasingly diverse over the past several decades, yet the performance implications of TMT diversity are not clearly established in the literature" (p. 13).

Regarding this goal, the present study constitutes an attempt to advance the literature on TMT composition by applying multi-level theory given the nested structure of the data set. Furthermore, the paper is one of few studies which apply longitudinal data to analyse the influences of TMT on corporate performance.

The results have been obtained from a set of hypotheses using a sample of 147 TMTs of large companies with headquarters in Spain. These findings can be useful for future investigations in two ways: by providing empirical evidence allowing companies ways to improve performance and highlighting the great debate of the black box demography in the literature.

The structure of the paper is as follows. First, the reference theory and hypotheses to be tested are explored. Second, the data and quantitative research method applied are detailed. Third, the empirical findings are provided and finally, possible managerial implications are offered together with the conclusions, limitations and future researches avenues.

2. Research constructs and research design

Upper Echelons Theory (Hambrick and Mason, 1984) is deeply rooted in the behavioural theory of the firm. Its main underlying assumption is that human limitations influence the perception, evaluation and decisions about organisational problems and hence influence firm's choices and behaviour. Accordingly these premises have made many researchers in the fields of social and organisational psychology for more than thirty years, evolving a great debate and controversy well known as black box that had been resume the interest by this theory currently (Hambrick, 2007; Boerner *et al.*, 2011; Li and Tan, 2013).

In the origin of this controversy is the fact that although research on manager effects on entrepreneurial results is abundant, however, questions as to whether their demographical constructs has positive or negative effects on corporate performance still remains open (Tacheva, 2007).

In the demographic literature numerous studies analysing the relationship between demographic characteristics and managerial performance have arisen (Boyd, 1995; Daily and Jonson, 1997; Tihanyi *et al.*, 2000; Golden and Zajac, 2001; Pitcher and Smith, 2001; Harrison *et al.*, 2002; Carpenter *et al.*, 2004; Certo *et al.*, 2006; Hambrick, 2007; Cannella *et al.*, 2008; Crossland and Hambrick, 2011; Nielsen and Nielsen, 2013). These studies display contradictory findings explained by two opposed postures. Some researchers manifests the impossibility of testing the hypotheses and conclude that this relationship is merely a black box (Hope *et al.*, 1999). Others admit the methodological weakness (Murray 1989), defending either the level or the demographic diversity as explanatory factors of the highest level of performance.

TMT and their relevance as a potential determinant of firm performance continue to be a focus of strategic management researchers (Goll *et al.*, 2001). The final objectives of TMT's efforts are to create a competitive advantage and ensure strong organisational performance (Marimuthu and Kolandaisamy, 2009a). Hence the crucial point in this research cannot be ignored by determining both the specific role of TMT and their contributions on financial performance.

The demographic characteristics of TMT include age, functional background, education and tenure (Hambrick and Mason, 1984), who covered a way to deal with diversity within top management and its impact on firm performance that is strongly linked to the Upper Echelon Theory. They argued that demographic top management's characteristics influence the decisions that they make and therefore the actions adopted by the organisations that they lead. It occurs because demographic characteristics are associated with many cognitive bases, values and perceptions that influence the decision making of top management (Marimuthu and Kolandaisamy, 2009b). This premise is consistent with a growing body of research on managerial cognition, which is noted in Walsh (1995). Day and Lord (1992) suggests that managers' mental models will influence their pattern decision making (Night *et al.*, 1999). This discussion was later expanded to the "six specific influence processes" that allow shaping the strategic direction and performance of the organisation (Navahandi, 2006). Many researchers has been appeared after Hambrick and Mason (1984) trying to test if the backgrounds or behaviour of managers have any effects on entrepreneurial outcomes. However, both lack unique and reliability results due to the opposite findings achieved among the two main dimensions, level and diversity, had been provoked a latent controversy around whether demographical managerial constructs have effects on firm performance.

Regarding the previous arguments the model specified below (Figure 1) draws upon Upper Echelon Theory attempting to test the influence of the Top Managers' level and diversity demographic constructs on performance. In order to that, the hierarchical Model allows to provide some new insights into the controversial relationship between these traditional topics and the firm performance in terms of their antecedents and future consequences. The hypotheses formulated below are based on the demographic academic literature as follows.

Educational background
The demographical construct education in the context of TMT Theories is regarded as a background characteristic that acquires special relevance not only at the time an executive is promoting but also previously to its income to firm. Educational background, both in level and diversity, is associated with better information and knowledge within the team (Williams and O'Reilly, 1998). Moreover, as formal education reflects an individual's cognitive abilities, diversity in educational background is
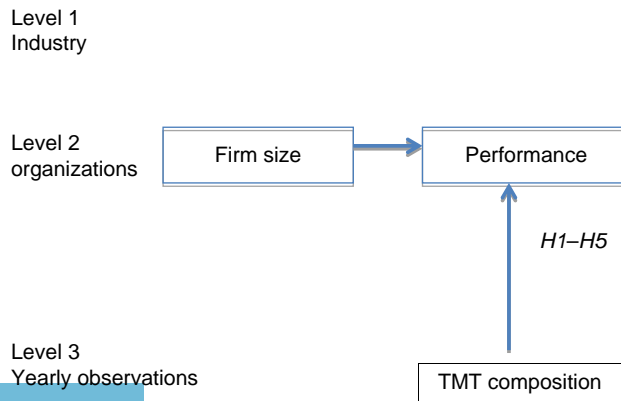

Figure 1.
Hierarchical model
and hypotheses

associated with diversity in top managers' perspectives, knowledge and skill sets. Similarly, diversity in educational backgrounds may enhance problem solving and decision making in dynamic industry environments. Hence, despite the internal social psychological tendencies towards homogeneity, firms facing unstable environmental conditions are more likely to consider diversifying the composition of their TMTs (Finkelstein *et al.*, 2008).

TMT demographical construct has been related with a high number of organisational outcomes, being the main analysed terms as strategy, innovation and performance (Bantel and Jackson, 1989; Wiersema and Bantel, 1992). Traditionally, the favourable effects of the former, these demographical constructs, the managerial variable as strategy or performance used to be strongly linked both with the top manager's education as the diversity of education of the TMT where is integrated. So, Finkelstein *et al.*, (2008) argued that some competitive and marketplace conditions call for different educational backgrounds and concomitant open-mindedness, information-processing abilities and cognitive flexibility. In addition, it widely recognised that different backgrounds diversity coming from more knowledge, experiences and perspectives, the quality of their decision making and subsequently firm performance will be improved along time (Carpenter *et al.*, 2004; Finkelstein and Hambrick, 1996; Pettigrew, 1992).

According to the previous arguments, the paper hypotheses:

H1. Education background diversity in TMT members will be positively related to corporate performance measured by return on sales (ROS) (*H1a*) and by return on assets (ROA) (*H1b*).

H2. Level of education diversity in TMT members will be positively related to corporate performance measured by ROS (*H2a*) and by ROA (*H2b*).

Functional background
Functional background is one of the most prominent and studied TMT's demographical characteristic within Upper Echelon Literature (Finkelstein and Hambrick, 1996). This construct can be regarded as both a background characteristic and experience. A range of functional experiences reflect high intra-personal functional diversity (Bunderson and Sutcliffe, 2002) and a broader individual knowledge and information base. As a result, diversity in functional backgrounds is believed to be related to diversity in top managers' perspectives, knowledge and skill sets. Therefore, TMTs are naturally comprised of individuals from different functional areas, contributing specific knowledge and experience necessary for successfully managing the complexity of the firm's operations. In addition, diversity in tasks-related attributes is associated with a higher number of perspectives that influence decision making by increased communication, debate and decision comprehensiveness within the team (Simons *et al.*, 1999; Smith *et al.*, 1994).

Functional background diversity is similar to educational diversity in terms of its determinants and anticipated effects. From a resource-dependence perspective (Pfeffer and Salancik, 1978), diversity in managerial backgrounds will bring to the firm relational capital (network contacts) as well as human capital (e.g. expertise, knowledge and skills) (Hillman and Dalziel, 2003) that are essential for successful management of complex organisations. Hence, TMTs with diverse background characteristics and experiences will be better able to manage complex environments compared to homogeneous TMTs (Carpenter, 2002; Keck, 1997). In order to be able to

cope with the complexity of a firm operations, TMTs need to adjust to have first, a broader knowledge base and information-processing capacity and, second, efficient team processes, which will allow the team to capitalise on the benefits of diversity in knowledge and experiences and make sound and innovative strategic decisions and consequently, firm performance (Tacheva, 2007). Supporting this, Grinyer and Spender (1979) sustain that strategic change is driven by the previous experiences that new managers bring to their new companies. Furthermore, Westphal and Fredrickson (2001) consider that the functional background of top managers will increase the results of their companies. Studies relating to the manager's knowledge have demonstrated that the experience of individuals is related to a complex cognitive structure allowing the processing of more efficient information. These findings will furthermore be predictive, accurate and better organisational results (Stabell, 1978; Ford and Baucus, 1987). Thus, top management selection processes are rooted in the market for human capital, in which decisions about the appropriate mix of executive knowledge and skills and the application of management knowledge and skills are made by both managers and firms (Srivastava and Lee, 2008). These previous results lead to the formulating of the model's hypothesis number three:

H3. Functional diversity in TMT members will be positively related to corporate performance measured by ROS (*H3a*) and by ROA (*H3b*).

Industry background
Upper Echelons Theory agrees with resource-dependence theory (Pfeffer and Salancik, 1978) when suggesting that firms are dependent on their environments, which influences organisational characteristics and behaviour. However, it goes further, arguing that the role played by their top managers into this influence is essential due to their ability to secure critical firm's resources, vital tasks to firms' survival. In fact, these executives act as a link between the organisation and its environment being appreciated as boundary spanners who have access to important information and resources (Hillman and Dalziel, 2003). Accordingly, and regarding to one environmental construct widely explored into demographical literature, mainly in industry sector, Hambrick and Mason (1984) suggest that background characteristics are influenced by a firm's industry, being the degree of environmental complexity in which a firm operates is determined by the dynamism and the characteristics of the industry to which it belongs. In the same way, Porter (1980) added that firm behaviour and performance are constrained by the industry in which firms operate. Focused on these arguments both theoretically and empirically other Upper Echelons empirical studies (i.e. Norburn and Birley, 1988; Pegels *et al.*, 2000; Buchholtz *et al.*, 2003; Hambrick *et al.*, 2005) have found significant differences within and between different industries regarding the diversity of demographic characteristics teams, being established the environmental construct as an important macro-level factor which may influence the diversity in TMTs. Furthermore, diversity in managers' industry experience is vital for highly diversified organisations. Therefore, this diversification brings to top managers an industry-specific knowledge and expertise as well as access to network contacts that they can apply to evaluate the trends, assess threats and opportunities, earn optimal level of performance and adopt the best growth strategic actions. As a result, the model formulates the hypothesis:

H4. Industry diversity in TMT members will be positively related to corporate performance measured by ROS (*H4a*) and by ROA (*H4b*).

International experience background
International experiences are a valuable source of knowledge and expertise regarding foreign markets and cultures (Johanson and Vahlne, 1977; Reuber and Fischer, 1997; Sambharya, 1996; Carroll and Harrison, 1998; Carpenter *et al.*, 2000).

A recent trend, particularly within the European business community during the last years, has been the growing number of foreign companies (Heijltjes *et al.*, 2003; Ruigrok *et al.*, 2005). The importance of having top managers, knowing and understanding the logic and dynamics of the firm's foreign markets and global business environment has been widely discussed by both practitioners and researchers (Bartlett and Ghoshal, 1989; Luo, 2005; Bowen and Wiersema, 2005). Indeed, Perlmutter and Heenan (1974) have defended the advantage of the use of foreign nationals as top managers' firms for more than 30 years.

Managers' international experience facilitates access to international networks (Athanassiou and Nigh, 1999). Furthermore the anticipated effects of diversity in top executives' international experiences provide a better understanding of the complexity and dynamics of managing a firm's international operations. Besides, a wide range of experiences outside the industry in which the firm operates can be a potential source for reducing the complexity and uncertainty related to decision making in highly turbulent environments, increasing the organisational outcomes such as performance. Accordingly, *H5* emerges from the proposal model:

H5. International experience diversity in TMT members will be positively related to corporate performance measured by ROS (*H5a*) and by ROA (*H5b*).

To conclude, the model and their hypotheses in Figure 1 can be summarised as follows: top managers coming from different educational and functional backgrounds and having different industry and international experiences, will create a broader knowledge base as well as higher cognitive and information-processing capacity, which in turn, will increase the TMT's ability to cope with the complexity of firm operations (Carpenter, 2002; Finkelstein and Hambrick, 1996; Keck, 1997; Sanders and Carpenter, 1998). This will allow the firm to achieve a high level of performance and not only to survive but also growth in new markets.

3. Method
Sample and data collection
A formal TMT definition (Michel and Hambrick, 1992; Pegels *et al* 2000) was used to specify TMT as a unit of analysis. TMT is defined as all those executives around and above the president level, as well as any other officers who served as directors of the company, i.e., vice-president, senior vice president, vice chairman, CEO, and any other officers who were on the board of directors. Data on the composition of the TMT sample both members as their hierarchy/jobs within their TMT, respectively, during the observed period (2004-2007) were obtained from the Business Journal namely "Firm New" (Nueva Empresa). According to these definitions the Spanish sample consisted of 147 TMTs. The organisations involved were big multinational companies with social headquarters in Spain.

To obtain the demographic background information, the principal lines of work that the researches on managerial demography have used: sources of secondary information included, company web sites, yearbooks and others similar sources (QuienesQuien en España, 2000; QuienesQuien en Europa: CEE, 1991; Who's Who in the world, 2001;

Who's Who in Finance and Industry, 2000; Who's Who in Spain, 2003, etc.), newspapers (Expansión, CincoDías, El País, ABC, etc.) specialising magazines (Nueva Empresa, ActualidadEconómica, Dirigentes, El Empresario, Ranking, IPMark, Fomento de la Producción, Fortune, Agenda de la Empresa, Mk Marketing + Ventas, Emprendedores, etc.) (Westphal and Milton, 2000; Pegels *et al.*, 2000), and primary information obtained from direct contact with the top managers involved in the sample selected. The collection of data were conditioned on the legal restrictions about data personal protection by the Spanish law, LORTAD[1]. The final sample size resulted in 147 TMTs from large companies with headquarters in Spain with activities in 18 industries. Observations with missing data at company or industry level were not included in the data. Despite of the LORTAD restrictions, the final sample size can be considered appropriate to achieve an acceptable comprehension for the aim of the paper (Boeker and Goodstein, 1993; Jehn *et al.*, 1999; Goll *et al.*, 2001; García and Fernández, 2004; Reinmoeller, 2004, Bowen and Wiersema, 2005). Data was collected between January 2004 and December 2007.

Data on TMT was collected at individual level and team level. Demographic magnitudes, education background diversity and education-level diversity functional diversity, international and industry experience diversity have been used as predictor variables. The variable background education was categorised into eight categories (sciences, engineering, math, business, economics, law, arts, and others), as traditionally used within the literature (Carpenter and Fredrickson, 2001). The Spanish Education Administration measured education level as a categorical variable indicating the level of education as recognised. Functional background has been categorised as a dummy variable based mainly on Wiersema and Bantel (1992). Industry experience diversity was coded as a dummy variable, being one of the top executive was experience in an industry different from the one he/she operates, and taking the value zero otherwise. International experience was measured as categorical variable with nine values, where value one indicates not experience abroad neither in the current company or other companies and value 9 showing international experience not only for the company but also for different companies.

Two different measures have been applied to aggregate data at team level following the criteria established in the Upper Echelon Theory. Simple ratios were calculated for dummy variables as functional and industry diversity. Blau's (1977) Index was used to measure the diversity on background education, education level and international experience. Blau's (1977) Index is a frequently used diversity measure for categorical variables (Bantel and Jackson, 1989; Keck, 1997; Pegels *et al.*, 2000) with the following expression $(=1-\sum (P_i)^2)$, with P_i being the percentage of individuals in the ith category (education, functional background), taken values from 0 to 1, with high values indicating a greater diversity on a particular variable.

Data on company performance, size and sector were obtained from two relevant databases SABI[2] and CNMV[3]. Company performance, the dependent variable, was measured by using two indicators of economic profitability used in the demographic literature, as the average ROA, and ROS (Denis and Denis, 1995; Certo *et al.*, 2006). These indicators are different from the usual ones used in the literature (Venkatraman and Ramanujam, 1984), as financial measures as ROE (Díaz Fernández, 2004; Smith *et al.*, 1994). The lower volatility of the former firm measures in relation to the latter, recognised by the previous performance researchers, guided our final choose. ROA was calculated as net income divided by total assets and ROS was obtained dividing the profit between the sales. While ROA measures the firms operative efficiency, ROS determines the gross benefit obtained by each monetary sold unit.

Data analysis
A hierarchical regression analyses was applied given the multi-level nature of
our hypotheses (Cohen, 2003; Liau and Chuang, 2004; Raudenbush *et al.*, 2011). HLM
appears to be the most appropriate method for data with nested sources of variability
by integrating the micro (individuals), intermediate (team, organisatisons) and
macro (industry) levels. HLM is a complex extension of ordinary least squares (OLS)
regression to a model including nested random coefficients recommended to analyse
variance in the dependent variables when the predictor variables are at varying
hierarchical levels (Raudenbush and Bryk, 2002). Therefore, HLM simultaneously
investigates relationships within and between hierarchical levels of grouped data, and
therefore by accounting for variance among variables at different levels than other
existing analyses.

HLM are increasingly applied in social science (business, marketing, education, and
psychology) and widely spread across other fields since it was first used in the 1970s
for analysing nested data (Woltman *et al.*, 2012). Particularly, the use of HLM with
random slope models is being recently applied in Upper Echelons researches (Boerner
et al., 2011; Carpenter, 2002). Two hierarchical regression models were estimated
for different measures of company performance in the period of time 2004-2007.

4. Results
Preliminary results
Tables I and II show descriptive statistics and bivariate correlations for the variables
included in the analysis. Industry and functional diversity ranged between 0
(no diversity at all) and 1 (highest diversity). Background education diversity ranged
between 0 and 0.75, education-level diversity ranged between 0 and 0.77 and
international experience diversity ranged between 0 and 0.73. Education (SK = -0.504),
function (SK = 0.2797) and education-level diversity (SK = -1.078) present left-skewed
distribution indicating that most of the companies do not present a high diversity in their
TMT whereas sector diversity (SK = 0.394) presented a right-skewed. International
experience (SK = -0.0071) showing a moderate left-skewed distribution with it being
nearly a symmetric distribution.

The results revealed that companies vary highly in size measured by total assets.
Company size is highly correlated with TMT size ($r = 0.4221$, $p < 0.01$ for both
assets and sales). The company size is also highly correlated with demographic
variables in terms of diversity. Total assets are correlated with education background
diversity ($r = 0.12$, $p < 0.01$), education-level diversity ($r = 0.29$, $p < 0.01$), functional diversity
($r = 0.16$, $p < 0.01$), industry diversity ($r = 0.19$, $p < 0.01$), international experience
($r = 0.17$, $p < 0.01$).

As observed in Tables I and II the performance variables, ROA, ROS are correlated
at 1 per cent of significance. To test for multicollinearity, the variance inflation factors
(VIF) of the independent variables were examined conducting OLS regressions.
To avoid problems of multicolinearity amongst predictor variables, the variables at
team level were centred (Hamilton, 2006). The VIF of the diversity measures centred
were <8 and therefore, two separate hierarchical analyses were conducted for each
financial indicator of corporate performance.

HLM results
Null model, Model 1. According to the nested structure of the dataset a three-level
model was specified by including a control variable firm size and with no predictors at

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10
1 Sizetmt	5.76	2.44	1.00									
2 Educatback	0.38	0.24	0.12**	1.00								
3 Educatlevel			0.29***	0.27***	1.00							
4 Functionality	0.40	0.32	0.16***	0.0065	−0.014	1.00						
5 Intern.experience	0.28	0.23	0.17***	0.12**	0.13**	0.14****	1.00					
6 Industry	0.39	0.28	0.19***	0.13***	0.24***	−0.30***	0.11**	1.00				
7 Total assets	254,626	918,161.1	0.43***	0.17***	0.1513***	0.1135**	−0.053	0.12**	1.00			
8 Sales	189,162.9	669,124.8	0.43***	0.15***	0.14***	0.14***	0.11**	−0.053	0.1191**	1.00		
9 ROA	.087	0.11	−0.012	−0.13***	−0.11**	0.005	0.047	−0.08*	−0.06	0.05	1.00	
10 ROS	.054	0.13	−0.05	−0.09*	−0.15***	−0.03	−0.12**	0.03	0.07	0.006	0.48***	1.00

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table I.
Descriptive statistics
and correlations

	Model 1		Model 2	
	ROS	ROA	ROS	ROA
Intercept	−3.21 (0.15)***	−2.83 (0.15)	−5.44 (0.45)***	−2.12 (0.26)***
Education back diversity			0.0024 (0.48)	0.079 (0.26)
Educationleveldiversity			−2.01 (0.68)***	−0.68 (0.32)**
Funcional diversity			0.31 (0.35)	−0.17 (0.19)
International expdiversity			−0.58 (0.48)	0.45 (0.26)*
Industrydiversity			0.98 (0.44)***	−0.21 (0.23)
Assets	0.21 (0.041)***	−0.042 (0.031)	0.22 (0.041)***	−0.05 (0.025)**
Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$				

Table II.
Fixed effects
HLM analysis

the starting point of the analysis, with Level 1 representing yearly TMT observation, Level 2 accounting for company and Level 3 representing industry. Model 1 provides the estimation results for firm size measured as logarithm of company total assets, the intercept (grand mean, average performance industry group) and the variance estimates between and within groups (Table III). The control variable firm size has a significant and positive impact on performance measured by ROS ($\hat{\gamma} = 0.21, \rho < 0.01$) The estimated variances at Level 1 (within firm variance), at Level 2 (between firm variance) and at Level 3 (between firms within industry variance) were 0.37, 1.12, and 0.94, respectively. The highest variance is observed at the second level of the data structure indicating higher variability between companies and therefore the main source of variability. Based on the estimated variances the ICC was calculated: 15 per cent of the variance in ROS was observed within companies, and 46 per cent was at Level 2, between companies and 39 per cent at Level 3, within industry. The χ^2-statistics indicated that variances are significantly different from zero ($\chi^2 = 160.76$, $p < 0.001$).

The main effect model, Model 2. H1a-H1b, H2a-H2b, H3a-H3b to H5a-H5b, assume that individual characteristics are positively associated with corporate performance measured by ROS and ROA. To test these hypotheses and therefore to analyse the main effects of the TMT composition diversity, a HLM with predictors at the lowest level is estimated for the financial performance indicators (Table III). Education-level diversity showed a negative and significant impact on corporate performance if measured for both ROS and ROA ($\hat{\gamma} = -2.01, p < 0.01; \hat{\gamma} = -0.68, p < 0.05$) The negative influence on corporate performance is supported in the literature (Schneider *et al.*, 1998; Boone *et al.*, 2004) and reveals that organisations try to select and retain a group of employees

	Model 1		Model 2	
	ROS	ROA	ROS	ROA
eijk (SD level 1)	0.37**	0.45**	0.36**	0.43**
rojk (SD level 2)	1.12***	0.82***	1.06***	0.13***
Uook (SD level 3)	0.94	0.58	0.95	0.60
Residual	0.46	0.29	0.44	0.29
ICC level 1	15.23	24.32	15.19	23.37
ICC level 2	46.09	44.32	44.72	44.02
ICC level 3	38.68	31.35	40.08	32.60
Notes: ** $p < 0.05$; *** $p < 0.01$				

Table III.
Random effects
HLM analysis

with no high diversity in backgrounds, characteristics and experience. As observed from Table III, the main effect of education-level diversity is stronger on ROS than ROA showing that ROS captures better the main effect of the education-level diversity.

No significant effects were found for functionality and education background diversity on ROS and ROA. Industry diversity showed a positive and significant influence on ROS ($\hat{\gamma} = 0.98, p < 0.01$). Organisations appear to be more concerned on the employee's education level rather than the degree in education background. Focus on the financial indicator ROS, companies seems to be more aware of industry experience diversity than functionality diversity. According to our results, the more international experience diversity the greater influence on corporate performance. Industry experience diversity leads employees to have high environment knowledge to face the treats of the competitive market. However, this finding for the Spanish companies is opposite to the idea that executives with experience in the same industry have a better knowledge of the company and its competitive environment (Prahalad and Bettis, 1986). The measurement of the variable functionality diversity as dummy variable could have influenced the main effect of this variable claiming a more complex measurement, which captures functionality diversity better. International experience had a positive, although a weak significant effect on corporate performance if measured by ROA ($\hat{\gamma} = 0.45, 0p < 0.1$). The positive influence of international experience on performance (ROA) reveals that employees with a high understanding of the international market are well prepared to face a more complex company's international operations (Carpenter *et al.*, 2001).

The inclusion of the predictor variables in Model 2, leads to a slight reduction in the unexplained variance at Level 1 and two for both ROS model and ROA model.

5. Managerial implications

Management and firm performance are two relevant issues for the company by conditioning essential aspects to any organisation as growth, expansion or survival, besides daily activity, modus operandi, managerial decisions or strategic magnitudes needed in the management best-practice (Drucker, 2004; Salgueiro, 2001). Furthermore, in entrepreneurial and business sectors, everything turns around the level and quality of management and firm performance as well as the dynamism and efficiency of the top managers and the and growth performance achieved by them (Drucker and Maciariello, 2005; Hambrick and Mason, 1984). Thereby, these managerial magnitudes are also important to society since its members receive benefits from those magnitudes (employment, products, innovation, wealth, money, quality, among other aspects). Apart from that, society and firm are benefited one from each other by the positive synergies created which are materialised through business links and social networks (Drucker, 2003). Under the above argument our study is justified since the business world, the scientific community, higher management institutions, consumers and society show a great interest in the results related to this topics. Being able to identify not only those elements influencing the performance, but also how a high level of performance can be obtained through a specific TMT, a fundamental goal would be achieved. This purpose has been widely pursued but not yet achieved.

The Upper Echelon Theory has been largely unexplored by prior researchers in different entrepreneurial contexts in the USA. In fact, our paper analyses its premises with a focus on a different European country, Spain.

The results demonstrated how and which demographic characteristics of top managers influence firm performance, supporting the current model proposed. Furthermore, this

paper also shows that a proper level and diversity of demographical characteristics of TMTs is recommended to achieve a high performance, highlighting the controversy of demography's black box literature. On the other hand, our empirical results highlight the importance of level and diversity amongst team members. Two different dimensions in the demographical literature as background level and diversity, in the Spanish industrial sector, over a period of time have been explored in this paper and constitutes an attempt to help managers in human resource allocation and team building. The importance of having the best TMTs who know and understand the logic and dynamics of the firm's foreign markets and global business environment is widely acknowledged and required not only to survive but also to grow in the critical competitive environments. This is a recent trend that acquires particularly significance within the European business context both due to the latest growing number of foreign firms requiring top echelons in their organisations (Heijltjes *et al.*, 2003; Ruigrok *et al.*, 2005) and the crisis and their consequences that those companies suffer. These facts increase and reinforce both the value of the knowledge of these good top managers. In addition, the level and diversity of demographical constructs of TMT influence performance and consequently the firm performance (Liang *et al.*, 2007). It seems plausible that if top managers are coming from different backgrounds and bring with them different knowledge, experiences and perspectives, the quality of decision making and subsequently firm choices will improve (Carpenter *et al.*, 2004; Finkelstein and Hambrick, 1996; Pettigrew, 1992). Moreover, differences in knowledge amongst members provide more flexibility in matching skills and tasks. Educational diversity may facilitate team members' learning from others, which in turn improves teamwork skills. Members with different professional experience may provide a variety of viewpoints and help to improve the quality of decision making. These factors may save mission-critical projects at critical junctures (Liu *et al.*, 2006). In definitive, firm and top managers can gain advantages by leveraging the knowledge of all these demographical characteristics in both level and diversity of the members of their managerial teams. Indeed, in some cases these factors may be helpful in developing creative and novel solutions towards many challenges typically encountered and necessary in the numerous projects involved in the management activity (Barki and Hartwick, 2001).

To conclude our discussion we agree with Huang and Lin (2006), Liang *et al.* (2007), Crossland and Hambrick (2011), Li and Tan (2013), Nielsen and Nielsen (2013), in that a multi-level approach to the phenomenon of TMT diversity related to managerial construct as firm performance can contribute to make progress in the current state of the demographical literature premises as well as highlight the role played by the upper echelons levels. It is recognised that there are still so many remains to be done in the Upper Echelon Theory and hence the necessarily to deepen the mentioned phenomenon due to its social and entrepreneurial significance.

6. Limitations and future researches
The starting point of this paper was to empirically investigate the impact of TMTs' demographical constructs on their business decisions and behaviour in order to explore to what extent these managerial choices and patterns of behaviour influence the performance of a firm. After reviewing relevant literature as well as the findings accomplished, this study considers that to achieve this goal suitability is necessary to be take into consideration several issues as provided below.

We agree with Murray (1989) when manifesting that there is an important methodological weakness in research related to demographical constructs. In this line,

this study has applied a new statistical technique in this field, a three-level HLM, supported on a panel dataset. The model proposed allowed us to study the moderator effect of certain variables as longevity as already appeared in the literature by using the mentioned HLM (Tacheva, 2007). Besides, based on the partial confirmation of the hypothesis formulated in our model and the Murray's (1989) methodological weakness, we also assumed another statistical technique as Partial Least Squared (PLS) could be a power statistical tool to correct the traditional weakness methodology already exposed extending the validity of our findings. This technique will be applied in future works. The aim of this research was an attempt to deepen the debate generated on the relationship TMT composition and corporate performance to highlight the black box of the demographic literature. The study recognised diversity as a multi-dimensional construct by including different dimensions of TMT composition. However, recent research approaches claim to be more appropriate in considering multiple diversity dimensions simultaneously (Carpenter *et al.*, 2004). Regarding the new research direction we will face a research where structural equation modelling is applied by allowing us to consider higher order structural models revealing the multidimensional structure of TMT diversity. On the other hand, as observed from the results, the significant effect of diversity attributes on company performance clearly depends on the performance measures. We also realised that a more general construct which includes different performance items and therefore dimensions will be more appropriate. Structural equation modelling appears to be an appropriate technique to obtain the score of the latent variable under study and therefore to specify a model where corporate performance is the dependent variable.

The relationship between diversity and performance is not only linear but curvilinear, as argued by Lau and Murnighan (1999) and Richard *et al.* (2004), but also the links and interactions between the implicated constructs into Upper Echelons Theory regarding any other type of managerial variable as performance are so complicated as to create different pattern of behavioural not easy to predict and confirm. To solve this inconvenient a non-linear statistical technique will be applied in future research projects.

It is necessary to study the diversity and level of demographical construct as well as their relationship with other constructs as organisational firm variables, in a multi-dimensional context and covering a wider period of time. Attending to theses premises, this research will continue to deep into the analysed phenomenon by including other unusual demographical constructs as nationality or task antique with a bigger sample size integrated by new top managers from foreign multinational localised in different countries not only from Europe and the USA but also from emergent economies as China, India, Russia and Brazil with different cultural and economics patterns striving to find the coexistence of different models by firm context.

It has been widely recognised that the organisational responses depend on the TMT composition and diversity in TMT characteristics appear to be for the company a relevant factor to make more accurate decision under uncertainty external environments and their own capabilities and constraints. However, TMT level or diversity consequences on decision-making process are not immediate, spreading their influences over a medium/long run term. Accordingly, a longer period of time should be analysed to see the real effect of TMT demographical constructs.

The tested phenomenon is part of a dynamic environment and can also be influenced by many elements. Respect to this limitation, environmental constructs as culture or industrial sector will be taken into consideration in future research.

Furthermore and in line with debates regarding which characteristics are more appropriate as proxies for a deeper psychological constructs (Lawrence, 1997; Priem *et al.*, 1999), we suggest exploring more about variables related to cognitive diversity different from background and experience variables accounting for the social psychological process in TMT which will affect the effectiveness of the organisational responses.

Research on multicultural teams suggests that demographical construct diversity have different influence on performance, in some cases opposite. This is due to the facts that first, managerial choices are believed to be not completely rational but rather influenced by the psychological make-up and background characteristics of managers (Hambrick and Mason, 1984); and second, TMT processes have a significant influence on firm strategic choices and performance (Amazon, 1996). According to this weakness, we recommend taking in mind that the notion of multi-dimensional diversity (Jackson *et al.*, 2003) not only distinguishes between different diversity dimensions but also challenges the assumption that their different effects are independent of each other. The existing practice to empirically test and discuss findings about different diversity dimensions, included in a single study separately, is based on the assumption that the effects of each type of diversity are independent of the presence of other types of diversity (Jackson and Joshi, 2004). This complex casuistic we aim to develop in future research.

7. Conclusions
The paper attempted to contribute to the debate of TMT diversity performance by using a Spanish TMT big multinational dataset in the period 2004-2007. No efforts by collecting in-depth Spanish data have appeared in the upper echelon debates thus far. The sample size consisted of 147 companies within 18 industries, being limited by the Spanish data protection Law that makes it even more difficult to gather information at the individual level.

The paper has focused on studying the effect of different diversity dimensions on TMT performance measures, by being aware that each diversity attributes has not similar influences on those patterns. The study overcomes the lack of previous research in the Upper Echelon Theory by considering TMT diversity as a single construct without distinguish between single diversity dimensions as diversity in experience and background. The study considers diversity as a multidimensional construct. The measures included are related to industry (industry diversity), company (international experience, functional background) and individuals (education diversity and level of education diversity). The predictor variables, although explored in the literature have been not used in the same model to capture the different dimensions of diversity in Spanish environment. The variable international experience was measured using nine categories is also an attempt to take into consideration different experiences in an international context unlike the studies defining the variable traditionally as dichotomous variable.

The corporate performance dependent variable has been defined by using two economic indicators reflecting different dimensions of this variable. Two separate hierarchical linear regressions have been estimated looking for different effects of TMT composition on each performance dimension (ROA, ROS). The nature of corporate performance led us to realise that the variables need to be defined considering different dimensions simultaneously since each proxy indicator gives different conclusions. Furthermore, the findings also revealed that the volatility of the performance measures

not only is manifested in order to financial firm measures as ROE argued in the literature but also it appears in measures of economic profitability as ROA and ROS.

The results of the empirical analysis, based on a three-level HLM tests provides evidence that TMT's education-level diversity showed a negative and significant impact on corporate performance and no significant effects for functionality and education background diversity have been found. Organisations appear to be more concerned with employee's education level rather than the degree diversity in education background. Furthermore, the statistical technique seems to confirm that companies tend to be more aware of industry experience diversity than functionality diversity when measuring performance by ROS. A relatively week influence of international experience diversity on corporate performance by ROA has been revealed. Hence, the proposal model is partially confirmed and although no similar conclusions have been achieved when measuring performance either by ROS and ROA, our findings are an attempt to highlight the controversy of the demographic black box. Moreover, the results may not only allow TMTs to achieve significant managerial implications in order to lead efficiently their firms, but also to encourage researchers to continue with the development of the premises appeared in Upper Echelons Theory a long time ago and resumed currently.

These previous comments together with the confirmation of some hypotheses have been supported depending on the measurement of the corporate performance. The different results achieved regarding the performance measurement highlight not only Murray's (1989) methodological weakness, but also the motivation to continue deeply into the phenomenon studied in order to solve the mentioned limitations and to achieve a reliable arguments through future researches.

Notes

1. LORTAD, Ley Orgánica 5/1992, 29 October, on the treatment of the personal data.

2. Sistema de Análisis de Balances Ibéricos (SABI). SABI is a database created by the company Informa that has collected annual accounts from the main Spanish and Portuguese companies since 1990. It is an interesting tool that helps with business analysis, comparisons between companies or company groups, rankings, concentration and segmentation analysis, and sectorial studies.

3. Comisión Nacional del Mercado de Valores (CNMV). CNMV is the Spanish government agency responsible for the financial regulation of the securities markets in Spain. It is an independent agency that falls under the Ministry of Economy and Finance of Spain.

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