

KNOWING YOUR TOP MANAGEMENT TEAM – A SUSTAINABILITY SUCCESS FACTOR?

**RELATIONSHIPS BETWEEN DEMOGRAPHIC
CHARACTERISTICS OF TOP MANAGEMENT TEAMS AND
SUSTAINABILITY PERFORMANCE**

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Bachelor Thesis

Stockholm School of Economics

2022



Knowing your top management team – a sustainability success factor?

Abstract:

Today, there is increasing pressure on companies to conduct sustainable business if they want to survive long-term. To understand why certain companies report higher levels of sustainability performance than others, it is of interest to explore the potential role that the composition of top management teams (TMTs) plays in this matter. By looking into demographic characteristics (gender, age, educational background, and functional background) of TMTs in Swedish listed companies within six different industries, this study aims to answer the following research question: *What is the relationship between demographic characteristics of top management teams and the sustainability performance of companies?* To provide an answer to this question, a quantitative study is conducted where the Upper Echelon Theory is applied on data collected through structured observations of corporate secondary data. The study finds significant support for positive relationships between sustainability performance and each of the variables mean age, age diversity, and educational level. Meanwhile, the study finds no significant relationships between sustainability performance and the variables gender, educational diversity, previous experience of executive management positions, previous experience inside the current company, and previous experience outside the current company but within the same industry. There are also implications that other factors than demographic characteristics of TMTs should be considered when attempting to predict sustainability performance. These results imply that further research could be of interest to understand the relevance of TMT demographics with regards to sustainability performance.

Keywords:

Top Management Teams, Demographic Characteristics, Relationships, Sustainability Performance, Upper Echelon Theory

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Bachelor Thesis

Bachelor Program in Management

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We would like to thank Markus and our supervisory group for providing us with inspiration and feedback throughout this entire process.

We would also like to thank Abiel for the valuable support and expertise that has been vital for the completion of this paper.

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1. INTRODUCTION

1.1. Background

Today, there is increasing pressure on companies to conduct sustainable business in terms of the triple bottom line (social, environmental, and financial sustainability), since they are facing both governmental sustainability goals and agendas as well as increased awareness and demand for sustainable products among consumers (Elkington 1994). Moreover, there also seems to be a positive relationship between corporate sustainability practices, such as reporting and measurement, and corporate financial performance, indicating that companies also can gain from conducting sustainable business (Alshehhi, Nobanee et al. 2018). This implies that companies should deliver on sustainability if they want to survive long-term, but this may be easier said than done.

The top management team (TMT) that is responsible for a company's daily operations is also responsible for ensuring that these operations are sustainable. To understand why certain companies report higher levels of sustainability performance than others, it is of interest to explore the potential role that the composition of TMTs plays in this matter. Previous studies have already shown different relationships between certain demographic characteristics of boards, but also TMTs, and financial performance (Ali, French 2019; Ararat, Black et al. 2017; Wang, Holmes Jr et al. 2016). Thus, it is likely that the composition of TMTs also has an impact on sustainability performance. More specifically, it would be of interest for management research to investigate the relationships between certain demographic characteristics of TMTs and the sustainability performance of companies since this possibly could have implications for how sustainability performance can be addressed through TMT composition. Thus, this research could possibly provide guidance on what factors that should be considered when appointing members of the TMT to address sustainability performance, whether there is an ideal composition of the TMT with respect to sustainability performance, and what might impede a company from achieving higher sustainability performance.

In this report, the TMT consists of roles such as Chief Executive Officer (CEO), Chief Financial Officer (CFO) and officers in areas such as Human Resources, IT, Communication and similar. Furthermore, sustainability performance is defined based on a ranking presented by Ekonomihögskolan of Lund University, which identifies sustainability aspects of value to

companies, such as their work with risk mapping, environment, climate, human rights, and anti-corruption (DI: Här är börsens mest hållbara bolag, 2021).

1.2. Purpose and research question

The purpose of this research is to investigate the relationships between certain TMT characteristics and the sustainability performance in companies. This will hopefully contribute to management research by indicating what factors that may be important to consider in the composition of TMTs with regards to sustainability performance, and whether certain characteristics are of greater importance in this sense. By looking into demographic characteristics (gender, age, educational background, and functional background) of TMTs in Swedish listed companies within the sectors of materials, consumer discretionary, consumer staples, capital goods, banks, and investment companies, this study aims to answer the following research question:

What is the relationship between demographic characteristics of top management teams and the sustainability performance of companies?

1.3. Delimitations

This study has been delimited by only examining listed companies. As listed companies face different demands from the public compared to unlisted ones, sustainability practices may vary between them, which implies that the study results may be difficult to apply to unlisted companies. Also, while many of the companies included in the study operate internationally, they derive from a Swedish context, which may complicate comparisons with international companies, as sustainability practices may differ between countries. Additionally, the companies included in the study operate in six different industries, which may limit the possibility to draw conclusions about TMT compositions in companies outside these industries. More specifically, regardless of the TMT composition, different industries may enable the achievement of different levels of sustainability performance due to industry specific conditions, such as the standards for usage of fossil fuels or poor working conditions.

2. THEORY

2.1. Theoretical positioning

In this research, the Upper Echelon Theory (UET) will help to provide an answer to the research question. There are two aspects of this theory. Firstly, it is considered that “executives act on the basis of their personalized interpretations of the strategic situations they face,” and secondly, that “these personalized construal’s are a function of the executives’ experiences, values and personalities.” (Hambrick 2007). Further, there have been several refinements of the theory.

One subordinate idea states that a better understanding of organizational outcomes is enabled by shifting focus from characteristics of individual top executives to entire top management teams. It is argued that leadership is a shared activity, and that all collective cognitions, capabilities, and interactions of the entire TMT unfolds into strategic behaviors. Therefore, it can be assumed that different TMT compositions affect organizational outcomes in different ways (Hambrick 2007).

A second subordinate idea states that demographic characteristics of executives can be used to predict their strategic actions. This idea attends to the ‘black box problem’, which suggests that it cannot be certainly known what social and psychological processes that lead to a specific behavior among executives. Strategic decisions are complex and largely the outcome of behavioral factors since executives develop their own cognitive bases for decision-making, which derive from both values, knowledge, or assumptions about future events, as well as knowledge of alternatives and their consequences. However, as such psychological and social processes are difficult to analyze, it is more convenient to use observable characteristics to estimate executives’ actions. Previous studies have shown evidence of quite strong relationships between the demographic characteristics of executives and outcomes related to strategy and performance. Thus, by gathering data on demographics such as executives’ functional backgrounds, industry and firm tenures, educational credentials and affiliations, executives’ actions can be relatively well predicted (Hambrick 2007; Hambrick, Mason 1984).

2.2. Literature review and hypotheses

As the UET suggests that demographic characteristics of TMTs ultimately have an impact on companies' performance, it is assumed that some type of relationships exist between demographic characteristics of TMTs and sustainability performance. According to what previous literature implies, eight (10) relationships between certain demographic characteristics and sustainability performance have been hypothesized below.

2.2.1. Gender

Female board directors are presumed to favorably boost sustainability performance (Al-Shaer, Zaman 2016). An explanation is that women in boards play an essential role in managing activities linked to sustainability and ethical policies (Gulzar, Cherian et al. 2019, Nadeem, Zaman et al. 2017). Also, women tend to be more enthusiastic, friendly, and caring towards others which makes them more prone to devote attention to ethical issues and achievements of corporate social responsibility (Burgess, Tharenou 2000). Moreover, female executives are superior to male executives in terms of realizing green supply chain management practices (Liu 2019). Other studies show that even if women may support environmental practices in general, female CEOs have no significantly greater effect on such practices compared to male CEOs (Glass, Cook et al. 2016). However, due to the extensive research suggesting that women are more likely to have a greater impact on sustainability practices and performance compared to men, the below hypothesis has been formulated:

Hypothesis 1: *There is a positive relationship between the share of female TMT members and sustainability performance.*

2.2.2. Age

Young managers devote little engagement to maintaining the status quo and are more enthusiastic to pursue novel and unprecedented management strategies (Hambrick, Mason 1984). As the age of managers increases, they are less enthusiastic to try new practices and less tolerant to adopt new projects, while their decisions are more formally and routinely made (Dushnitsky, Lenox 2005). Furthermore, younger teams tend to pursue more risky strategies (Hambrick, Mason 1984; Boeker 1997) compared to older ones that may be more risk averse

(Carlsson, Karlsson 1970). As a result of younger people's enthusiasm in novelty, unprecedented and risk-taking strategies, various studies suggest that organizations with younger managers achieve higher sustainability performance compared to organizations with older managers (Wang, F., Cheng et al. 2015). This relationship is also confirmed in another study which advocates that large organizations with old managers manifest low sustainability performance (Lee, Sun et al. 2018).

Contrariwise, several studies highlight that older managers perform better than younger ones in terms of environmental performance. Managers' environmentally related knowledge tends to increase with time, implying that older managers score better in environmental performance compared to younger ones (Elmagrhi, Ntim et al. 2018). Additional research indicates that younger managers, with their primary focus on maximizing profits, forsake sustainability-related practices and performance, whereas older ones do not (Tran, Pham 2020). Meanwhile, some studies indicate that a manager's age has no significant impact on corporate performance (Xu, Yun et al. 2019). As the implications of the relationship between age and sustainability performance are ambiguous, a hypothesis that addresses these contradictory facts has been formulated:

Hypothesis 2a: *There is a positive (negative) relationship between the mean age of TMT members and sustainability performance.*

As the research on age is ambiguous, it is interesting to also study the relationship between TMT age diversity and sustainability performance. Some previous studies indicate that age diversity in boards boost the firm's financial performance (Ali, French 2019; Ararat Black et al. 2017; Kim, H., Lim 2010; Mahadeo, Soobaroyen et al. 2012). Other studies show that age diversity in boards has negative effects on social performance (Faleye 2007; Hafsi, Turgut 2013; Kunze, Boehm et al. 2011; Kunze, Boehm et al. 2013; Talavera, Yin et al. 2018), profitability (Ali, Ng et al. 2014; Talavera, Yin et al. 2018; Abdullah, Ismail, Ku Nor Izah Ku 2013), and strategic transformations of a firm (Kipkirong, Tarus, Aime 2014). Simultaneously, there are studies indicating that there is no significant relationship between age diversity and firm performance (Randøy, Thomsen et al. 2006). Due to this ambiguity, a hypothesis like the above has been formulated:

Hypothesis 2b: *There is a positive (negative) relationship between the age diversity of TMT members and sustainability performance.*

2.2.3. Educational background

Higher level of education contributes to improved speculative ability which in turn enhances logical decision-making, implying that higher educated managers can establish strategies that advocate long-term development of the company, and thus, are more inclined to apply green supply chain management as they are (Liu 2019). Moreover, TMT education and firm growth are positively related (Maschke, Knyphausen-Aufsess 2012), and education is interlinked with higher performance and growth rates (Cooper, Gimeno-Gascon et al. 1991, Norburn, Birley 1988, Stuart, Abetti 1990). Furthermore, educated people are more inclined to reflect on the external environment, accept ambiguity, and treat complexity (Dollinger 1984). There is also evidence of a connection between innovation and the educational level of TMT members (Bantel, Jackson 1989), as well as a positive relationship between educational level and strategic change (Wiersema, Bantel 1992). The ideas in the presented research are considered to likely be connected to sustainability performance, and therefore, the following relationship between educational level and sustainability performance has been hypothesized:

Hypothesis 3a: *There is a positive relationship between the level of education of TMT members and sustainability performance.*

Another aspect of educational background is field diversity. Research shows that educational diversity of board members substantially influences a company's strategic decision (Dedunu, Anuradha 2020; Musa, Gold et al. 2020), as well as there being a positive relationship between the board educational diversity and firm performance (Hoffman 1959; Hoffman, Maier 1961; Hoffman, Harburg et al. 1962; Willems, Clark 1971). Board teams characterized by high educational diversity prove a positive impact on companies' sustainability performance and disclosure (Umukoro, Uwuigbe et al., 2019). While some other studies indicate a negative relationship between educational diversity and firm performance due to aspects such as possible friction, incompatibility and inefficient coordination among team members (Daft, Lengel 1986; Miller, Burke et al. 1993; Dahlin, Weingart et al., 2005; Knight, Pearce et al. 1999; Weber, Camerer 2001), the positive relationships that have been found with

sustainability performance in particular is considered to be of more relevance in this study, and therefore, the following hypothesis has been formulated:

Hypothesis 3b: *There is a positive relationship between the educational field diversity of TMT members and sustainability performance.*

2.2.4. Functional background

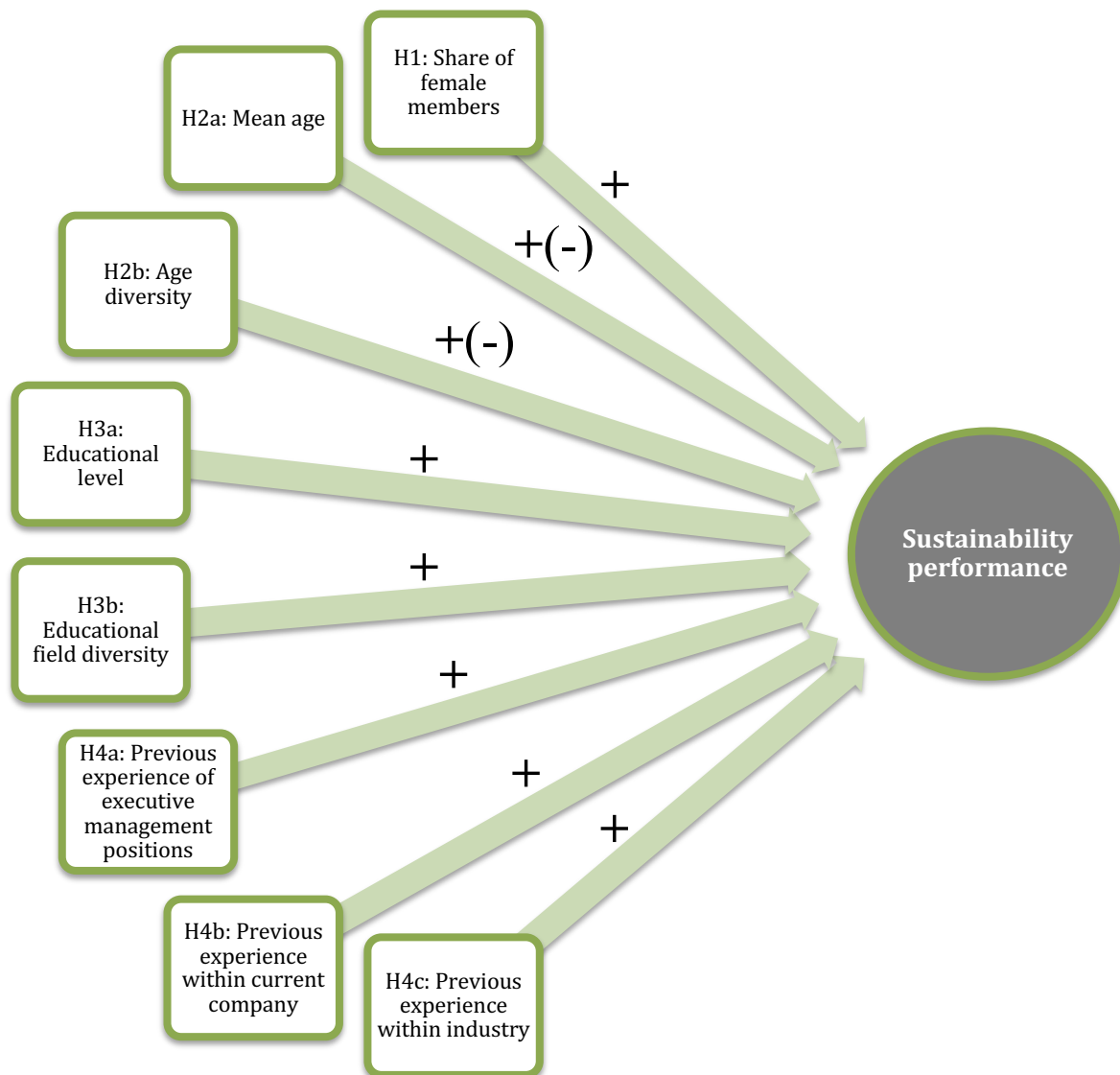
Previously conducted studies have shown that top managers' functional background, in terms of job experience and expertise, may affect their organizations' performance. For example, top managers with practical experiences as top managers in a similar context seem to be able to achieve a higher quality of the service that their organization provides (Kim 2021). Moreover, organizations that have a fit between the functional background in their TMT and their pursued strategy perform better compared to other organizations (Aboramadan 2021). Furthermore, a CEO's prior career experience is positively associated with firm strategic actions in terms of major organizational changes or events, and these strategic actions are positively related to future firm performance and profitability (Wang, Holmes Jr et al. 2016). Based on these previous studies, the following hypotheses have been formulated:

Hypothesis 4a: *There is a positive relationship between TMT members' previous experience of executive management positions and sustainability performance.*

Hypothesis 4b: *There is a positive relationship between TMT members' previous experience of working within their current company and sustainability performance.*

Hypothesis 4c: *There is a positive relationship between TMT members' previous experience of working at another company within the same industry and sustainability performance.*

Figure 1. Overview of hypothesized relationships



2.3. Possible contributions

2.3.1. Empirical contribution

While research has been conducted on this topic, most investigates characteristics of board members and their connection to organizations' sustainability performance (Al-Shaer, Zaman 2016, Gulzar, Cherian et al. 2019, Nadeem, Zaman et al. 2017), or how demographic characteristics affect firm performance in general (Wang, G., Holmes Jr et al. 2016, Díaz-Fernández, González- Rodríguez et al. 2020). This implies a lack of research on the specific relationship between TMT characteristics and the sustainability performance of a company, as

well as a lack of more general guidelines for how to address sustainability performance through TMT composition. Therefore, it would be of interest to investigate whether connections between certain demographic characteristics and other aspects of firm performance have the same implications when looking into sustainability performance. Furthermore, as previous research is rather ambiguous, with some suggesting positive relationships between certain characteristics and different aspects of firm performance, and others no relationships, there is a need for more research within the area to hopefully find less ambiguous conclusions.

2.3.2. Theoretical contribution

Previous studies within this theory-research area refer to the effects of TMT diversity in broad terms (Henry, Buyl et al. 2019, Díaz-Fernández, González- Rodríguez et al. 2020), or the effects of CEO characteristics on firm performance and outcomes (Wang, Holmes Jr et al. 2016; Kim 2021). The focus on TMT in terms of diversity only, as well as on individual top executives, implies a possibility to expand the academic field within this theory-research area through the research question suggested above. By investigating relationships between certain characteristics of TMTs and sustainability performance, there might be implications of what aspects that are of relevance when attempting to predict performance.

3. METHOD

3.1. Research approach

This research is based on objectivist ontology and has been conducted within the positivistic research paradigm, where observable and measurable facts are objectively analyzed and collected from a true and independent reality that is external to the interpretations and experiences of social actors (Saunders, Lewis and Thornhill 2019, p.133-135, 144). To conduct the study, a deductive approach has been used initially, since the aim is to find generalizable laws through testing theories and hypotheses regarding the demographic characteristics of TMTs and their relationship to organizational sustainability performance. However, the study has been developed to also include elements of an abductive approach as some results are explored further by using the applied theory, and then are discussed in terms of theoretical development and refinement (Saunders, Lewis and Thornhill 2019, p.153-155).

3.2. Research design

As the research approach is deductive and based on the positivistic research paradigm, the appropriate research method is quantitative (Saunders, Lewis and Thornhill 2019, p.176). The data is collected through structured observation of available secondary data from companies and existing databases. Based on the formulated hypotheses, statistical measures are created to help explain possible relationships between TMT characteristics and sustainability performance of companies. The measures are used to conduct a hierarchical multiple regression analysis to investigate the explanatory power of the different TMT characteristics with regards to sustainability performance.

To avoid the issue of reversed causality, the study applies lagged variables, meaning that the demographic characteristics of TMTs are retrieved from 2020 while the sustainability performance ranking is obtained from 2021 year's results. Thereby, it is ensured that the TMTs have been composed prior to the sustainability performance outcome and not vice versa.

3.3. Research method

Below, all variables are compiled together with a short description of the variables used to test each of them. An overview of each variable and statistical measure is found in Appendix 1.

3.3.1. Dependent variable

The data on the dependent variable, **sustainability performance**, is retrieved from a study published by Dagens Industri (DI) together with Aktuell Hållbarhet where Swedish listed companies are ranked on their sustainability performance as of 2021. The ranking is presented by Ekonomihögskolan of Lund University together with an advisory board consisting of experts and representatives from organizations such as FAR, Swesif, SFF, Vinnova and Tillväxtverket (Aktuell Hållbarhet: Frågor och svar om rankningen Hållbara bolag 2021, 2021).

The sample consists of 133 of Sweden's listed companies within the following industries: materials, consumer discretionary, consumer staples, capital goods, banks, and investment companies (DI: Här är börsens mest hållbara bolag, 2021). The definition of these industries is based on the Global Industry Classification Standard (GICS) and have been specifically selected since these are the industries with the most listed Swedish companies, enabling a large sample. Unlisted companies have been excluded to avoid issues of unavailable data (Arvidsson, 2022).

The advisory board has created a ranking model including aspects that are both of sustainability valuable to the companies and contribute to sustainable development in a larger context. To determine each company's sustainability performance, seven categories are studied and assessed: anti-corruption, personnel, environment and climate, sustainability strategy and SDGs, human rights, capital market impact, as well as the category other. The advisory board has selected these categories based on previous research as well as own experiences. The aim with the choice of categories is to study the companies using a holistic sustainability perspective and to get a broad understanding for how different aspects of sustainability interact within organizations (Arvidsson, 2022).

The ranking model in the study is based on two different parts: an analysis of the companies' annual/sustainability reports and their websites, and a survey where the assessed companies have answered questions related to sustainability practices. Each company can receive 119

points at most, with the report/website study representing 98 points and the survey 21 points (Aktuell Hållbarhet: Frågor och svar om rankningen Hållbara bolag 2021, 2021). All members of the advisory board take turns in assessing the different companies to assure objective and robust results (Arvidsson, 2022).

In the survey, the companies answer questions concerning analysis of sustainability risks and scenarios within 21 specific areas, and the advisory board uses a coding document to assess whether each company has a low, average, or high activity within each area and distributes the points accordingly. Thus, companies with high activity within all areas will receive 21 points on the survey (Arvidsson, 2022).

The report/website study is based on 98 different parameters within the seven different sustainability categories. The advisory board investigates all these parameters within each company by searching for specific statements, intervals or detailed examples related to each parameter, and then, by using a coding document, the company is assigned 0 or 1 depending on whether the company fulfills the requirements of the parameter or not. This means that a company that fulfills the requirements of all parameters will receive 98 points (Arvidsson, 2022).

Based on the total points in the study, each company is assigned a ranking. As some companies receive the same points, they end up having the same ranking. The company with best performance is ranked as 1, while the company that performed worst is ranked as 69.

In the regression analysis completed in this study, the sustainability performance ranking is constructed as a categorical, ordinal variable. To facilitate a correct interpretation of the regression results, the ranking has been reversed, since using the original ranking could be misleading for the relationships revealed in the regression. This means that the company with the best ranking instead has the highest number (69) and the company ranked worst has the lowest (1).

3.3.2. Independent variables

To gain data on the specified demographic characteristics (**gender, age, educational background, and functional background**) of the TMTs, secondary data is retrieved from the

companies' 2020 annual reports and websites. As the studied companies are relatively large, this type of information is public for most of them. However, in cases where data is not available through published information, data on TMT members' educational and functional background has been retrieved from the social network LinkedIn. To be consistent, the starting point for harvesting the desired data is the companies' own reports and websites, and only when these sources are lacking data are the TMT members' publicly open LinkedIn profiles visited. This method allows the study to become more complete with a larger number of samples compared to if observations would be removed due to lacking data.

The data is retrieved on individual TMT members and then aggregated to represent the TMT on a group level. Below follows a short description of each of the independent variables on an aggregated level.

The gender variable represents the share of female members in each TMT. The mean age variable is the natural logarithm of each TMTs' mean age. The use of the natural logarithm is to assure normal distribution of the variable and thereby improve the fit of the model. Further, the age diversity variable is represented by the standard deviation of the members' age in each TMT.

What concerns educational level, the variable indicates the average educational level within each TMT. Each educational level is represented by individual categories and are divided into upper secondary school (0), post-secondary education (1), bachelor's degree (2), master's degree (3), and PhD or similar (4).

The educational field diversity variable is based on the Simpson's diversity index, which ranges between 0 to 1 and has the following equation:

$$S = \sum_{i=1}^N s_i^2$$

In this case, S represents the educational field diversity, with s_i being the share of a particular educational field in TMT i , and N the number of members in each TMT.

Originally, an index of 0 means perfect diversity while 1 means no diversity. However, to facilitate the interpretation of the variable, it has been reversed in this study. Thus, a value of 1 indicates perfect educational field diversity (all TMT members have different educational field backgrounds) and 0 no educational field diversity (all TMT members have the same educational field backgrounds).

Finally, the functional background variables are represented by the share of members in each TMT that have previous experiences of three different types. There is thus a share of members with previous experience of executive management positions, a share of members with previous experience within the current company, and a share of members with previous experience outside the current company but within the same industry.

3.3.3. Control variables

The control variables **firm size**, **firm performance**, **TMT size** and **industry** are used to ensure the validity of the regression analysis. These are some of the variables that have been used in previous research on the topic and they are specifically relevant in this study since TMT size matters for TMT composition, and the other three may matter for sustainability performance.

All control variables have been gathered manually through the companies' financial reports and websites. Firm size is measured by the number of employees in each company and the variable is based on the natural logarithm to assure normal distribution. Firm performance is measured as the return on assets (ROA) in percentage of each company, and TMT size as the number of members in each company's TMT.

Concerning industry, it will be controlled for by using the six industrial categories that each company has been given in the sustainability performance study (materials = 0, consumer discretionary = 1, consumer staples = 2, capital goods = 3, banks = 4, investment companies = 5). Industry fixed effects are applied in the model, meaning that any results are assumed to be general for these industries, with industry differences being controlled for (see Appendix 2 for details).

3.3.4. Statistical method for data analysis

To estimate linear models, ordinary least squares (OLS) regressions have been completed using the statistical program STATA. Compared to logistic models, the OLS requires fewer assumptions and provides results that are more easily interpreted. To ensure that the assumptions of an OLS regression hold, a test for multicollinearity has been completed, as well as the normality and homoscedasticity of residuals have been checked for. These results are presented in Appendix 3 and show that the data has no multicollinearity, that residuals are close to a normal distribution, and that there are no signs of heteroscedasticity in the data. Thus, the model holds for testing the hypotheses.

A linear model has been used to estimate the full model below, where each variable has been added hierarchically:

$$y_i = \alpha + \beta_1 Fem_share_i + \beta_2 Mean_age_i + \beta_3 Age_div_i + \beta_4 Edu_lev_i + \beta_5 Edu_div_i + \beta_6 EMP_i \\ + \beta_7 ICC_i + \beta_8 OCC_i + \theta_i + C_i + \varepsilon_i$$

In this model, y_i represents sustainability performance, α the intercept, β_{1-8} the independent variables, θ_i a vector of the control variables, C_i the industry dummies, and ε_i an error term.

3.4. Method discussion

3.4.1. Approach to missing data and excluded observations

While the original sample size consisted of 133 companies, some have been excluded from the final sample size (see Appendix 4). Firstly, nine observations of companies with inaccessible data on demographic characteristics for a majority of the TMT members have been excluded since these types of observations will not contribute to any valid results of the study. Secondly, 11 observations of companies with a TMT size of less than three individuals have also been excluded, since such observations will not reflect any group dynamics and therefore may show misleading results in statistical tests.

Although some of the companies are removed from the sample due to inaccessible data on their TMT members or a small TMT size, the final sample size of 113 observations is still large enough to ensure statistically valid results based on the central limit theorem that has been used to approximate a normal distribution.

3.4.2 Reliability and ethical considerations

In terms of reliability, there is a risk that the LinkedIn profiles are not completely accurate since the TMT members themselves present information of their choice. However, since the profiles visited belong to senior executives that in many cases are publicly known, and since LinkedIn's status as a platform for recruiting and networking, the information retrieved from the source is considered sufficiently accurate.

Regarding confidentiality and anonymity, the usage of personal LinkedIn profiles as sources for data gathering might be considered sensitive. While the profiles visited are publicly available, the individuals behind the profiles may present information about themselves in the belief that this material will not be harvested or analyzed by anyone as part of a larger data set (Saunders, Lewis and Thornhill 2019, p.261). However, while the companies present the identity of their TMT members that is used for LinkedIn searches, the information gathered on the individuals are not linked to specific names or identities. The individuals are completely anonymized, and their demographic information is only connected to an individual within the TMT of a specific company to enable the completion of statistical tests. The specific characteristics of each anonymous TMT member will not be presented in this report as the results are aggregated to a group level, implying that no results possibly could be related to a specific individual. Hence, this study does not present any personally sensitive information and the anonymity of each TMT member is thus guaranteed.

3.4.3. Critical discussion

To fully understand the relationship between demographic characteristics within TMTs and companies' sustainability performance, the ideal approach would have been to investigate the causal relationships between these variables. However, considering the scope of this study, this type of research would have been too extensive to complete, and thus, a study of the relationships between demographic characteristics of TMTs and sustainability performance was considered most suitable as a contribution to the research area. This choice is central to the study and is therefore something that will be taken into consideration when discussing the implications of the study's results.

Since all the data has been gathered manually, there is a potential risk of human errors in the compilation and coding of the data. However, all the observations have been scrutinized by the authors several times to minimize such errors. Another potential caveat of this study is that for some observations, there has been incomplete data on educational level. In these cases, the educational level has been assumed and stated by the authors based on the educational field that has been observed for the specific observation. However, since these cases are few (about 5% of the total number of observations), any potentially defective assumptions are not considered to have an extensive impact on the end results.

4. EMPIRICAL DATA

4.1. Descriptive statistics

The original sample included 133 companies, all ranked on their sustainability performance. Of these, nine observations were excluded due to incomplete data on independent and control variables. Also, 11 observations with small TMTs were excluded to achieve more accurate results, resulting in the below analysis sample:

Table 1. Analysis sample

	n
Original sample of companies	133
Sample after excluding companies with inaccessible data	124
Sample after excluding companies with a TMT size < 3	113
Analysis sample	113

The below tables contain the descriptive statistics and correlations of the final sample:

Table 2. Descriptive statistics

	Obs	Mean	Std. dev.	Min	Max
SP	113	38,416	18,640	2,000	69,000
Fem_share	113	0,231	0,157	0,000	0,750
Mean_age	113	3,921	0,071	3,697	4,100
Age_div	113	6,084	2,040	1,528	13,102
Edu_lev	113	2,628	0,369	1,333	3,250
Edu_div	113	0,611	0,149	0,219	0,906
EMP	113	0,776	0,216	0,000	1,000
ICC	113	0,546	0,280	0,000	1,000
OCC	113	0,446	0,288	0,000	1,000
TMT_size	113	7,832	2,918	3,000	15,000
Firm_size	113	7,352	2,207	1,386	11,608
ROA	113	0,039	0,207	-1,589	0,561

Table 3. Correlation matrix

Variables	SP	Fem_share	Mean_age	Age_div	Edu_lev	Edu_div	EMP	ICC	OCC	TMT_size	Firm_size	ROA
SP	1,000											
Fem_share	0,080	1,000										
Mean_age	0,374	-0,325	1,000									
Age_div	-0,122	-0,080	-0,146	1,000								
Edu_lev	0,388	-0,005	0,029	-0,211	1,000							
Edu_div	0,165	0,104	0,004	-0,136	-0,109	1,000						
EMP	0,185	0,153	0,039	-0,046	0,209	-0,048	1,000					
ICC	0,360	-0,015	0,367	-0,232	0,125	0,027	0,336	1,000				
OCC	-0,153	0,170	-0,180	0,089	-0,013	-0,148	0,051	-0,019	1,000			
TMT_size	0,371	0,327	0,087	-0,126	0,149	0,167	0,255	0,205	0,099	1,000		
Firm_size	0,693	0,015	0,429	-0,204	0,278	0,221	0,265	0,417	-0,268	0,392	1,000	
ROA	0,229	0,024	0,110	-0,177	0,054	-0,095	-0,223	0,182	-0,055	0,028	0,143	1,000

The dependent variable ranges from two to 69, rather than from one to 69, since the worst ranked company was one of the excluded observations. Also, as some companies received the same ranking due to similar scores in the study, the mean of the dependent variable is slightly skewed. Further, there are no TMTs consisting of women only, and the mean of the female share is lower than 50%, indicating that the studied TMTs are dominated by men.

As the TMT mean age variable is logged, it is difficult to draw conclusions from its descriptives. However, to understand the distribution within the sample, descriptives for the original TMT mean age variable were studied, where the mean was 50,594 and the standard deviation 3,544. The lowest TMT mean age was 40,308 and the highest 60,333, indicating that most TMT members are rather old.

Analyzing the mean of TMT educational level, the sample is evidently centered at a level between a bachelor's and master's degree. Also, the mean of the TMT educational diversity variable indicates that the sampled TMTs are closer to perfect educational diversity rather than no educational diversity. Further, most TMTs have many members with previous experience of executive management positions. The TMT size of the final sample varies between 3 and 15 members, with the mean being 7,832 members.

Within the data, there are low to medium low correlation values, and thus no strong correlations between any variables. The strongest correlations are between the TMTs' mean age and the firm size (0,429), as well as between the TMT members' experience inside the current company and firm size (0,417). This indicates that older TMTs and more previous experience inside the current company among TMT members are associated with larger firms. However, these correlations are still on a medium low level, and as stated, no multicollinearity was found within the data.

4.2. Regression data and results

4.2.1. Data

To examine the data, a hierarchical OLS regression was completed, with the control variables being added first and independent variables being added individually. While several different hierarchical models were tested, the below model was found to be strong as well as the most sensible one, and with regards to the scope of this study, other models, except for the appended models, are not presented in this paper.

Table 4. Hierarchical regression and full model

Variables	SP	SP	SP	SP	SP	SP	SP	SP	SP
Fem_share Unsupported		0,881 (-8,335)	4,203 (-8,842)	5,297 (-8,789)	8,005 (-8,601)	7,607 (-8,585)	7,805 (-8,691)	7,825 (-8,726)	8,385 (-8,794)
Mean_age Supported (!)			22,834 (-20,47)	25,208 (-20,339)	36,419+ (-20,212)	39,343+ (-20,302)	39,290+ (-20,403)	36,910+ (-21,096)	35,799+ (-21,228)
Age_div Supported (!)				1,050+ (-0,626)	1,365* (-0,619)	1,426* (-0,62)	1,428* (-0,623)	1,456* (-0,628)	1,489* (-0,632)
Edu_lev Supported					9,662** (-3,656)	10,401** (-3,696)	10,496** (-3,748)	10,508** (-3,763)	10,479** (-3,775)
Edu_div Unsupported						10,839 (-8,835)	10,496 (-9,063)	10,586 (-9,101)	10,053 (-9,165)
EMP Unsupported							-1,141 (-6,055)	-2,077 (-6,395)	-1,974 (-6,416)
ICC Unsupported								2,403 (-5,088)	2,726 (-5,127)
OCC Unsupported									-2,902 (-4,471)
TMT_size	0,985* (-0,462)	0,966+ (-0,497)	0,955+ (-0,497)	0,984* (-0,493)	0,807+ (-0,484)	0,773 (-0,483)	0,783 (-0,488)	0,780 (-0,490)	0,832+ (-0,498)
Firm_size	5,949*** (-0,649)	5,953*** (-0,653)	5,673*** (-0,699)	5,846*** (-0,701)	5,250*** (-0,717)	5,082*** (-0,729)	5,111*** (-0,749)	5,042*** (-0,766)	4,931*** (-0,787)
ROA	9,679 (-6,259)	9,693 (-6,290)	9,040 (-6,310)	11,225+ (-6,389)	12,799* (-6,236)	12,908* (-6,221)	12,621+ (-6,434)	11,953+ (-6,613)	11,914+ (-6,633)
Constant	-8,266 (-6,169)	-8,311 (-6,213)	-97,042 (-79,787)	-113,412 (-79,685)	-180,302* (-81,456)	-200,139* (-82,844)	-199,376* (-83,349)	-190,397* (-85,815)	-184,288* (-86,585)
Observations	113	113	113	113	113	113	113	113	113
R-squared	0,584	0,584	0,589	0,6	0,626	0,632	0,632	0,633	0,634

Standard errors in parentheses

*** p<0,001, ** p<0,01, * p<0,05, + p<0,10

(!) = contradictory hypotheses unsupported

The R-squared value of the full model is 0,634, indicating that this regression model can explain 63,4% of the variability in the dependent variable.

Regarding the independent variables, the natural logarithm of TMT mean age is positively correlated with sustainability performance and becomes weakly significant throughout the model. As this variable is a natural logarithm, holding all variables constant at their means, the coefficient 35,799 in the full model indicates that a 1% increase in TMT mean age is associated with 0,358 higher sustainability performance ranking ($35,799/100 \approx 0,358$).

TMT age diversity is slightly stronger positively correlated with sustainability performance. Holding all variables constant at their means, a unit increase in TMT age diversity is associated with around 1,5 higher sustainability ranking. Since TMT age diversity corresponds to the standard deviation of TMT age, a one unit change in TMT age diversity means that it varies by approximately 3,5 years as this was the standard deviation for the original TMT mean age variable.

TMT educational level is even stronger positively correlated with sustainability performance. The coefficient 10,479 implies that, holding all variables constant at their means, a one unit increase in average TMT educational level is associated with 10,479 higher sustainability performance ranking.

Concerning the other independent variables, their p-values are not low enough for them to be significant in this model and no conclusions about their correlations with sustainability performance can be made.

As for control variables, firm size is deviating with its strong positive correlation to sustainability performance throughout the hierarchical model. Since this is also a natural logarithm, the same principle applies as for the TMT mean age variable in the full model: holding all variables constant, a 1% increase in firm size is associated with approximately 0,05 higher sustainability performance ranking ($4,931/100 \approx 0,05$). Also, in the full model, the control variables TMT size and ROA are both positively, but weakly, correlated with sustainability performance. Thus, all control variables seem to be relevant in this model.

4.2.2. Hypotheses results

Based on the regression results, it can be concluded that three out of eight (10) hypotheses are supported. Firstly, there is a positive correlation between TMT mean age and sustainability performance, and Hypothesis 2a is thus supported on a 10% significance level. Secondly, there is a positive correlation between TMT age diversity and sustainability performance, meaning that Hypothesis 2b is supported on a 5% significance level. Lastly, there is a positive correlation between TMT educational level and sustainability performance, implying that Hypothesis 3a is supported on a 1% significance level. The other hypotheses cannot be supported by the results.

4.3. Statistical exploration

Besides the model presented above, additional models were tested to investigate possibly diverging, but interesting, results within the data. When only including the independent variables and no control variables (see Appendix 5), there was an even stronger positive correlation between TMT mean age and sustainability performance, with the additional effect of the variable being 79,182 at a 0,1% significance level. This result also holds, with the additional effect of the variable varying between 76,175 and 82,898, when each of the control variables are added individually, except from when firm size is controlled for (see Appendix 6). The additional effect of the variable then decreases to about half and the positive correlation is only significant at a 10% level. The same results were found for the correlation between TMT educational level and sustainability performance. Interestingly, the correlation between TMT age diversity and sustainability performance was only significant when TMT size, firm size, and ROA were all included.

When no control variables are included, or each of them being included individually, both TMT educational field diversity as well as TMT previous experience inside the current company are positively correlated with sustainability performance at varying significance levels (see Appendix 6). The correlation between educational field diversity and sustainability performance is also significant when all control variables are included except from firm size (see Appendix 7). However, when the control variables are included all at once, none of these correlations are significant.

Important to consider, however, is that the model that only includes independent variables has an R-squared value of 0,388, while the models including individual control variables, except from firm size, have R-squared values ranging from 0,412 to 0,441. The model including all control variables except from firm size has an R-squared value of 0,485. When firm size is the only control variable included, the R-squared value increases to 0,553. The full model, with all independent and control variables included, clearly has a greater ability to explain variability in the dependent variable (R-squared value of 0,634).

Additionally, interaction effects were examined between the supported results and other variables that were considered to potentially be interacting with the significant correlations. However, no significant interaction effects were found, and therefore, the main effects of the variables are what have been interpreted.

4.4. Conclusion of statistical results

The sample consists of relatively old TMTs with an average size of 7,832 members and an average educational level centered between a bachelor's and master's degree. The hierarchical regression resulted in a full model with an R-squared value of 0,634. The results indicated that TMT mean age, TMT age diversity, and TMT educational level all are variables that are positively correlated with sustainability performance, but with different effects and at different significance levels. Thus, the hypotheses 2a, 2b, and 3a were all supported, while no support could be found for the other five (seven) hypotheses. Additionally, other regression models indicated that the control variable firm size affects the significance of the three significant variables negatively. There are also signs of other independent variables being significant when experimenting with how the control variables are added.

5. ANALYSIS AND DISCUSSION

5.1. Analysis of empirical material

As stated, three out of eight (10) hypotheses are supported. Below, both the supported, not supported, and exploratory results are analyzed using the Upper Echelon Theory.

5.1.1. Supported results

The positive relationship between TMT mean age and sustainability performance indicates that older TMTs are associated with higher sustainability performance in companies, but this relationship is only weakly significant. The positive relationship between TMT age diversity and sustainability performance is slightly more significant and implies that a higher variability in age among TMT members is associated with higher sustainability performance. The strongest significant relationship is the positive relationship between TMT educational level and sustainability performance, which suggests that higher education within TMTs is associated with higher sustainability performance.

All three supported results confirm the UET in the sense that different TMT compositions seem to affect organizational outcomes in different ways when shifting focus from individual top executives to entire TMTs. What is supported in this study is that the demographic characteristics mean age, age diversity and educational level of TMTs are positively associated with sustainability performance within a company. As UET implies that executives' actions, and ultimately the outcomes of these actions, can be relatively well predicted by gathering data on demographics, this study suggests a value in collecting data on mean age, age diversity, and educational level of TMTs for predicting sustainability performance in companies.

5.1.2. Unsupported results

The empirical results show no significant relationships between each of the five other independent variables and sustainability performance. The possibility that these given relationships do not exist can thus not be rejected and it is not possible to assume that these demographic characteristics in TMTs are associated with sustainability performance in any way, even though the UET implies that such demographic characteristics should be useful to

predict organizational outcomes. This study thus suggests that these TMT demographic characteristics are not particularly useful for predicting sustainability performance of companies.

5.1.3. Exploratory results

As presented in the empirical data, the applied control variables seem to absorb the positive relationships between TMT demographics and sustainability performance. The TMT demographics seem to be even stronger related to sustainability performance without control variables, but with control variables, the demographics together have a higher ability to predict sustainability performance. Thus, if TMT demographics should be useful to predict organizational outcomes, as discussed within the framework of UET, the application of certain control variables seems to be significant for producing accurate results. While the UET suggests that TMT demographics are related to different organizational outcomes, it also seems important to consider that other factors matter for these relationships. In this study, firm size seems to be most significantly associated with sustainability performance.

5.2. Discussion and implications of results

5.2.1. Supported results

The supported results imply that older TMTs are associated with higher sustainability performance. As mentioned in the literature review, reasons could be that managers' environmentally related knowledge increases with time (Elmahrhi, Ntim et al. 2018), while younger managers primarily focus on profit maximization (Tran, Pham 2020). However, some previous research also suggests that younger managers achieve higher sustainability performance than older managers as they are likely to make more novel and unprecedented decisions (Wang, F., Cheng et al. 2015), compared to older managers that are less tolerant and make more formal, routine decisions (Dushnitsky, Lenox 2005; Lee, Sun et al. 2018).

A possible explanation to why one of these ideas is supported, but not the other, is that opportunities to influence organizational outcomes may vary between TMT members, and this study does not consider which member(s) of the TMT that may have the most influence on sustainability practices. The average TMT in this study consists of almost eight members, and

in practice, all individuals may not have the same opportunity to influence organizational outcomes. For example, it is possible that younger managers have the most influence on sustainability practices, even though the average age of the team is rather high.

The results also indicate that age diversified TMTs are associated with higher sustainability performance. Previous studies discussed in the literature review indicate that age diverse boards boost the firm's financial performance (Ali & French, 2019; Ararat et al., 2017; Kim & Lim, 2010; Mahadeo et al., 2012), and it therefore seems likely to assume that age diversified TMTs are associated with a boosted sustainability performance as well.

Moreover, this can be linked to the above discussion regarding TMT mean age. As previous research indicates that both older and younger managers have positive relationships to sustainability performance, the result concerning age diversity implies that these contradicting facts both may be of relevance since it could be the case that the combination of young and old managers is positive for sustainability performance. The studies suggesting that age diversity has a negative impact on social performance, profitability, and strategic transformation were initially considered to possibly have implications for the relationship between age diversity and sustainability performance as well, but it could simply be the fact that these results do not apply to this type of performance as the relationship was found to be positive.

It is also supported that companies with highly educated TMTs are associated with higher sustainability performance. As discussed in the literature review, reasons could be that higher levels of education improves speculative ability which enhances logical decision-making and the advocacy of long-term development of companies (Liu 2019). In addition, highly educated people are more innovative (Bantel, Jackson 1989), strategic (Wiersema, Bantel 1992), reflect on the external environment, accept ambiguity, and treat complexity (Dollinger 1984), which may further explain the positive relationship between educational level and sustainability performance. Moreover, educational level and firm growth are positively related (Mashke, Knyphausen-Aufsess 2012; Cooper, Gimeno-Gascon et al. 1991; Norburn, Birley 1988; Stuart, Abetti 1990), and due to the increased pressure on companies to conduct more sustainable business and the possible gains from it (Alshehhi, Nobanee et al. 2018), it also seems reasonable to accept that there is a positive relationship between educational level and sustainability performance.

Important to note, however, is that this does not mean that higher education causes higher sustainability performance. Even though measures have been taken to overcome the issue of reversed causality, it could be the case that companies with a long history of performing well within sustainability attracts more highly educated people since they may be aware of the importance of sustainability in today's corporate world.

5.2.2. Unsupported results

As the formulated hypotheses have been based on implications of previous research, the unsupported results do not seem to be in line with ideas from previous research. It can thus be discussed whether previous implications are applicable in studies that investigate relationships between TMT demographics and sustainability performance.

First, most previous research investigates financial performance and its relationship with demographics of executives, which may produce results that are not as relevant when studying sustainability performance. More specifically, different attributes and characteristics could be differently associated with financial and sustainability performance respectively and may be a reason for why some of the relationships found in previous research are not found in this study.

Another possible explanation for why the results of this study is deviating from previous research could be that many previous studies examine boards or CEOs rather than TMTs. Boards and TMTs may not always be comparable since TMTs make decisions on a daily operational basis, while the decisions of boards concern long-term frameworks in strategic terms to a greater extent. Thus, different types of attributes may be of importance for these different types of decisions, and these differences, together with the above discussion regarding sustainability performance in comparison to other aspects of firm performance, may have divergent implications. Studying CEOs alone could also have different implications compared to considering characteristics of whole TMTs. CEO characteristics may be of greater significance for important decisions on the organizational level since CEOs often have most influence among the executives, and by only studying CEOs, one will disregard the effects of group dynamics and the role these different characteristics play in such contexts.

Finally, most of the reviewed literature are of international character, and since this study has been conducted in a Swedish context, the diverging results could imply that different cultural

contexts and surroundings may result in varying supported relationships. Societal and cultural structures concerning characteristics such as gender, age, or educational level, may affect the strength of the relationships between such characteristics and organizational outcome or performance. Also, as this study is delimited by using industry fixed effects and only examining listed companies, the results may differ from those of previous studies within the research area.

5.2.3. Exploratory results

As mentioned in the analysis, the applied control variables seem to absorb the positive relationships between TMT demographics and sustainability performance, but the explanatory power also increases with them. This highlights that a company's sustainability performance seems to involve more than just the demographic characteristics of TMTs. For example, this study implies that firm size is a control variable of great significance. One reason for this could be that larger companies can devote more time and resources to sustainability related activities. Additionally, many large companies have sustainability managers employed, which may further increase the focus on sustainability factors. Thus, to truly understand and explain sustainability performance, more factors than just the characteristics of TMT may need to be considered. As the triple bottom line suggests, sustainability seems to be multifaceted, and therefore, it is important to have a holistic approach when analyzing demographic characteristics of TMTs in relation to companies' sustainability performance.

5.2.4. Answer to research question

In this study, the aim has been to answer the following question:

What is the relationship between demographic characteristics of top management teams and the sustainability performance of companies?

The answer to the research questions is that there are supported positive relationships between sustainability performance and mean age, age diversity, and educational level of TMTs, with educational level being most significant and mean age the least. Contrariwise, there are no significant relationships between sustainability performance and each of the characteristics gender, educational diversity, previous experience of executive management positions, previous experience inside the current company, and previous experience outside the current

company but within the same industry. Therefore, it is not possible to assume that these demographic characteristics within TMTs have a relationship with sustainability performance in any way.

5.2.5. Managerial implications

The fact that a TMT's mean age, age diversity, and educational level all are demographic characteristics that seem to be able to predict the sustainability performance of a company have several managerial implications. A possible interpretation is that, if a company is looking to improve their sustainability performance, it seems reasonable to compose a TMT with relatively high mean age, but with members' age still varies to a certain extent, as well as having TMT members that are highly educated. These three aspects seem more important to consider than others when composing a TMT if the company aspires to focus on sustainability.

What concerns the age aspects, it could be difficult for those composing a TMT with the goal to achieve a high sustainability performance to interpret the implications of both having a high mean age as well as a high variability in age among members. A possible, broad interpretation of this is that for executive positions, both extensive experience as well as varying experiences among TMT members are of importance and should be considered when composing TMTs. However, it is important to acknowledge that previous studies have shown ambiguity concerning these two aspects. More specifically, it is also supported that a younger TMT would be preferable for sustainability performance within companies, as well as that an age-diverse TMT would have no impact in terms of sustainability performance. It is therefore important to conduct further studies to more certainty be able to declare that a specific TMT composition in terms of age would be more beneficial than another with regards to sustainability performance.

Regarding educational level, this study implies that higher education should be valued when recruiting new executives. This also aligns with previous research, which further strengthens that highly educated members of TMT seem preferable and that this should be considered when composing a TMT with regards to sustainability performance.

Another important aspect is to not only consider the demographic characteristics of TMT members to achieve a specific outcome, but also to be aware of the surrounding conditions and that aspects such as firm size, TMT size, financial performance, and industry may affect the

relationship that these characteristics have with sustainability performance. It is therefore important not to blindly focus on the TMT's demographic composition, but also to take other external factors into consideration when looking to improve sustainability performance.

5.2.6. Theoretical implications

When reviewing the results of this study in the perspective of the applied theoretical framework, it can be concluded that the study contributes to extending the UET in several ways. Firstly, it provides results related to the relationship between specific demographic characteristics and organizational outcome rather than the relationship between TMT diversity only and organizational outcome, which is rather unusual in previous research using the UET. Secondly, the findings concern complete TMTs and not only CEOs, as has been mostly done within the theoretical framework when not analyzing diversity aspects. This may extend the subordinate idea of the theory suggesting that a better understanding of organizational outcomes can be achieved by focusing on entire TMTs rather than individual top executives.

The results also support the UET in the sense that certain demographic characteristics of TMTs seem to be able to predict organizational outcomes, and that different compositions may contribute to different outcomes. However, this study indicates that some variables seem to be of greater relevance when attempting to predict performance, which possibly could contribute to theoretical refinements in terms of what demographic characteristics that should be considered when attempting to predict organizational outcomes. Also, the UET only addresses the aspect of demographic characteristics and their impact on organizational outcome, but this study indicates that control variables also are relevant when examining such relationships and that some are of more importance than others, meaning that context also matters, which could be a valuable implication for other studies applying the UET.

Finally, the results could contribute to less ambiguity in this research field, at least in terms of the age aspects. Mean age and age diversity were the only aspects where two opposing hypotheses were formulated due to ambiguity in previous research, but the results for both aspects support positive relationships with sustainability performance. These specific results are not ambiguous, which could enhance the understanding for how age aspects are related to different aspects of firm performance.

6. CONCLUSION

6.1. Summary of the study

This study has examined the relationships between demographic characteristics of TMTs and sustainability performance. The final sample used in the study consisted of 113 Swedish listed companies ranked on their sustainability performance. To analyze the collected data, the Upper Echelon Theory has been applied to further develop the research field, which previously has been focused on demographic characteristics of boards and/or CEOs in relation to firm performance in general.

The study has found significant support for positive relationships between sustainability performance and each of the characteristics mean age, age diversity, and educational level. Meanwhile, no significant relationships between the other variables (gender, educational diversity, previous experience of executive management positions, previous experience inside the current company and previous experience outside the current company but within the same industry) and sustainability performance has been found. The study has also shown that the control variable firm size seems to be strongly associated with sustainability performance, which indicates that other factors than just demographics of TMT seem to be associated with sustainability, and therefore need to be considered when conducting this type of studies.

To conclude, the results of the study suggest that different aspects could be more or less important to consider when composing TMTs with regards to sustainability performance, and that some aspects could be of more relevance when attempting to predict organizational outcomes.

6.2. Limitations and future research

6.2.1. Limitations of the study

Regarding the application of the study results, a few limitations have been identified. Firstly, the analyzed sample consists of 113 companies, and a larger sample could be necessary to be able to provide more extensive support for previous research within the field. Secondly, the data on the sampled TMTs was retrieved from the year before the companies obtained their

ranking on sustainability performance, which was enough to avoid the issue of reversed causality, but it may take more than one year to be able to identify the actual relationship between a specific TMT and organizational outcome. Lastly, the study does not consider the fact that in practice, different TMT members may have varying influence on decisions and outcomes. Weighing the demographics according to actual influence would be difficult, but it is possible that an attempt to weigh them more properly according to the influence different members may have, could have resulted in different implications.

6.2.2. Implications for future research

This study indicates that some demographics of TMTs seem to be more relevant than others when it comes to how a company performs in terms of sustainability. Therefore, it would be interesting to further investigate the significance of different TMT demographics in relation to sustainability performance to more certainly be able to determine which demographics really may, and may not, influence companies' outcomes in terms of sustainability.

Another possible development that could provide more robust results would be to examine the composition of TMTs and sustainability performance over time. This would allow for more extensive studies to be conducted and could potentially help find stronger relationships between the aspects to further develop the UET with regards to TMTs and sustainability performance.

Additionally, this study has shown that other factors beyond TMT demographics, such as firm size, seem to be associated with sustainability performance. Therefore, it would be interesting to further explore possible relationships that such factors may have with sustainability performance since this could have implications for the actual impact that TMT demographics may have on sustainability performance.

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7.2. Interviews

ARVIDSSON, SUSANNE; Associate professor, Senior lecturer, Accounting and Corporate Finance, Department of Business Administration at Lund University. Interview 20 April 2022.

8. APPENDICES

Appendix 1: Description of variables and statistical measures

Category	Variable (label)	Statistical Measure	Description
Dependent variable	Sustainability Performance (SP)	Ranking from 1 (best) to 69 (worst)	Reversed ranking from 1 (worst) to 69 (best)
Independent variables	Gender (Fem_share)	Female: 1 Otherwise: 0	Share of female TMT members
	Mean age (Mean_age)	The age of TMT member as a number	Average age among TMT members
	Age diversity (Age_div)	The standard deviation of the age within each TMT	The standard deviation of the age within each TMT
	Educational Level (Edu_lev)	Upper Secondary: 0 Post-secondary education less than 3 years: 1 Bachelor: 2 Master: 3 PhD or similar degree (postgraduate): 4	Average educational level among TMT members
	Educational Field Diversity (Edu_div)	Business/Economics: 1 Engineer: 2 Law: 3 Human Resources, Sociology & Psychology/Behavioral Science: 4 Forestry, Paper & Wood Technology: 5 Marketing, Communication & Sales: 6 Politics, Culture & History: 7 Military & Pilot: 8 Fine Arts (Graphics, Design, Textiles): 9 Agricultural Economics & Food Technology: 10 Executive Education: 11 IT, Technology, Computer Science: 12 Administration: 13 Geology, Mining, Metallurgy: 14 Commerce, Purchasing, Trade: 15 Journalism: 16 Electrician: 17 Double degree: 18	Simpson's Diversity Index, ranges from 0 to 1 where 0 indicates <i>no</i> educational field diversity (all TMT members have the same educational field backgrounds) and 1 indicates <i>perfect</i> educational diversity (all TMT members have different educational field backgrounds)
	Previous experience of executive management positions (EMP)	Prev. exp. of EMP: 1 Otherwise: 0	Share of TMT members with previous experience of executive management positions
	Previous experience in current company (ICC)	Prev. exp. ICC: 1 Otherwise: 0	Share of TMT members with previous experience inside current company

	Previous experience outside current company (OCC)	Prev. exp. OCC: 1 Otherwise: 0	Share of TMT members with previous experience outside current company
Control variables	Firm Size (Firm_size)	Numerical value	Total number of employees within the company (2020)
	TMT Size (TMT_size)	Numerical value	Total number of TMT members (2020)
	Firm Performance (ROA)	Return on assets (ROA), %	Net income / Average assets (2020)
	Industry	Materials: 0 Consumer discretionary: 1 Consumer staples: 2 Capital goods: 3 Banks: 4 Investment companies: 5	Each company is located within a specific industry, where materials is the reference category

Appendix 2: Industry details

Descriptives

	Obs	Mean	Std. dev.	Min	Max
Materials (0)	15	42,333	22,382	2	69
Consumer discretionary (1)	24	32,000	18,496	5	68
Consumer staples (2)	8	54,000	8,718	41	67
Capital goods (3)	47	38,894	16,837	3	66
Banks (4)	8	39,000	22,728	9	64
Investment companies (5)	11	33,273	18,380	2	57

Regression coefficients (correlation to SP, materials as reference category)

Consumer discretionary	-3,785
Consumer staples	0,501
Capital goods	-9,021*
Banks	-3,117
Investment companies	5,228

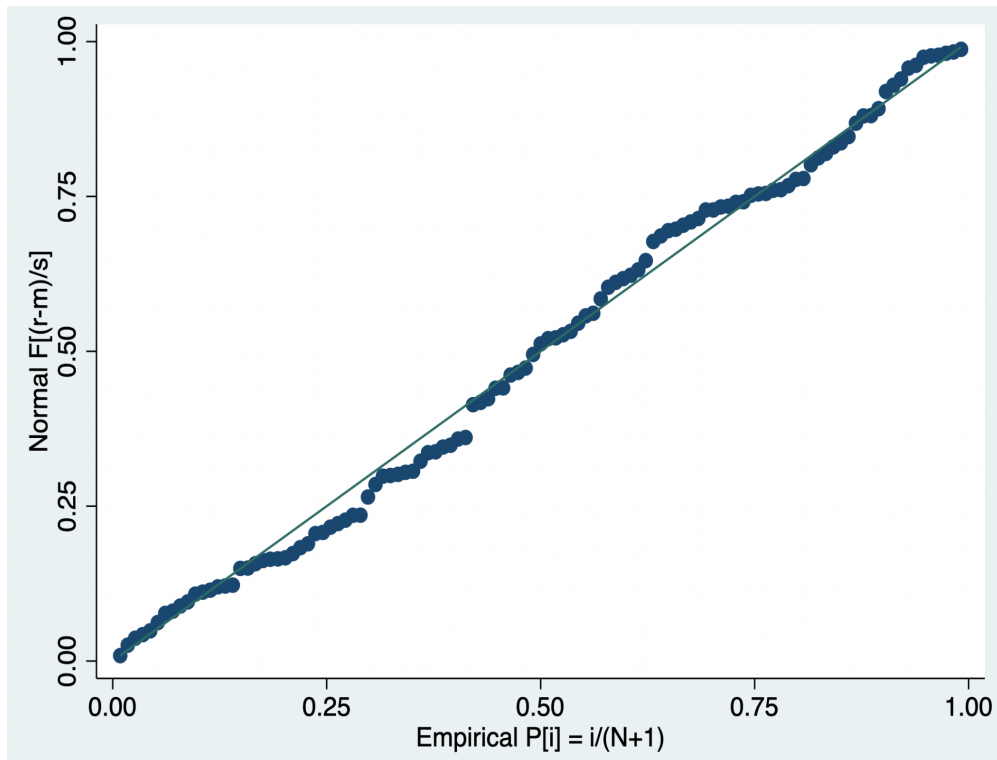
Appendix 3: Test for multicollinearity, normality, and homoscedasticity

VIF-test for multicollinearity

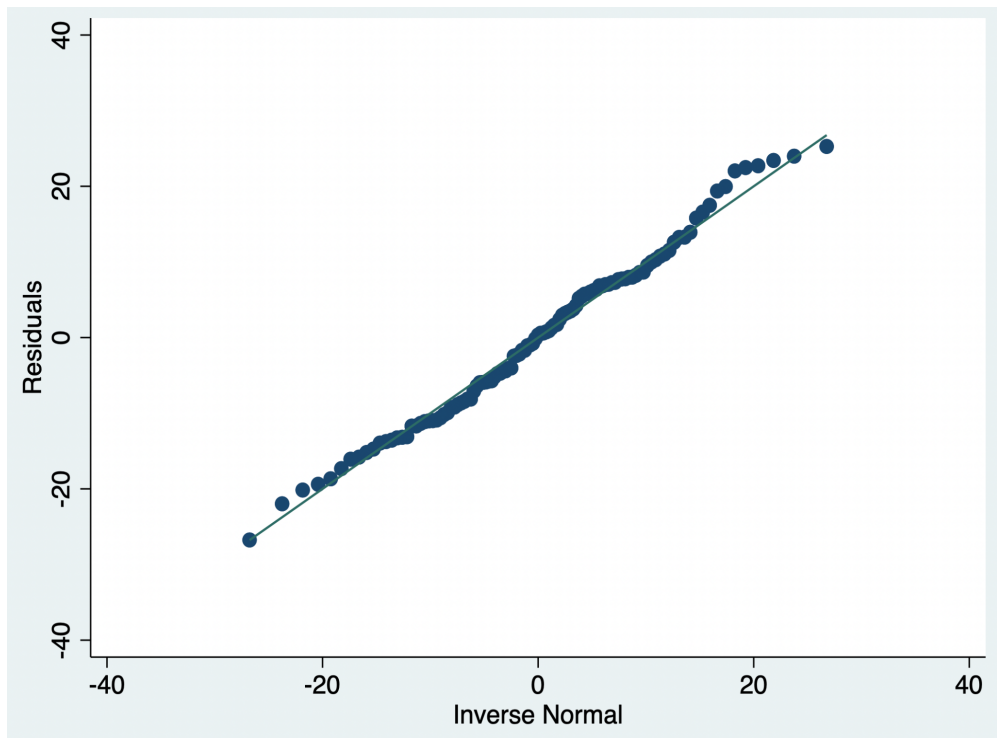
Variables	VIF	1/VIF
Fem_share	1,44	0,70
Mean_age	1,72	0,58
Age_div	1,26	0,80
Edu_lev	1,47	0,68
Edu_div	1,41	0,71
EMP	1,45	0,69
ICC	1,56	0,64
OCC	1,26	0,80
TMT_size	1,60	0,63
Firm_size	2,28	0,44
ROA	1,42	0,70
Industry		
1	2,55	0,39
2	1,61	0,62
3	3,16	0,32
4	1,70	0,59
5	2,48	0,40
Mean VIF	1,77	

Check for normal distribution of residuals

P-norm plot:



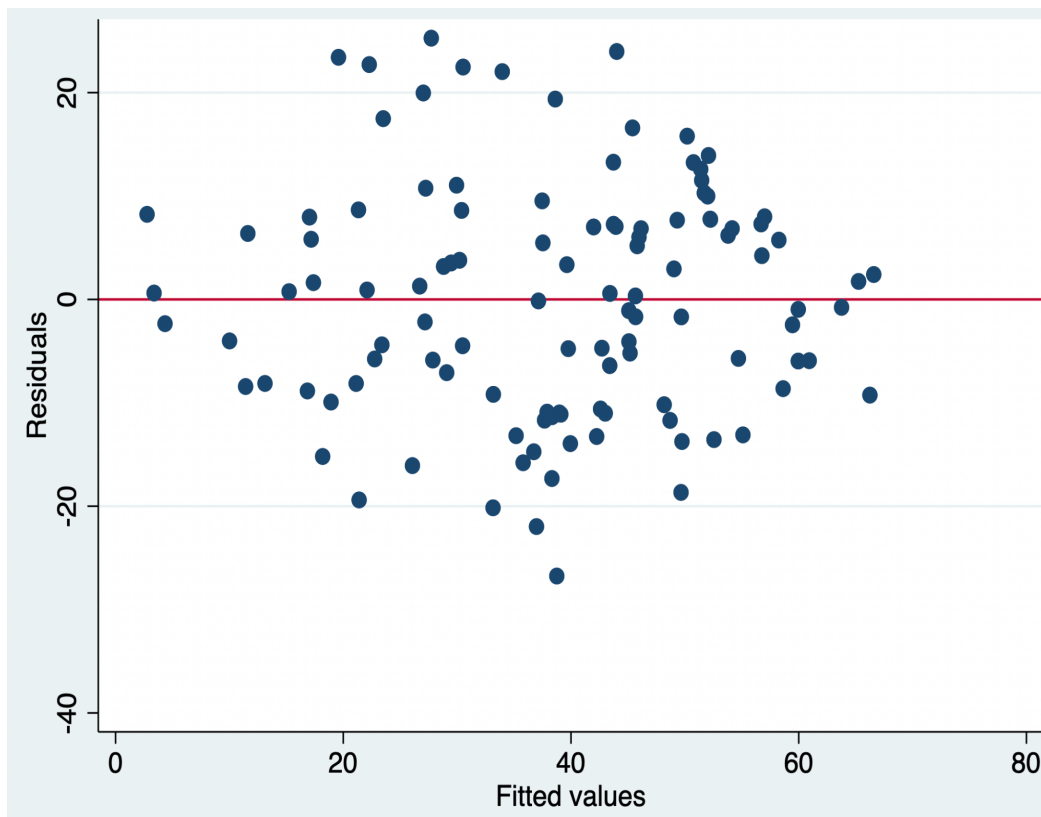
Q-norm plot:



White's test for heteroscedasticity

Source	chi2	df	p
Heteroskedasticity	113	112	0,4557
Skewness	27,97	16	0,0319
Kurtosis	3,39	1	0,0655
Total	144,36	129	0,168

Check for heteroscedasticity



Appendix 4: Sample of companies

Companies included in the study

AAK	Bufab	Hexatronic	Nobia	SSAB
ABB	Bure	Hexpol	Nolato	Stora Enso
Addtech	Byggmax	Holmen	Nordea Bank	Strax
Ahlstrom-Munksjö	Cavotec	Husqvarna	Nordic Waterproofing	Sweco
Alfa Laval	Clas Ohlson	ICA Gruppen	Odd Molly International	Swedbank
Alimak	Cloetta	Industrivärden	OEM International	Swedish Match
AQ Group	Collector	Indutrade	Oscar Properties Holding	Systemair
Arctic Paper	Concentric	Instalco Intressenter	Peab	TF Bank
Assa Abloy	CTT Systems	Investor	Profilgruppen	Thule
Atlas Copco	Duni	Inwido	Projektengagemang Sweden	Traction
Avanza Bank	Dustin	JM	Qliro	Trelleborg
Axfood	Electra Gruppen	Josemaria Resources	Ratos	Troax
Balco	Electrolux	Kinnevik	Resurs Holding	VBG
BE Group	Eltel	Lifco	RNB (Coala Life Group)	Venue Retail Group (Rizzo Group)
Beijer Alma	Endomines	Lindab International	Rottneros	Volati
Beijer Ref	Eolus Vind	Lundberg	Saab	Volvo
Bergs Timber	EQT	Malmbergs Elektriska	Sandvik	Vostok
Besqab	Essity	Mekonomen	SCA	
Bilia	Fagerhult	Midsona	Scandi Standard	
Billerud Korsnäs	Ferronordic Machines	Mips	SEB	
Björn Borg	FM Mattsson Mora	Munters	Serneke	
Boliden	Garö	NCC	Sintercast	
Bonava	Granges	Nederman Holding	Skanska	
Boozt	Haldex	Nibe Industrier	SKF	

Companies excluded from the study

Companies with small TMTs (<3)	Companies with missing data
Bergman & Beving	Fenix Outdoor
Catella	H&M
Creades	Kabe
Duroc	Lucara Diamond
Latour	Lundin Gold
Midway Holding	Lundin Mining
Momentum	New Wave
Nilörngruppen	Svedberg i Dalstorp
Stockwik	Svenska Handelsbanken
Xano Industri	
Öresund	

Appendix 5: Hierarchical regression with control variables added last

Variables	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP
Fem_share	6,721 (-10,265)	17,987+ (-9,805)	17,066+ (-9,878)	14,504 (-9,464)	10,591 (-8,976)	9,149 (-8,928)	8,624 (-8,727)	9,554 (-8,771)	16,024 (-10,193)	13,615 (-8,995)	12,178 (-8,906)	8,385 (-8,794)
Mean_age		102,840*** (-22,191)	100,030*** (-22,468)	95,437*** (-21,503)	101,529*** (-20,329)	97,027*** (-20,293)	81,390*** (-20,754)	79,182*** (-20,858)	82,898*** (-22,762)	43,436* (-21,295)	44,135* (-21,015)	35,799+ (-21,228)
Age_div			-0,543 (-0,645)	-0,156 (-0,626)	-0,067 (-0,591)	-0,159 (-0,587)	0,233 (-0,594)	0,245 (-0,594)	1,017 (-0,723)	0,975 (-0,638)	1,134+ (-0,634)	1,489* (-0,632)
Edu_lev				14,751*** (-4,173)	16,387*** (-3,955)	15,385*** (-3,957)	15,192*** (-3,868)	15,132*** (-3,867)	18,536*** (-3,966)	13,356*** (-3,619)	13,264*** (-3,572)	10,479** (-3,775)
Edu_div					29,795*** (-7,472)	30,377*** (-7,409)	26,824*** (-7,373)	24,794** (-7,629)	18,199+ (-9,729)	7,965 (-8,773)	11,113 (-8,807)	10,053 (-9,165)
EMP						10,995+ (-6,105)	6,878 (-6,18)	7,458 (-6,204)	-1,992 (-7,087)	-6,089 (-6,291)	-1,688 (-6,608)	-1,974 (-6,416)
ICC							13,763* (-5,389)	13,649* (-5,389)	12,208* (-5,757)	5,843 (-5,204)	3,805 (-5,241)	2,726 (-5,127)
OCC								-5,032 (-4,874)	-7,701 (-4,989)	-0,551 (-4,584)	-0,341 (-4,524)	-2,902 (-4,471)
TMT_size									1,370* (-0,537)	0,557 (-0,496)	0,555 (-0,489)	0,832+ (-0,498)
Firm_size										4,225*** (-0,764)	4,039*** (-0,760)	4,931*** (-0,787)
ROA											12,434+ (-6,405)	11,914+ (-6,633)
Constant	35,341*** (-2,881)	-370,544*** (-87,625)	-356,027*** (-89,416)	-378,604*** (-85,656)	-423,636*** (-81,536)	-411,328*** (-81,06)	-353,797*** (-82,354)	-342,171*** (-83,097)	-368,773*** (-91,368)	-214,582* (-85,227)	-221,135** (-84,161)	-184,288* (-86,585)
Observations	113	113	113	113	113	113	113	113	113	113	113	113
R-squared	0,004	0,154	0,159	0,239	0,329	0,347	0,382	0,388	0,441	0,57	0,585	0,634

Standard errors in parentheses

*** p<0,001, ** p<0,01, * p<0,05, + p<0,10

Appendix 6: Regression model with control variables added individually

Variables	SP	SP	SP	SP	SP	SP
Fem_share	9,554 (-8,771)	16,024 (-10,193)	8,61 (-7,524)	8,1 (-8,577)	7,276 (-8,932)	8,385 (-8,794)
Mean_age	79,182*** (-20,858)	82,898*** (-22,762)	35,837+ (-19,092)	76,175*** (-20,388)	77,022*** (-22,082)	35,799+ (-21,228)
Age_div	0,245 (-0,594)	1,017 (-0,723)	0,459 (-0,511)	0,357 (-0,581)	0,268 (-0,610)	1,489* (-0,632)
Edu_lev	15,132*** (-3,867)	18,536*** (-3,966)	10,590** (-3,390)	14,869*** (-3,775)	14,420*** (-4,128)	10,479** (-3,775)
Edu_div	24,794** (-7,629)	18,199+ (-9,729)	11,481+ (-6,856)	27,243*** (-7,504)	26,007** (-8,583)	10,053 (-9,165)
EMP	7,458 (-6,204)	-1,992 (-7,087)	-2,808 (-5,550)	11,306+ (-6,232)	8,665 (-6,581)	-1,974 (-6,416)
ICC	13,649* (-5,389)	12,208* (-5,757)	8,481+ (-4,690)	11,097* (-5,349)	13,474* (-5,453)	2,726 (-5,127)
OCC	-5,032 (-4,874)	-7,701 (-4,989)	0,229 (-4,258)	-4,486 (-4,761)	-6,363 (-5,016)	-2,902 (-4,471)
TMT_size		1,370* (-0,537)				0,832+ (-0,498)
Firm_size			4,536*** (-0,697)			4,931*** (-0,787)
ROA				18,769* (-7,220)		11,914+ (-6,633)
Constant	-342,171*** (-83,097)	-368,773*** (-91,368)	-178,156* (-75,606)	-334,059*** (-81,151)	-334,282*** (-90,183)	-184,288* (-86,585)
Observations	113	113	113	113	113	113
R-squared	0,388	0,441	0,553	0,422	0,412	0,634

Standard errors in parentheses

*** p<0,001, ** p<0,01, * p<0,05, + p<0,10

Appendix 7: Hierarchical regression with firm size added last

Variables	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP
Fem_share	6,721 (-10,265)	17,987+ (-9,805)	17,066+ (-9,878)	14,504 (-9,464)	10,591 (-8,976)	9,149 (-8,928)	8,624 (-8,727)	9,554 (-8,771)	16,024 (-10,193)	13,95 (-10,019)	12,458 (-10,356)	8,385 (-8,794)
Mean_age		102,840*** (-22,191)	100,030*** (-22,468)	95,437*** (-21,503)	101,529*** (-20,329)	97,027*** (-20,293)	81,390*** (-20,754)	79,182*** (-20,858)	82,898*** (-22,762)	81,505*** (-22,292)	75,991** (-23,895)	35,799+ (-21,228)
Age_div			-0,543 (-0,645)	-0,156 (-0,626)	-0,067 (-0,591)	-0,159 (-0,587)	0,233 (-0,594)	0,245 (-0,594)	1,017 (-0,723)	1,228+ (-0,714)	1,389+ (-0,746)	1,489* (-0,632)
Edu_lev				14,751*** (-4,173)	16,387*** (-3,955)	15,385*** (-3,957)	15,192*** (-3,868)	15,132*** (-3,867)	18,536*** (-3,966)	18,105*** (-3,887)	17,178*** (-4,275)	10,479** (-3,775)
Edu_div					29,795*** (-7,472)	30,377*** (-7,409)	26,824*** (-7,373)	24,794** (-7,629)	18,199+ (-9,729)	21,826* (-9,651)	21,318* (-10,612)	10,053 (-9,165)
EMP						10,995+ (-6,105)	6,878 (-6,180)	7,458 (-6,204)	-1,992 (-7,087)	3,683 (-7,351)	3,571 (-7,503)	-1,974 (-6,416)
ICC							13,763* (-5,389)	13,649* (-5,389)	12,208* (-5,757)	9,092 (-5,792)	9,351 (-5,924)	2,726 (-5,127)
OCC								-5,032 (-4,874)	-7,701 (-4,989)	-6,997 (-4,894)	-9,026+ (-5,152)	-2,902 (-4,471)
TMT_size									1,370* (-0,537)	1,320* (-0,526)	1,370* (-0,580)	0,832+ (-0,498)
Firm_size												4,931*** (-0,787)
ROA										16,719* -7,152	17,405* -7,764	11,914+ (-6,633)
Constant	35,341*** (-2,881)	-370,544*** (-87,625)	-356,027*** (-89,416)	-378,604*** (-85,656)	-423,636*** (-81,536)	-411,328*** (-81,060)	-353,797*** (-82,354)	-342,171*** (-83,097)	-368,773*** (-91,368)	-368,470*** (-89,450)	-342,058*** (-97,822)	-184,288* (-86,585)
Observations	113	113	113	113	113	113	113	113	113	113	113	113
R-squared	0,004	0,154	0,159	0,239	0,329	0,347	0,382	0,388	0,441	0,469	0,485	0,634

Standard errors in parentheses

*** p<0,001, ** p<0,01, * p<0,05, + p<0,10