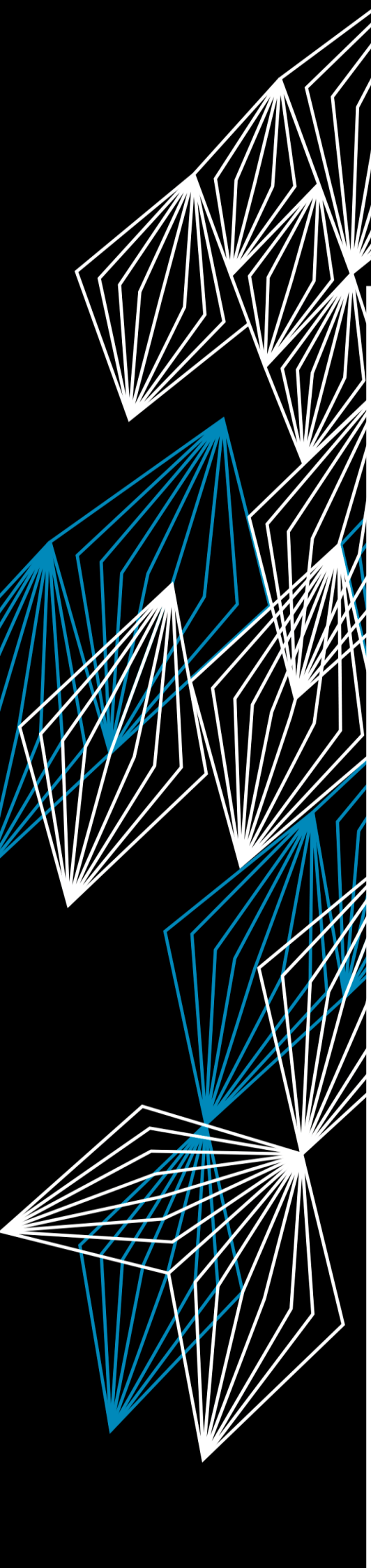

Master Thesis
Business Administration
Financial Management

Diversity matters: gender parity in top management teams and its effect on firm performance.

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Abstract

This master thesis investigates and explores the relationship between gender diversity in top management teams and the financial performance of companies. Ordinary least squares regressions are utilized as the statistical method. The total sample consists 1,616 companies from 15 different European countries. The year of interest is 2018. As for the first hypothesis, the results indicate partial support for a significant relationship between financial performance and gender diversity in top management teams. The dependent variable ROA, turns significant at the 0.01% level when utilizing a dummy variable for gender diversity in top management teams. The second hypothesis, innovative companies stand to benefit more from gender diversity in top management teams than non-innovative companies, receives no support. The opposite actually seems to be true, the regression coefficients only become significant when performing regressions with ROA and gender diversity in top management team in a non-innovative sub sample.

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1. Introduction

In Europe, a serious gender disparity gap exists. This regards the amount of female representation in senior positions in corporate firms. As of 2014, only 4% percent of the CEO's were female, only 14% of the positions of the top management team were exercised by females and only 19% of the board of directors was female in the 600 largest companies of Europe (Christiansen, Lin, Pereira, Topalova, & Turk, 2016). This gender disparity gap can be considered extreme since in 2014 almost half of the total workforce was composed of women (45,8%). This gender disparity gap prompted the European Commission to call on firms to voluntarily increase the percentage of women in senior management positions or in the board of directors (European Commission, 2012).

Some countries reacted to this by instituting quotas on the percentage of female directors on the board of directors in a company. The first gender quota law of Europe was instituted in 2006 in Norway and required that 40% of the board of directors should be female (Matsa & Miller, 2013). Other countries followed soon suit with gender quotas, some with different percentages and policies. Spain recommended a gender quota of 40% females for the board of directors in 2009 (Gabaldon & Giménez, 2017). The Netherlands induced a gender quota also in 2009 and France and Iceland both followed in 2010 (Matsa & Miller, 2013). The empirical evidence from Norway provides information that gender quotas decrease gender disparity gaps, because the percentage of female board of directors more than doubled.

One of the possible reactions towards these required gender quotas was that a lot of research papers investigated the relationship between female board directors and the financial performance of a company (Adams & Ferreira, 2009; Campbell & Minguez-Vera, 2008; Carter, D'Souza, Simkins, & Simpson, 2010; Gupta & Raman, 2014; Rhode & Packel, 2014). This is further confirmed by Dezsó and Ross (2012), stating that the vast majority of studies is focused on gender diversity in corporate boards of directors. Dwyer, Richard and Chadwick (2003) and Christiansen et al. (2016) add to this, stating that gender diversity in top management teams (TMT) has received insufficient attention in the research literature. This may partly be due to the absence of a gender quota in top management team positions. In conclusion, gender diversity in higher managerial ranks remains a less researched topic. This given makes it interesting to further investigate the relationship between the gender diversity of a TMT and the financial performance of a company.

There are two kinds of different reasonings why one could argue for gender diversity in top management teams. The first one societal and ethical; it is not justifiable to exclude women from top management positions. The workforce consists of a considerable number of female workers, yet gender diversity in (higher) managerial ranks is regarded as very low. As for the ethical reasoning, Fortune 500 tracks the percentage of women who are leading the world's largest companies and they report that not even 5% of the CEO's of the largest companies are female (Christiansen et al., 2016).

The second reasoning is financial and economical; it is arguable that gender diverse companies outperform their not so diverse counterparts. One of the reasons for this to happen is the fact that a diverse top management team understands the diverse market better because the customers are also diverse and identify with the company, thus increasing a company's ability to penetrate markets (Robinson & Dechant, 1997). Another reason is the occurrence of increased creativity and innovation (Lee & Farh, 2004). The last and final reason for increased financial performance is the broad perspective on problem solving, as more alternatives are being evaluated in contrast to less diverse companies (Katzenbach, Backett & Dichter, 1995). Both reasonings indicate that gender diversity in top management teams should increase.

The literature on gender diversity is divided and there are different arguments why gender diversity would or would not positively affect the financial performance of a company. Also, the empirical evidence of studies give mixed results. This is also endorsed in the literature

review on the relationship between gender diversity and firm performance written by Rhode and Packel (2014). These authors conclude that empirical research on the effect of board diversity on firm performance is inconclusive and often dependent on methodology. The findings of this particular literature review are summarized in Appendix 1 – Literature review gender diversity by Rhode and Packel (2014). The authors refer to some methodologies who bear shortcomings, such as short-term observation of performance, whilst the boards of directors in general influence strategic decisions with long-term effects. Other examples of methodologic shortcomings include the complication of controlling for reverse causation, endogeneity and other excluded variables that can affect both diversity and the performance of a company. Together with the different periods, economic circumstances, continents, countries, sectors, industries, measurements of gender diversity and the financial performance of companies, all utilized in different studies, it is believed that this substantially contributes to the mixed results (Rhode & Packel, 2014).

That, in general, the empirical support for the diversity-performance relationship is mixed, is also acknowledged by Williams and O'Reilly (1998). This leads to the fact that both arguments in favour and against are numerous, reasonable and convincing. As for these arguments, on the one hand, the OECD (2012) argues that a higher percentage of women working in top management positions could bring heterogeneity in values, beliefs and attitudes, which would benefit the decision-making process.

In addition, Lee and Farh (2004), state that greater female representation leads to more critical thinking and higher creativity. A study conducted by The Lehman Brothers Centre for Women in Business (2007) adds to this by stating that gender diverse working forces are more likely to share knowledge, be creative, experiment and thus are better capable of fulfilling their tasks. This indicates that women perform better in certain sectors or with certain tasks.

In accordance with this, Croson and Gneezy (2009) research the phenomenon that females exercise a different managerial style than man. McKinsey (2009) and Alesina, Giuliano and Nunn (2013) point out that fewer gender disparity gaps in top management positions would also reduce gender disparity between subordinates, which could cause an increase in the productivity of employees. This is proven by Bilimoria (2000) and (2006) Daily and Dalton (2003), who discovered that women on corporate boards enhance the motivation and organizational commitment of women in lower-level positions. This indicates towards other female employees that, regardless of the barriers towards women in society, the company is women-friendly and committed towards the advancement of women at different levels.

Furthermore, according to Hunt, Layton and Prince (2015), companies who have a low level of gender diversity are statistically less likely to achieve above average returns. On the other hand, arguments that state disadvantages regard the fact that gender diversity could decrease performance by increasing misunderstanding (Choi, 2007; Lazear, 2001), personal conflicts (Akerlof & Kranton, 2000) and communication problems (Becker, 1957; Kremer, 1993). Complementary, certain studies found negative relationships between higher gender diversity levels and the financial performance of a company. According to Earley and Mosakowski (2000), people who belong to the same group, identify more with each other and share the same opinion and thus deliver better results. Turner and Tajfel (1986) add to this by stating that groups of people, consisting of similar members, are more willing to work together and induce fewer conflicts. Lau and Murnighan (1998) argue that a gender diverse teams produce more opinions and thus more conflicts, and that this affects the decision-making process, delaying it and making it less effective. This enables the conclusion that the arguments for and against gender diversity are both prevalent and numerous.

The top management team (TMT) and the board of directors of a company perform a wide range of important functions. Senior managers, as operationalized in this study, are those, who together, form the top management team (TMT) of a company. Typically, senior managers are

employees that have more authority and responsibility in an organization than department managers. The most important function of the top management team is inventing and implementing an appropriate strategy that keeps the organization functional, effective and successful in a competitive and everchanging market (Hambrick & Mason, 1984). This is agreed upon by Carpenter et al. (2004), who state that the exact definition of the top management team varies greatly, but a clear distinction is that members should be involved with strategic decision-making. This leads to the fact that the top management team is constructed at the senior level, usually indicated by position or title, since these individuals are allowed to make strategic decision. The interest on this group should be great, since TMT members interact both with the company and the external environment and are relatively powerful and therefore are likely to have an impact on the organization (Carpenter et al., 2004).

Besides this, the TMT is tasked with monitoring if the company's performances are effective and efficient. Within a certain time cycle, strategy and goals should be reviewed and adapted to the new circumstances. In addition, the TMT always needs to regard the demands of the stakeholders.

As for the board of directors, its primary function is the hiring of executives that run the company's day-to-day operations, advising management and the improvement of changes in corporate control (Matsa & Miller, 2013). Earlier studies conclude that the board of directors serves as a sparring-partner for the CEO and the top management team, but do not establish corporate objectives, strategies or policies (Mace, 1971). However later studies describe the board of directors as more active (Demb & Neubauer, 1992; MacAvoy & Millstein, 1999). Board members can influence corporate governance indirectly by appointing top executives who are congruent with their corporate vision.

Characteristics and the composition of the TMT and the board of directors are very influential on their performance and the way they execute their activities. One of these characteristics is gender diversity. Dezsó and Ross (2012) reason that an improvement of the task performance of the TMT should naturally lead to an improvement in the performance of a company. In conclusion, the gender diversity of a TMT has the potential to statistically influence the performance of a company.

The main research question of this master thesis is as follows: "What is the relationship between the gender diversity of the top management team and the financial performance of companies?" In order to answer this research question, the results of an Ordinary Least Squares (OLS) regression between the relationship of gender diversity in TMT and the financial performance of companies is interpreted. The data is extracted from Orbis and results in a sample 1,616 European companies.

The research question in this study is twofold. The first question is whether gender diversity has a economical and statistical effect on the financial performance of a firm. The second question is whether gender diversity has more or less positive effects in different sectors/industries. It is expected that the benefits of gender diversity materialize more easily in innovative-intense sectors, because females stimulate creativity, critical-thinking and innovation in general (Dezsó & Ross, 2012).

The interpretations of associations in statistics are subject to many difficulties. In this master thesis, it is hypothesized that a greater presence of females in the TMT improves company performance, but this causality could also be reversed – firms with a better financial performance are simply able to attract more female TMT members. Due to the scarcity of experienced women in senior management positions, these women can choose for which succesfull company they want to work for (Farrel & Hersch, 2005). Another aspect that influences the interpretation of statistics are the social and economic trends over time, because they simultaneously are able to affect the performance of a company and can alter the willingness to employ and appoint females in senior management positions (Bloom & Reenen,

2010). In particular, human resource practices can influence the personal commitment of female employees. Either way, according to Matsa and Miller (2013), inducing quotas for women in senior management positions changes the nature of the senior management team and has a number of direct effects. Examples of these direct effects of gender quotas are an increase in the number of members new to the senior management team, an increase in the total number of members of the management team and a decrease in the pool of eligible new candidates. In conclusion, one should be cautious of the effects when changing the composition of senior management teams, the same goes for explaining associtions.

This master thesis aims to contribute to the existing literature on gender diversity by shedding some light on the underreported effects of increased gender diversity in TMT and its effect on performance. Two hypotheses are formulated: an increase in gender diversity in TMT increases financial performance and innovative companies stand to benefit more from gender diversity than non-innovative ones.

The remainder of the paper is organized as follows. Chapter 2 presents a literature review including empirical evidence and hypotheses development. Chapter 3 contains information on the methodogy, models and the variables utilized. Chapter 4 presents the data and the sample. Chapter 5 – Results present the results of the statistical techniques.

2. Literature review and hypotheses development

2.1. Theoretical background

The theories that support the gender diversity-performance link are derived from either the economic discipline (Christiansen et al., 2016; Shrader, Blackburn, & Iles, 1997) or from the organizational discipline (Adams & Ferreira, 2009; Dezsó & Ross, 2012; Dwyer et al., 2003; Matsa & Miller, 2013). Most arguments of the economic discipline evolve around the distinction between heterogeneous and homogeneous groups. In general, economic theory states that gender diversity in TMT is able to improve the performance of a company through two broad channels.

Firstly, the OECD (2012) argues that a higher number of females could bring heterogeneity in values, beliefs and attitudes, which would broaden the range of perspectives in the decision-making process. In general, more heterogeneous groups make higher quality decisions (Hoffman & Maier, 1961; Wiersema & Bantel, 1992). McLeod, Lobel and Cox (1996) summarize this by stating that varied opinions have the potential to improve the quality of decisions. Secondly, gender diverse teams have a greater ability for critical thinking and creativity. The theory from the economic discipline that hypothesize about the diversity-performance link is the resource-based view of competitive.

Recently, changing environments such as migration, globalisation and disruptive technologies influences organizational theory. This, together with increased awareness on the underrepresentation of female in TMT's, raises the question whether organizations should adopt diversity stimulating measures. The theories from the organizational discipline that hypothesize about the diversity-performance relationship are social identity theory, upper echelons theory, contingency theory and configurational theory.

2.1.1. Resource-based view of competitive advantage

The resource-based view of competitive advantage supports the view that organizations should utilize the internal resources to gain a competitive advantage instead of acquiring this via the competitive environment. According to the resource-based view, it is not the industry structure that leads towards competitive advantages and therefore a better performance, but rather the ability of a company to utilize its internal resources to its maximum extent (Barney, 1997). This theory theorizes that companies exist of unique human capital assets or resources. The competitive advantage can be accomplished by gathering unique and difficult to acquire human capital assets or resources. This – a sustained advantage in human capital - could lead to situations in which companies can take advantage of environmental opportunities and counterbalance enviromental threats (Barney, 1991).

In addition, Barney (1991) stresses the importance of human resources in obtaining the competitive advantage and that employee and management capabilities are firm-level resources that are among the most important and difficult for competitors to imitate. The benefits of diverse human resources are based on the rudimentary differences between heterogenous and homogenous groups. Based on the literature, heterogeneous groups possess two major advantages which does do not materialize in homogeneous groups. The first one being increased creativity and innovation and the second one being stimulating critical thinking.

Firstly, as for increased creativity and innovation, Wiersema and Bantel (1992) claim that, in general, higher levels of diversity are associated with more creativity and innovation. This statement is elaborated by van Knippenberg et al. (2004), who explains that in the case of gender diversity, this leads to a more thorough information processing and combines dissimilar views. This phenomenon is particularly valuable for creative solutions or tasks. Ginsberg (1994) reasons, in this context, that female members of the TMT should be particularly favourable for firms that aim to execute an innovate strategy. Castanias and Helfat (2001) point

out that companies with an innovative strategy have managers who have more freedom to make decisions. This strengthens the importance of managerial effectiveness for company achievements. Thus, both tasks and activities that require creativity are best executed by a diverse team. This is confirmed by Rosener (1995), who acknowledge that female managers are superior in the area of idea generation and innovation.

Secondly, diversity facilitates critical thinking (Lee & Farh, 2004). Hoffman and Maier (1961) add to this by stating that gender diversity in particular nurtures critical thinking. Past research also concludes that diversity has the potential to not only induce critical thinking, but also increase problem-solving abilities (Cox, 1994; Cox & Blake, 1991). Coff (1997) summarizes the benefits stated above as: "a gender diverse TMT leads to a sustained human capital advantage" (p. 377). This is because with the expertise of female managers the managerial talent rises and thereby the quality of the managerial workforce rises overall. This statement links directly back to the resource-based view of competitive advantage. It is important to note that a key success factor in innovative/high technology sectors is the effectiveness by which the human assets are managed (Banerjee & Campbell, 2009). Further arguments include that underutilized resources tend to include females and those of diverse racial and ethnic backgrounds who might otherwise bring different perspectives to the firm (Katzenbach et al., 1995).

Katzenbach et al. (1995) furthermore conclude based on their research on company change, that companies have underutilized many resources in this time of international competition and organizational change. These underutilized resources, include but are not limited to females and those of different racial and ethnic backgrounds. Employing these underutilized resources could lead to companies becoming more creative and more willing to accept change (Katzenbach et al., 1995). Wiersema and Bantel (1992) argue that heterogeneous management teams are better able to facilitate strategic change. If an organization overcomes the resistance towards accepting gender diversity, it should be well positioned to handle other types of change as well (Iles & Hayers, 1997). In addition, diverse (heterogeneous) workforces are found to be beneficial because they improve problem solving ability of the team and facilitate synergy (Iles & Auluck, 1993). This indicates that gender diverse management teams bear many benefits such as broadening the range of perspectives, cognitive resources and overall the problem-solving capacity of the team (Bantel & Jackson, 1989; Hambrick, Cho, & Chen, 1996; Smith et al., 1994).

Rosener (1995) argues that companies should be aware of the importance of human resource management – and the use of the underutilized female managers – as this becomes an increasingly important determinant of global competitiveness. Also, companies that fully utilize the potential of female managers stand to gain competitive advantage over companies that do not employ female managers. Further support is given by Hamel and Prahalad (1994), who claim, based on the resource-based view of competitive advantage, that the development and utilization of unique resources in comparision with competitors is the key competitive advantage. Companies that expertise at leverage or getting the absolute most out of their unique resources, compete better in their industry and human resources take up a major role in this process.

Garnero, Kampelmann and Rycx (2014) extend and conclude the arguments of the literature on workforce diversity. They conclude that sectors characterized by complex tasks and innovative processes stand to benefit more from gender diversity. In agreement, Jackson (1992) proposes that group heterogeneity is beneficial for unstructured and novel tasks, but not for routine tasks. Bowers, Pharmer and Salas (2000) and Hambrick and Mason (1984) agree with this by stating that homogenous groups slightly perform better than heterogeneous groups on simple tasks, although heterogenous groups outperform homogeneous ones on difficult tasks. This is explained by the fact that alternative points of view and sources of information to

which gender diversity in the top management team gives rise are actually counterproductive for routine tasks (Dreu & Weingart, 2003). In conclusion, it seems that gender diverse team are able to improve the performance of a company, although this is bounded by certain conditions for these benefits to be materialized.

The study who utilized the resource-based view of competitive advantage are Shrader et al. (1997). These authors explored the relationship between gender diversity in TMT's and the financial performance of a firm in an exploratory study. Shrader et al. (1997) reason that by employing a higher number of female top managers, these companies are better able to link the company with other employees, customers and other entities. They reason that these firms perform financially better, because they are more competitive, progressive and are better able to mirror the composition of the existing market. As a result the utilization of these female top managers lead to better financial results. Support for this is found in the fact that companies – who guarantee excellent workplaces for women to work and advance in – see their competitive advantages exponantially increase (Cox & Blake, 1991). In their exploratory study, Shrader et al. (1997) document, contrarily to the literature and the hypothesis that the relationship between female TMT members and financial performance is insignificant and sometimes even negative.

This result may be explained by the study conducted by Jehn (1995). This author warned that, although diversity in human resources may contribute to, among other things, the quality of ideas, it can also create additional costs stemming from the need for increased coordination and control required for a more heterogeneous group. In line with this Akerlof and Kranton (2000), Becker (1957), Choi (2007), Kremer (1993) and Lazear (2001) also warn that an increase in diversity could undermine performance if it is associated with greater misunderstandings, communication problems (Wiersema & Bantel, 1992), personal conflicts, or negative reactions from stakeholders. Furthermore, diversity may also negatively impact social cohesion and, thus, employee satisfaction (Tsui, Egan, & O'Reilly, 1991). Other negative effects from these authors that arise when a work team of men is being led by a female supervisor are the lack of psychological commitment and the fact that the workers are more likely to practice absenteeism. Thus, gender diversity could potentially decrease the overall motivation of male managers.

2.1.2. Social identity theory

Social identity is the belonging to a certain group based on feeling. The foundation of this theory is based on the perception of oneness with a group of individuals (Ashforth & Mael, 1989). Because an individual is identifying and associating with a group, the interests of both the indiviudal and the group are aligned. Thus, social identification motivates activities that are compatible with the identity of the group. Both the individual and the group benefit from this phenomenon. Companies are able to benefit from this by hiring a gender diverse top management team, because this enables the employees to identify more with the company. Also, social identity is associated with stereotypical perceptions of self and others and the theory explicitly states that social groups discriminate against other groups to enhance their self-image (Tajfel & Turner, 1979).

Based on the concept of identity in a model of economic behaviour, the argument unfolds that the utility of an employee joining a company increases with the fraction of employees that belong to the same social category (Akerlof & Kranton, 2000). In this light, it is argueable that the benefits of gender diversity increase when the percentages of women that participate in the workforce increases as well. This is directly derived from social identity theory.

Other evidence that hints in this direction consists of the findings of Chatman, Polzer, Barsade and Neale (1998) who, using a business simulation, found that the organizational culture of a company moderated the effect of diversity in such a way that conflict arising from

group heterogeneity was seen as more beneficial for companies that identify with a collectivist organizational culture. A collectivist culture can be best described as an organization that focuses on the needs and goals of the group as a whole and tends to neglect the needs and desires of individuals (Huff & Kelley, 2005). In general, cultures in Central America, Africa, South America and Asia are more collectivistic.

Another benefit of an increase in the percentage of female managers is described by McKinsey (2009), stating that when gender diversity in the TMT is increased, the productivity of the workforce in general could improve. This is agreed upon and complemented by Dezsó and Ross (2012), who argue that female representation in TMT brings informational and social benefits to the TMT. Van Knippenberg et al. (2004) argue that gender diversity in TMT augments the behaviours displayed by managers throughout the company and motivates women in middle management.

Krishnan and Park (2005) describe social identity theory as the impact that socialization and categorization has on organizational outcomes. For example, managers classify themselves as part of an exclusive group and as a result socialize to the established norms (Kent & Moss, 1994). Krishnan and Park (2005) argue, based on the theory of social identity, that increasing the percentage of female TMT members brings forth various advantages towards the company. Firstly, female managers are argued to better handle tasks which call of social interaction, this is even more applicable as organizations compete in highly competitive global markets (Kent & Moss, 1994). Secondly, women in management more than men experience difficulty in their career development, this results in the fact that women may be better equipped with skills to perform tasks that contain uncertainty. Thirdly, female directors are more likely to display a leadership style that accentuates harmony, compared to male counterparts. The results of this are that female leaders form a source of inspiration for other women and colleagues, share information and power and bring employees together (Hurst, Rush, & White, 1989). Finally, a greater representation of females in TMT's would decrease the gender gap between managers and other employees, which is expected to raise the productivity of the employees.

2.1.3. Upper echelons theory

Upper echelons theory states that the decisions of the TMT are influenced by their characteristics. Upper echelons theory can be classified as a management theory and is published by Hambrick and Mason (1984). This theory contributes to the literature by stating that the organizational outcomes of a company – strategic changes and performance levels - are to a certain degree dependent on the managerial background and demographic characteristics of the TMT. These characteristics include, but are not limited to, financial position, age, gender, socio-economic roots, tenure in the organization, education and practical environment. Although gender is only one of the many characteristics of the TMT that affect company performance, in regard to this master thesis it is the most important one.

Furthermore, it is argued that even the past experiences, personal values and personalities of executives extensively affect their cognitive frameworks, such as information seeking capabilities and the information evaluation process (Hambrick, 2007). This, in turn, also affects their managerial choices. In researching the upper echelons theory, proxies for cognitive frameworks are often observable characteristics such as gender or race. In accordance with upper echelons theory, it is argued that female members of the TMT possess unique knowledge, experience and personal values that provide the potential to not only expand the pool of information for decision making but also how decisions are made. For this reason, companies stand to benefit from a gender diverse top management team.

The difference in genders of members of the TMT also affects their managerial style. This is elaborated by Croson and Gneezy (2009), who conclude based on a literature review that gender differences and other factors affect managerial styles of males and females. For

example, women managers may be better able to match female workers to tasks in the firms (Flabbi, Macis, Moro, & Schivardi, 2014). To the same extent, Rosener (1995) finds that women exhibit an interactive leadership style that emphasizes inclusion. Dezsó and Ross (2012) describe female managers as people who encourage participation from others, who like to share power and information by keeping open communication channels with subordinates and improve the sense of self-worth of their subalterns. Also, female managers are successful at developing good interpersonal relations and cooperative alliances with their foreign counterparts (Jelinek & Adler, 1988) and can actually enhance the firm's capabilities to be flexible and deal with uncertainty (Rosener, 1995). This supports the conclusions drawn by Antoncic and Hisrich (2001) and Rosener (1995), who find that female managers are more orientated towards supporting and maintaining relationships than their male counterparts. Considering the above, the conclusion that female managers are at least as good, if not better, managers than men can be made.

It is found that empowering and participatory leadership styles and information sharing in groups directly causes an increase in intrinsic motivation and creativity with employees (Larson, Foster-Fishman, & Franz, 1998; Zhang & Bartol, 2010). Eagly, Makhijani and Klonsky (1992) document that when women occupy senior management positions, they focus more on the development and mentoring of their subordinates, encouraging them to reach their full potential and rewarding them for good performance. These supportive' managerial behaviours have been found to boost feelings of self-determination and personal initiative and thereby increase intrinsic motivation (Oldham & Cummings, 1996). On the contrary, supervisory behaviour is found to undermine the intrinsic motivation of employees (Book, 2000). Helgesen (1990) concludes that women are less hierarchical, more cooperative and collaborative than men. In line with this, Eagly & Johnson (1990) find that women, in organizational settings, tend to manage in a more democratic and participatory way. These kinds of managerial behaviours stimulate, nurture and promote the sharing of task-relevant information (Daily & Dalton, 2003), which in the long run leads to better decisions that enhance the financial performance of a company.

Furthermore, Eagly, Karau and Makhijani (1995) argue that a women's leadership style may be more effective in female-dominated or female-oriented settings. Giuliano, Spilimbergo and Tonon (2006) agree with this, stating that female managers should be better positioned to serve customer markets that primarily consist of females. Also, as firms penetrate unfamiliar markets or acquire companies in new geographic regions or in different industries, females, especially holding corporate senior positions, may bring added knowledge, expertise and experience as well as cultural awareness and understanding to adequately serve the needs of new market segments (Cox, 1994). This is summarized by Dwyer et al. (2003), who state that gender diversity offers market-related advantages.

Also, it is found that female and male members of the TMT, in gender balanced companies, are better able to exhibit both masculine and feminine behaviours that allows to better meet the demands of the task at hand (Ely, 1995). The managers of companies that have a gender disparity gap, display masucline characteristics, in other words, act in accordance with historical gender norms and therefore have a disadvantage compared to gender balanced companies. Diversity could open the door to additional insights into important strategic questions and female senior managers can help and benefit the company with fullfilling the demands of female consumers, employees and trading partners (Daily, Certo, & Dalton, 1999).

Other evidence that favours female leaders comes from Beaman, Chattopadhyay, Duflo, Pandi and Topalova (2009) and Chattopadhyay and Duflo (2004), who state that women are more likely to invest in public goods demanded by women or serve as role models for other women, thereby raising the productivity of female workers. There seems to be evidence that in certain scenarios female managers are the best option to be appointed. Besides, Huang and

Kisgen (2013) document that male executives display overconfidence when compared to female counterparts. In addition, another disadvantage that men possess compared to women is that men embrace competitive individualism (Eagly et al., 1992; Grant, 1998). Another characteristic of female executives comes from Matsa and Miller (2013), who claim that companies under the control of female executives are significantly less likely to downsize their workforce. This characteristic does not necessarily indicate superiority between male and female executives, but the conclusion that male and female (managerial) leadership differ from each other can be drawn.

2.1.4. Contingency theory & configurational theory

The contingency theory is derived from organizational theories and is an important theoretical lens used to view organizations. It claims that executing a perfect and coherent way to organize firms, to lead firms or to make decisions does not exist. The essence of organizational effectiveness results from matching company characteristics, such as structure or culture (Pennings, 1987). From this, it is easy to draw the line that in order to reap the benefits of gender diversity, the culture or structure of a company needs to be compatible. Furthermore, the optimal course of action for a company is dependent upon three factors. These factors are environmental, organizational and (organizational) strategy. The organizational factor is the most important one for this study, as this is where the gender diversity-performance link is investigated.

To examine the diversity-performance relationship with a contingency approach means that the effect of different factors that interact with diversity are examined (Neale, Northcraft, & Jehn, 1999; Richard & Johnson, 1999). Studies utilizing this approach investigate different factors and therefore bear different results. For example, Richard and Johnson (1999) conclude that the the benefits of diversity are more likely te be materialized, when business strategy and organizational culture are congruent, but Richard (2000) concludes based on empirical evidence that diversity is unfavourable for companies that are currently downsizing. The usage of a contigency approach towards investigating the diversity-performance seems justifiable, because diversity only seems beneficial in certain contexts.

The concept of configuration – that the whole is best understood from a methodological and organized perspective and should be regarded as a system of interconnected components (Weber, 1922) – has gradually been integrated beyond organizational studies. Configurational theory is similar compared to contingency theory, but departs from it because it takes a multivariate approach instead of a bivariate one. Organizational theorists therefore deem this multivariate configuration more useful (Baker & Cullen, 1993; Dess et al., 1993; Miller, 1986). Organizational theory in particular, could benefit from multivariate configurations that give a more useful and complete explanation than compared to the contingency approach which uses a bivariate interaction (Baker & Cullen, 1993; Dess et al., 1993; Miller, 1986).

Evidence of this is delivered by the fact that configurations of multiple variables are found to have a higher value of predictive power than bivariate relationships (Dess et al., 1993). It is important to note that the configuration theory reviews an organization or construction as whole and that it cannot be viewed upon divided up in parts.

Although neither the configurational approach nor the contingency approach is not going to be used in this master thesis, it is still an important element in research papers which investigate the diversity-performance relationship. In their study, Dwyer et al. (2003) position gender diversity "within a broader set of strategic and organizational variables" (p. 10), consistent with organizational demographic research utilizing a contingency approach and strategic human resource management research adopting a configurational approach. The research question of these authors is centred around in what context gender diversity in

management impacts financial performance. The answer to this focusses mainly on the growth orientation and organizational culture of a company.

Organizational culture can be identified as an organizational control mechanism. It provides a framework through which employees set expectations about internal behaviour and corporate roles. Also, it is found that organizational cultures who support diversity improve performance (O'Reilly, Williams, & Barsade, 1997)

Dwyer et al. (2003) reason that companies pursuing growth can benefit from gender diversity as this brings a wide range of experience and knowledge (McLeod et al., 1996), since this increases technical competence and managerial expertise (Pearce, 1982). Company growth can be achieved by selling your products or services to a larger customers base in new markets through geographic expansion or through mergers and acquisition (Suresh & Orna, 1989). Either way, both expansion strategies require creativity, knowledge, experience and insight. So, when firms enter newly acquired markets or acquire new companies, gender diversity in managerial ranks brings the requirements – knowledge, experience, flexibility and cultural insight – to adequately serve the needs of the new market (Cox, 1994).

A configurational approach is most often seen in order to gauge the organizational type to which the organization belongs, from here research often indicates that certain organizational types are required for the beneftis of gender diversity to be materialized. Dwyer et al. (2003) distinct the following organizational types: clan culture type, adhocracy type, hierarchy culture type and market culture type. The first type is internally oriented, focuses on informal governance, and values the development of human resources. Adhocracy culture combines informal governance with external orientation. The hierarchy culture type is internally orientated and follows formal rules and policies closely. The market culture type is structured around formal governance and external orientation. How these different kind of types relate to gender diversity will be discussed in the empirical results section of this master thesis.

Paragraph 2.1. Theoretical background is summarized in Table 1 – Theories and arguments

Theory	Study	Arguments
Economic discipline		
Resource-based view of competitive advantage	(Shrader et al., 1997)	According to the theory, gender diversity offers the following advantages: - Increased creativity and innovation; - Stimulation of critical thinking; - More thorough information processing; - Combining dissimilar views/ different perspectives; - Increasing problem-solving abilities - More willing to accept (strategic) change; - Facilitates synergy. This leads to companies being better able to: - Take advantage of environmental opportunities; - Counterbalance environmental threats.
Social identity theory	(Christiansen et al., 2016) and (Dwyer et al., 2003)	Social identity theory states that: - Members belonging to the same social group get an increase in motivation when activities are compatible with the identity of the group; - This materializes in an upward trend when more members are part of the social group; - This materializes especially in companies with collectivists cultures; - The mitigation of gender difference in a company leads to an increase in overall productivity; - Gender diversity in TMT better motivates female employees; - Female representation brings forth informational and social benefits.
Organizational discipline		
Upper echelons	(Dwyer et al., 2003) and (Shrader et al., 1997)	Female characteristics that have the potential to benefit performance are: - Past experiences, personal values and personalities; - Unique knowledge that expands the pool of information available; - Managerial style; - Cultural awareness. This enhances the following for the top management team: - Information seeking capability and information evaluation process; - Pool of available information; - Managerial choices.
Contingency and configurational theory	(Dwyer et al., 2003)	These theories state that the benefits of gender diversity can only materialize if the culture and structure of a company are compatible. This leads to the conclusion that gender diversity is only beneficial in certain contexts.

Table 1 - Theories and arguments

2.2. Empirical evidence

2.2.1. The fragmented impact of gender diversity on firm performance

Studies investigating the gender diversity-performance relationship conclude different results. These different results are firstly caused by the fragmented literature and secondly subject to the different performance measurements. Within the gender diversity literature, the performance measurements range from accounting-based measurements such as ROA, ROE and short-term profit to market-based performance measurements such as Tobin's Q, but also other performance measurements such as (employee) productivity.

Studies that focus on the financial impact report positive relationships as well as negative ones. For instance, Catalyst (2007), McKinsey (2007) and Terjesen, Couto and Francisco (2015) all document a strong positive relationship between female representation on the board of directors of Fortune 500 companies and corporate performance. This is agreed upon by Adler (2001), Carter, Simkins and Simpson (2003) and Khan and Vieto (2013) who, based on evidence from the US, also document a positive relationship between female representation in TMT and in the board of directors and financial performance. Blackburn, Doran and Shrader (1994) and Throup (1994) formulate their conclusion more moderate, stating that there exists evidence that firms who employ more female managers actually perform better financially.

Furthermore, Dwyer et al. (2003) state, based on their research, that the interaction between gender diversity and company growth is significant, although this holds only for the performance measurement level of productivity and not for return on equity. From this they draw the conclusion that high levels of gender diversity in management teams leads to higher productivity levels.

In general, earlier studies investigating the diversity-performance link report a positive impact on the company. However, later studies document that the causal impact of the representation of females is not as evident as suggested in previous studies (Ahern & Dittman, 2012). This is especially demonstrated by studies that focus on individual countries. For example du Rietz and Henrekson (2000) documented this for Swedish firms and Lam, McGuinness and Paulo (2013) for Chinese firms.

Matsa and Miller (2013) have, on this same footnote, concluded that the introduction of gender quotas in corporate boards in Norway, led to a reduction of short-term profit, because employee layoffs were fewer. Because of these results, Ahern and Dittman (2012) seriously doubt that an increase of gender diversity has an overall positive effect. These authors see their arguments strengthened by the fact that the response to gender quotas in Norway was not only a decline of the stock prices, but also a permanent decline in the market value of those companies. Lastly, Lee and James (2007) conclude that stock prices of companies who hired a female Chief Executive Officer (CEO) reacted negatively, but there was no reaction found for appointing a female to any other senior management positions.

However, it is worth to consider that market value and stock price are financial measurements who are determined by shareholders. As stated above these shareholders may be biased against female managers, directors and corporate leaders. This seems to be the case, because a similar study in Spain concluded that gender quotas led to positive stock market reactions and to an increase of firm value over time (Campbell & Vera, 2010).

In another interesting study, Adams and Ferreira (2009) put forward the question if gender quotas can increase company value of companies that are already. Their research shows that overall the financial performance and gender diversity relationship is negative and that the benefits of gender diversity only materialize for firms that have weak shareholder rights.

The overall conclusion of Klein and Harrison (2007), that the benefits of diversity are conditional on the context, seems to be accurate. Arguments in favour of this statement include the fact that diverse workforces have a greater potential to thrive in certain organizational cultures than in others (Dwyer et al., 2003) and the fact that diversity's beneficial effects are more likely to be realized when firms' business strategies and organizational cultures are compatible (Richard & Johnson, 1999).

2.2.2. Gender diversity in top management teams (TMT)

Some authors have examined the link between gender diversity in TMT in companies and the financial performance of a company (Christiansen et al., 2016; Dezsó & Ross, 2012; Shrader et al., 1997).

Shrader et al. (1997) performed an early exploratory study, in which they try to establish simply correlation of the predictive power of female top manages on the financial performance of a company. Dezsó and Ross (2012) complemented their research by testing and identifying that an innovative strategy acts as a moderating variable. Christiansen et al. (2016) examine gender diversity and its effect on financial performance for European countries and discover two channels through which gender diversity affects firm performance. Multiple authors have researched the question whether and how gender diversity affects firm performance and this resulted in answers that partly overlay each other.

Shrader et al. (1997) note that, based on their discriptive statistics, the variation of the total number of managers, throughout the years, is great. This is likely due to some companies downsizing. Their results contradict the hypothesized relationship between the percentage of female top managers and financial measurements. In fact, some coefficients or even negative. These authors give three viable explanations for their findings in regard to female top managers. Firstly, there are simply few female top managers – 4.5% of the sample consisted of female TMT members and no female chief executives were reported. Secondly, female top managers can exercise fewer impact because they recieve assignments that are less important. This is based on what was concluded in the research of Bilimoria and Piderit (1994), who found that female board members were disadvantaged by their board assignments. Females tend to get assigned with projects that have a lesser impact. Lastly, there are not enough female top managers to form a critical mass that has an impact on actual decision making of the company (Rosener, 1995).

Furthermore, Christiansen et al. (2016) point out that almost all studies, that research the diversity-performance link, have one thing in common and that is the fact that the data that is available is usually constrained to publicly listed firms in individual countries. This results in a small sample size and therefore makes it harder to detect a statistically significant relationship. Although the percentage of female managers in senior positions has grown, there is still a sizeable gap between the composition of the workforce and the composition of senior positions. Furthermore, the authors acknowledge that the vast amount of literature has not led to clear consequences of gender diversity. The only conclusion that is drawn regards the fact that based on a thorough and exhaustive literature review no evidence exists towards a consistent and robust relationship between gender diversity in senior positions and financial outcome (Rhode & Packel, 2014).

The results of Christiansen et al. (2016) depict a different relationship than those of Shrader et al. (1997). Christiansen et al. (2016) conclude that a higher representation of women in the TMT is associated with better financial performance. Although, the boost towards financial performance is small, it is highly significant. Contrarily, Shrader et al. (1997) did not find that higher percentages of women managers on the TMT were disproportionately associated with higher financial performance.

Christiansen et al., (2016) furthermore conclude that the assumption that female representation has a stronger effect in industries that employ relatively more females than other sectors seems to be true, since it is found that the effect is stronger when comparing high-intensity female secotrs with low-intensity female sectors. Also, firms operating in an industry with relatively few women in its workforce would not see a positive change in financial performance. In addition, knowledge intensive and high-technology sectors — which demand higher creativity and critical thinking which diversity in general brings — seem to benefit significantly more from a higher share of women in TMT's. The positive association between firm performance and the share of women in senior positions raises the question: should women hold all senior positions in the corporate world? This question is answered by the authors with the fact that it is found that the the peak optimal share of women in senior position is about 60 percent.

Dezsó and Ross (2012) explore the relationship of gender diversity and performance further than Christiansen et al., (2016) and Shrader et al., (1997). These authors ask the question in which context female top managers leads to better financial performance. Their theoretical model hypothesizes that the positive impact of female representation in top management is moderated by innovation intensity.

Based on their descriptive statistics, Dezsó & Ross (2012) report that a large number of companies does not employ female managers. These are the same results as Shrader et al., (1997). The results of Dezsó and Ross (2012) state that companies with a higher percentage of female managers enjoy superior performance, as it is significantly linked to Tobin's Q. Also, economic significance is established because of the magnitude of the coefficient. The hypothesized moderating effect of an innovative strategy is also supported by the empirical evidence. These authors conclude that the more a company's strategy is focused on innovation, the more female representation in top management improves company performance. This creates the following boundary condition for the effect of female representation to be materialized: in order to benefit from gender diversity a company's strategy must be focused on innovation.

In 1997, Shrader et al. (1997) report that even though women have made strides into managerial ranks, corporate senior positions still seem to be bastions of men. More than a decade later Dezsó and Ross (2012) conclude that TMT's still consist mostly of men, although a visible trend emerges that females slowly integrate in TMT's. As this may seem the case the authors point out that the percentage of companies with even one female in the TMT never surpasses one third in any given year. This is even more so the case for companies who employ two or more female members in the TMT; this percentage never reaches 10%. These findings lead to the conclusion that the percentage of female in senior corporate positions increases, but that this goes at a very slow rate.

2.2.3. Gender diversity in corporate boards

Matsa and Miller (2013) investigate the impact of Norway's 2006 gender quota and this makes it that their research diverges from the other research papers included in this literature review. Researching the effect of a gender quota is something else entirely than researching possible effects if gender diversity levels were to be increased.

Norway has the scoop for being the first country to endorse a mandatory gender quota for the board of directors. The law required for all public companies to increase the percentage of female directors to 40% in 2 years time. Matsa & Miller (2013) point out that, although the importance of this quota is evident, it remains unclear how this affects the appointment procedure of directors of the board. Possible effects that are quickly identified are the lowering of the competence in the pool of eliglibele candidates, increasing the number of members that are new to the board or incrasing the total number of board seats.

The gender quota caused the share of females on boards to more than double. This, on avergae, led to an increase of about one female board member. More presicely, from 1.1 women to 2.3 women. The quota reduced male membership by about the same amount (from 5.0 men to 4.1 men). Total board size increased slightly (from 6.1 to 6.3). So, although the quota raised the representation of females on the board of directors, the effect on the performance of companies remains unclear.

The difference-in-difference analysis results conclude that within Norway, comparing listed companies to unlisted companies the profit declined by 2.7%. This conclusion raises the concern that a publicly traded company has greater access to capital in distress or could expose their managers to different governance structures under similar market conditions. This problem is addressed by including companies from other Nordic companies. This results in a decline of profit of around 3.4 %.

The above summarizes what happened to companies affected by the Norwegian quota, but the research goal of the authors was to reveal how the quota affected corporate decision-making. So, these authors tried to identify whether revenues or costs were responsible for the change in profit. An increase in relative employment is found to be a main driver of increased costs. In addition, although not significant, revenues decrease with 0.9%. In comparison, labour costs significantly rose by 4.1%. Other costs decrease slightly, but none are significant. Upon further examination the authors reach the conclusion that, although some costs decrease, the increase in labour costs is not due to the company negotiating unfavourable with suppliers. It hints towards a change in board members' leadership style and preferences, as predicted by theory.

Further exploration reveals that the quota led to greater relative employment and that average wages per worker did not increase. It is arguably better to initiate layoffs during conjectures, as it is found that layoffs directly reduce salary costs and therefore increase short-term financial performance. A critical side note to this must be drawn, namely that employee layoffs can also cause an increase in costs later on by decreasing employee morale requiring the recruiting and training of new personnel when demand shifts (Katz, 1986; Parsons, 1972). In conclusion, a possible result in gender quotas for corporate board seats is that corporate strategy can be affected. Controlling for board director inexperience, inactivity and entrenchment it is concluded that board gender itself has influenced labour policies. This is supported by a body of growing literature in social psychology, economics and management who specify the differences in leadership styles between males and females.

In a similar study, Adams and Funk (2012) studied the gender differences in the board of directors and CEO's in Sweden. These authors conclude that females report significant other values than their male counterparts. Directors who are female care less about achievements and power and more about universalism and benevolence. Also, board members who are female are more independent-minded, valuing self-direction and stimulation more than men and value tradition and conformity less than men (Adams & Funk, 2012). In conclusion, this could explain why female directors engage less in employee layoffs and choose to retain their workforce, which causes financial performance to decrease.

Shrader et al. (1997) also researched the effect of gender diversity in corporate boards on the financial performance of companies. These authors admit that there is little known about women on boards, but acknowledge that corporate boards fulfil an important role for monitoring management and strategic direction. Their results however, yield no significant results and they must conclude the following: it was not found that higher percentages on the board of directors were disproportionately associated with higher financial performance (Shrader et al., 1997).

2.2.4. Gender diversity in middle management

Upper-echelons theory states that TMT members have a critical impact on the performance of a company, because they are allowed to make important organizational decisions (Finkelstein & Hambrick, 1997). Instead to focus on the diversity of the top management team, Dwyer et al. (2003) performed a broader level of analysis including all company employees that are managers or officials. This is agreed upon by Finkelstein and Hambrick (1997), who state that previous research regarding the diversity performance link was limited to the examination of top management teams. It is important not to neglect the role that middle managers fulfil when it comes to altering the strategic decisions process and the implementation (Burgelman, 1994; Floyd & Wooldridge, 1992; Kanter, 1982).

Furthermore, although senior managers are responsible for the strategy, middle managers have proven to contribute to the strategic process by identifying strategic problems and opportunities (Burgelman, 1994; Floyd & Wooldridge, 1992) and to offer important strategic alternatives (Burgelman, 1994; Velde, Jansen, & Vinkenburg, 1999). Complementing this, it is found that senior managers monitor the company internal and external environment, but that middle managers administer departments and that lower-level supervisors supervise subalterns (Kraut & Pedigo, 1986). In addition, certain studies document a positive relationship between the involvement of middle managers in the strategic management process and the financial performance of companies (Schilit, 1987; Wooldridge & Floyd, 1990). In conclusion, the strategic performance and therefore the performance of a company is dependent on not only the senior managers, but the entire pool of managers and officials (Floyd & Wooldridge, 1994, 1997).

Dwyer et al. (2003) first test the interaction between gender diversity in management and growth. Significance is found for the dependent variable productivity, but not for return on equity. The results give support for the hypothesis who states that a clan organizational culture type will have a higher performance through gender diversity, but this only holds true to the dependent variable productivity. As for the adhocracy organizational culture type, a negative association is found. This contradicts the hypothesized relationship. The last hypothesis researched whether gender diversity in management, adhocracy culture type and orientation towards growth will be associated with higher performance levels. The results give partial support, because significance is found for productivity but not for ROE. Tests for the hierarchy and market culture type were not executed, because these companies value a governance system, which is highly regulated and mechanized. An environment like that is likely to diminish the beneficial effects of gender diversity. The above leads to the conclusion that the benefits of gender diversity only materialize in certain organizational cultures.

Both Dezsó and Ross (2012) and Shrader et al., (1997) have also investigated the representation of females in middle management and the financial performance of a company.

The conclusion of both studies is almost the same. Dezsó and Ross (2012) conclude based on their results that companies with female representation in TMT's enjoy superior financial performance. Shrader et al. (1997) conclude, however, that the results denote mixed relations among measures of women in middle management positions and firm financial performance, as the results differ between choosen years. In conclusion and in general, all three studies report a significant and positive relationship between female middle managers and company performance.

The results of the different studies are categorized based on managerial difference (top, board of directors and middle) in the company and are displayed in Table 2.

Authors	Positive findings	Negative findings
Level: gender diversity in top management teams (TMT)		
(Christiansen et al., 2016; Dezsó & Ross, 2012; Shrader et al., 1997)	Christiansen et al. (2016) document that a higher representation of women in the TMT is associated with better financial performance. The results of Dezsó and Ross (2012) state that companies with a higher percentage of female managers enjoy superior performance, as it is significantly linked to Tobin's Q.	Shrader et al. (1997) did not find that higher percentages of women managers on the top management team were disproportionately associated with higher financial performance
Level: Gender diversity in corporate boards		
(Adams & Ferreira, 2009; Matsa & Miller, 2013; Shrader et al., 1997)	Matsa and Miller (2013) found that the gender quota on corporate boards decreased short term profit with 3.4%. They found that this was due to an increase of relative employment. However, this can later save the costs of acquiring and training new personnel when demands shift. Adams and Ferreira (2009) find that the gender composition of the board is positively related to measures of board effectiveness. Which in turn leads to a better financial performance.	Shrader et al. (1997) did not find that higher percentages of female board of directors' members were disproportionately associated with higher financial performance
Level: gender diversity in middle management		
(Dezsó & Ross, 2012; Dwyer et al., 2003; Shrader et al., 1997)	In their results, Dwyer et al. (2003) acknowledge the relationship between management group demography and organizational outcomes is complex. As hypothesized, a positive association was found between the gender diversity–growth orientation interaction and company performance. Dezsó and Ross (2012) conclude based on their results that companies with female representation in top management teams enjoy superior accounting performance. Shrader et al. (1997) conclude, however, that the results of analysing female representation in both top management positions and in corporate boards denote mixed relations. The results of women in middle management positions and firm financial performance yields strong evidence. This holds especially true for financial profitability measures (ROS, ROI, ROE and ROA). No negative findings are reported by the above mentioned studies.	

Table 1 - Management positions and empirical results

2.3. Hypotheses development

Based on the resource-based view of competitive advantage, the arguments unfold that gender diverse TMT's have higher levels of creativity, more innovation and display critical thinking. Gender diverse teams also process information more thorough, combine dissimilar views and are more willing to accept change. This materializes in an increase of problem-solving abilities. It's because of these advantages that a gender diverse top management team is better equipped to take advantage of opportunities and to counterbalance threats.

Based on the theory of social identity, it is argued that because of the fact that gender diverse top management teams belong to the same social group, this grants motivation in their activities. So, gender diversity in TMT's leads to an increase of the motivation of female employees in general.

According to upper echelons theory, female TMT members bring past experiences, personal values, personalities, unique knowledge, a different managerial style and cultural awareness. These advantages benefit the information seeking capability, information evaluation process and the managerial choices.

Based on the arguments of the resource-based view of competitive advantage, agency theory, social identity theory and upper echelons theory it is hypothesized that gender diverse management team increase the financial performance of a company. This leads to the following hypotheses:

Hypothesis 1: ''Higher gender diversity in top management teams leads to better financial performance''.

Studies that researched gender diversity concluded that gender diversity will only materialize in certain contexts. Dezsó and Ross (2012) state that female representation in top management only improves the performance of a company if that firm focuses its strategy on innovation. These authors base their arguments on the resource-based view of competetitive theory. This theory extents to the fact that gender diverse TMT's stimulate innovation. In general, higher levels of diversity are associated with more innovation Wiersema and Bantel (1992). In addition, female representation induces higher creativity and critical thinking (Lee & Farh, 2004), superiority in idea generation and innovation in general (Rosener, 1995) and benefits in complex, novel and unstructured tasks and innovative processes (Garnero et al., 2014; Jackson, 1992).

In a similar way, Dwyer et al. (2003) find that a gender diverse management group provides benefits to a growth-oriented firm in a culture that values innovation, flexibility, and interaction with the environment. Based on these studies, it seems plausible that it is likely that companies will benefit more from gender diversity if they are innovative or pursue an innovative strategy.

So, based on the extention of the resource-based view of competitive advantage the following boundary condition for the effect of gender diversity emerges: in order to benefit from gender diversity in TMT's, a company's strategy must be focused on innovation. This leads to the second hypothesis:

Hypothesis 2: "Companies operating in an innovative sector stand to benefit more from gender diversity in top management teams than companies operating in anon-innovative sector".

Based on the above the following theoretical model can be drawn (figure 1).

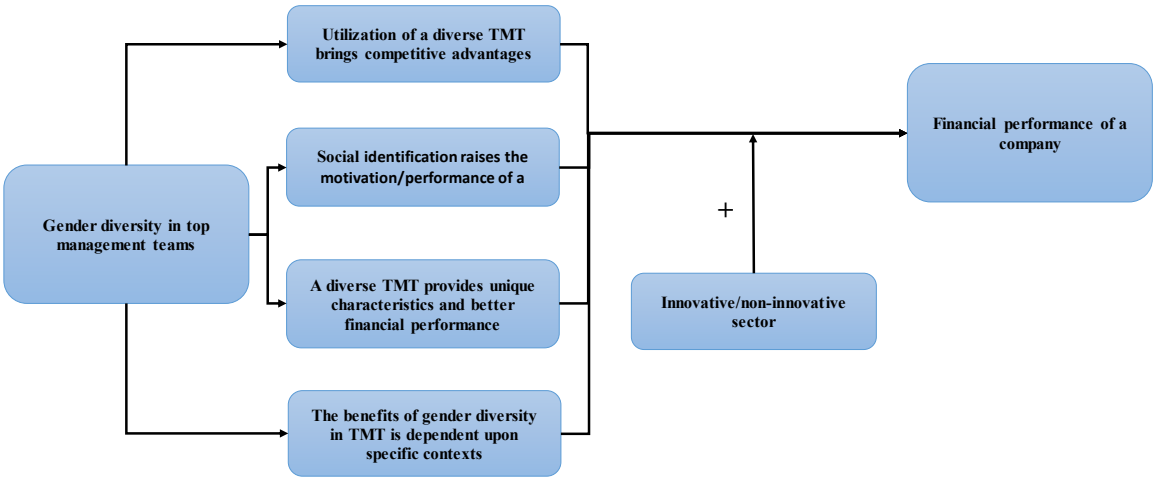

Figure 1 - Theoretical model

3. Methodology

The following chapter discusses and elaborates upon the methodology which is used in this master thesis in order to test the hypotheses and to answer the research question. This study aims to establish correlation between gender diversity in TMT and tries to see if this effect is more profound in innovative sectors. The preferred statistical technique is OLS regression and Pearson's correlation matrix. The statistical technique is more thoroughly elaborated in paragraph 3.2.4.

3.1. Research framework

This master thesis aims to test both hypotheses regarding the gender diversity-performance relationship and the beneficial effects being more profound in innovative sectors, whilst controlling for idiosyncratic factors that also affect the performance of a company. This is exhibited in Figure 2 – Research framework gender diversity in top management team(s). The first hypothesis hypothesizes that gender diversity in TMT's, measured as a proportion or as a dummy variable, positively influences the dependent variables – return on assets and Tobin's Q. The second hypothesis hypothesizes that companies operating in an innovative sector, determined by the classification of high-innovation sectors based on NACE compiled by Eurostat (2019), showcase an even more positive relationship between gender diversity in TMT and the financial performance of a company compared to companies operating in non-innovative sectors.

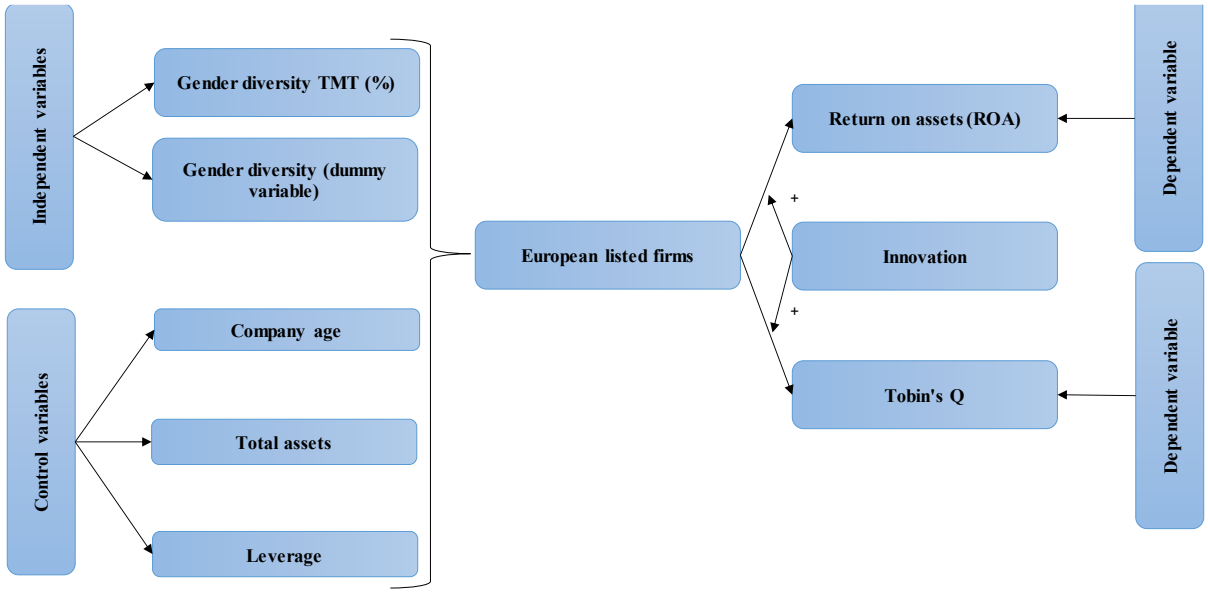

Figure 2 - Research framework gender diversity in top management team(s)

3.2. Methods used in primary studies

Multiple statistical techniques have been used by different authors. Ordinary least squares regression is utilized by Dezsó and Ross (2012) and Adams and Ferreira (2009). Besides, Dezsó and Ross (2012) explicitly mention the utilizatoin of 15 years of panel data. This longitudinal data allows for intersting panel data regression analysis. Furthermore, hierarchical regression analysis is utilized by Dwyer et al., (2003 and Shrader et al. (1997). Lastly, difference-in-difference regression analysis is utilized by Christiansen et al. (2016) and Matsa and Miller (2013).

3.2.1. Difference-in-difference regression

Difference-in-difference is a statistical technique that basically tends to mimic an experimental research design (Abadie, 2005). This is achieved by studying the effect of a independent variable that affects the 'variable' group but not the 'control' group. Any effect of the independent variable is identified by a difference in the mean of both groups. The test calculates the explanatory power and the effect of a variable by comparing the average change between the control group and the variable group. The difference-in-difference regression analysis can be used in the case of gender diversity to compare firms that are gender diverse with firms that are less gender diverse. For instance, the analysis approach of Matsa & Miller (2013) depends on difference-in-difference comparisons with matched samples of private firms in Norway and public and private companies in other Nordic countries. More specifcally, for each publicly listed Norwegian company, the five closest companies in terms of industry, assets, employees and operating profits are identified.

$$y_{inc} = \delta * SEC_n * sh\_wmn_{inc} + \beta * sh\_wmn_{inc} + \gamma * x_{inc} + \alpha_{nc} + \varepsilon_{inc}$$

Model 1 - Difference-in-difference regression equation

Model 1, depicted above, showcases the equation used by Christiansen et al. (2016). In this equation, Y_{inc} is the dependent variable and denotes the ROA of company *i*, in industry *n*, operarting in country *c*. SEC_n is either the female intensity of the sector the company operates in or classification for high-technology or knowlegde-intensive sector. The independent variable, sh_wmn_{inc}, is the share of females in senior management positions in the company. x_{inc} are firm-specific control variables, in this specific case being firm size, firm age, size of the top management team and total assets. α_{nc} denotes the country-industry fixed effects, which control for all time-invariant differences of firm performance across industry-country pairs. ε_{inc} is the standard error. The coefficient of interest in this specification is δ, which captures the extent to which the independent variable influences the dependent variable.

The first part of the equation, $\delta * SEC_n * sh\_wmn_{inc}$, represents the interaction between the independent variable and either a varaible for female intensity, high-technology or knowlegde intensive. The part which contains $\beta * sh\_wmn_{inc}$, depicts the interaction of the 'control' group. These features typically define an difference-in-difference regression equation.

This statistical technique relies on strict exchangeability assumptions, which means that there are no differences between the control group and the treatment group except for the treatment. This makes difference-in-difference an useful technique to use when randomization on the individual level is not possible (Abadie, 2005). Besides this assumption, more assumption also need to hold:

- The first one being positivity. For every possible value for the independent variable, a positive probability is required;
- The second assumption centers around the stable unit treatment value assumption. According to Cox (1958), stable unit treatment value assumption is the requirement that the potential outcome of a observation on one unit should be unaffected by the particlur assignment of treatments to other units;
- In addition, the allocation of intervention was not determined by outcome is also a required assumption;
- Also, it is required that control/treatment groups have parallel trends in outcome and composition;
- Finally, the comparison groups are stable for repeated cross-sectional design and it is required that there are no spillover effects. A repeated cross-sectional design is yearly surveys with different interviewees at different time points. The groups of interviewees have to be similar to each other. A spillover effect is an seemingly unrelated event in one country that influences, against the expectation, another country.

Of all the assumptions the parallel trend assumption is the most important one for the internal validity and also the hardest to fulfil. This essentially means that in the absence of treatment there is no difference between the control and treatment group. This assumption can only be acquired via visual inspections, since there is no statistical test for this assumption. The violation of this assumption leads to biased estimations of the causal effect.

Certain strengths and limatations are coherent to this method, these will be explained briefly (Bertrand, Duflo, & Mullainathan, 2004). Its greatest strength lies in the fact that it can be used for intuitive interpretation. This means that based on common sense, relationships can be thought of and tested via a difference-in-difference regression. Also, this statistical test can obtain causal effect using observational variables if it is the case that all the assumptions are met. Causal effect is the process in which a independent variables contributes or affects a dependent varaible. This causal effect can be appointed to either group or individual data.

Lastly, the statistical test accounts also for change caused by other factors than the treatment or intervention. The biggest downside of the statistical test is that it requires baseline data, also known as data collection at the beginning of a study. Besides this, difference-in-difference regression also requires a control group. In addition, the conclusions of the difference-in-difference regression test cannot be used if the comparisons groups have a different outcome trend. In conclusion, this means that one should be careful interpreting the results when the composition of the control group(s) before and after are different.

3.2.2. Hierarchical regression

Hierarchical linear regression is basically running an ordinary least square (OLS) regression, but it takes the hierarchical structure of the data into account. Data clustered together in groups or units are called hierarchically structured data. An example of this are classrooms within schools.

Performing a hierarchical regression yields as a result to which degree the variables of interest explain a statistically significant amount of variance in the choosen dependent variable. This process accounts for all other variables. It is viewed upon as a framework that can be used

for model comparison rather than a statistical method (Robert & Rubinfield, 1998). The process starts with one regression model and then goes further by continuously adding variables to a previous model every step along the way. In this process later models must always include the smaller models fabricated in previous steps. The baseline of interest is determining whether newly added variables show a significant improvement in the proportion of explained variance of the dependent variable by the new model. The procedure comes down to having different models and the first model includes demographic variabels such as age, nationality, education, gender, ethnicity and education. The following models include variables that are known to be important for the line of research. An interesting result would be to conclude that the last model explains the dependent variable better than the first or second model. If this conclusion is statistically significant, presumably the added variables in the later model explains the dependent variable(s) above and beyond the variables used in previous models.

One disadvantage of hierarchical regressions is the fact that the researcher needs to run multiple regressions compared to just one with other regressions. Also, hierarchical regressions can only be used to study simple relationships with a limited number of variables. Analysing complex relationships with hierarchical regression is not that easy.

There are quite a number of different ways to perform hierarchical regression and this solely depends on the research question(s) that are being asked. For example, the possibility exist to add mutliple variables at each step. Also, in this statistical procedure it is possible to only have two models but also having more than three are viable strategies. It essentially depends on the type and the number of research questions. Finally, running regressions on multiple dependent variables and comparing the results for each dependent variable is common.

3.2.3. Panel data regression

Panel data regressions utilize data that are longitudinal in nature. This data is multidimensional and is gathered in different periods over time (Davies & Lahiri, 1995). This so-called panel data contains observations of (multiple) variables usually over multiple time periods for the same group, firm or individual. In this statistical procedure cross-sectional units, for example country, industry or firm are surveyed over time. This means that the data is pooled on both space and time. There are multiple reasons why to use panel data regressions, the most important ones will be mentioned.

Firstly, panel data regression can take explicit account of individual-specific heterogeneity. This means that the groups being studied do not necesarilly have to be homogenous in composition. Secondly, panel data regression, by combining data in the two aforementioned dimensions, results in more data variation, less collinearity and more degrees of freedom. Data variation is in essence the distribution of the data, for example the range (difference) between the greatest and lowest data values. Thirdly, panel data regressions are greatly suited for studying data that captures dynamics of change. These dynamics of change mostly refers to transition behaviours – for example company bankruptcy, takeovers or mergers. Fourthly, panel data regression is better in detecting and measuring effects which cannot be observed in both cross-section or time-series data. Fifthly, panel data regression is better suited to study more complex behavioural models – for example government prohibition, technological changes or economic cycles. Lastly, panel data regression can minimize the effects of aggregation bias, by aggregating firms into broad groups.

3.2.4. Ordinary least squares regression

Ordinary Least Squares (OLS) regression is an inferential and statistical technique that estimates the relationship between one (or more) independent variables and a dependent variable. More specifically, what this regression does is estimating the relationship by

minimizing the sum of the squares in the difference between the observed and predicted values of the dependent variable configured as a straight line (Tofallis, 2009). OLS regressions are usually utilized in bivariate models. This means that the analysis involves two variables (one dependent and one independent).

However, OLS can also be used in multivariate models by involving more than two independent variables. The intercept in OLS indicates where the straight line intersects the Y-axis, that is the vertical axis. The slope indicates to which extent the straight-line increases at an angel. The error and the error term indicate that the relation between the variables predicted in the model is not perfect. The need for this error term exists because the independent variable does not perfectly predict the dependent variable. Overall, the usage of an error term is totally normal in the social sciences. In OLS Greek letters (α and β) denote parameters (intercept and slope values) representing the relationship between the independent and dependent variable in the larger population. On the contrary, lowercase letters (a & b) denote parameters in the sample. In order to fully utilize the potential of the OLS regression (referred to as the most common used regression) the assumptions need to be met – otherwise the results of the regression may not be trustworthy. Also, when these assumptions are met, the best possible estimates for the parameters of the population can be given. In total, there are seven assumptions. Most assumption regard the properties of the error term, which is never fully known. However, residuals are widely available and can be used instead. Residuals are basically the sample estimate of the error for each observation.

In order to utilize OLS regression, six assumptions are required to be satisfied, with the option of a seventh one (del Pino, 1989). The following assumptions need to be met:

- The first assumption is that the regression model is linear in the coefficients and the error term. This ensures the functionality of the model;
- The second assumption regards the fact that the error term must have a population mean of zero. If the model is unbiased, the average value of the error term must equal to zero. The error term itself explains the variation in the dependent variable that is not explained by the independent variables;
- The third assumption is that all independent variables are uncorrelated with the error term. When an independent variable is correlated with the error term, it can be used to predict the error term itself. This causes the failure of the error term in representing unpredictable random error. There are three possible phenomenon that can occur that violate this assumption. It can be caused by simultaneity between the independent and dependent variables, omitted variable bias and measurement error in the independent variables. Simultaneity occurs when the dependent variable influences the dependent variable, but the independent variables also influences the dependent variable. This is also referred to as endogeneity. Omitted variable bias is very problematic, because this means one or more relevant variables were left out of the statistical model. The effect of these missing variables is attributed to the included variables. The occurrence of measurement is mostly due to faulty measurement instruments, but can be very precarious if not (timely) detected;
- The fourth assumption requires that every observation of the error term is uncorrelated with each other. This means that the previous observation does not influence the next observation in any possible way;
- The fifth assumption demands that the error term has to have a constant variance. This variance bears the name of homoscedasticity. This means that the variance is not altered by each observation or for a range of observations;
- The sixth assumption regards the fact that no independent variable is a perfect linear function of other explanatory variables. When this would be the case it means that if

one variable changes, the other variable changes in completely fixed proportion. This means that the variables move in complete unison and it would suggest that the variables are some form of the same variable;

- The seventh assumption is optional and it suggests that the error term should be normally distributed. This is, however, not a requirement, but satisfying this assumption equals statistical hypothesis testing and the generation of confidence intervals prediction intervals.

3.3. Model

Choosing a statistical test is dependent upon a great number of factors, but the foremost one is the data that is available. This master thesis utilizes ordinary least squares regressions, because other statistical tests are not possible due to data limitations. These data limitations arouse mainly from the fact that Orbis does not provide information of the composition of the top management team throughout the years (Christiansen et al., 2016). This effectively means that analyses that include multiple years cannot be performed, such as difference-in-difference regression and panel data regression.

The first and second hypotheses will be tested with OLS regressions. The second hypothesis employs an interaction term between an innovative variable and gender diversity in TMT. This leads to the following equations:

$$Financial\ performance_{it} = \beta_0 + \beta_1\, GD\_TMT_{it} + \beta_4\, (control\ variables) + \mu_{it} + \varepsilon_{it}$$

$$Financial\ performance_{it} = \beta_0 + \beta_1\, GD\_TMT_{it} + \beta_2\, Innovative + \beta_3\, Innovative * GD\_TMT + \beta_4\, (control\ variables) + \mu_{it} + \varepsilon_{it}$$

Where,

Financial performance = the financial performance for company *i* and *t* is the year 2018.
β_0 = the constant term.
β_1 GD_TMT = proxy for gender diversity in TMT's for company *i* and *t* is the year 2018.
β_2 = Innovative variable.
β_3 = Innovative * GD_TMT.
B_4 (control variables) = the control variables that are deemed to affect the financial performance of the company.
μ_{it} = country fixed effect, for company *i* and *t* is the year 2018.
ε_{it} = the total amount of change that cannot be explained by the variables above mentioned (error term), for company *i* and *t* is the year 2018.

A complete overview of all variables is displayed in Table 3 – Variable definition and references.

3.4. Variables

Different research questions brings forth different variables of interest. Most studies therefore utilize different variables of interest, however a few studies use common ones. The most commonly dependent variable in studies used for investigating the effect of gender diversity in TMT's on financial performance are return on assets (ROA) and Tobin's Q. The same goes for the independent variable, gender diversity TMT, as this is most often operationalized as a percentage by dividing the number of female members of TMT with the total number of members of the TMT. As for the control variables, most, but not all, control variables are the same between different studies. Subsequently, all independent, dependent and control variables will be thoroughly explained and at the end a clarificatition for the use of the variables in this master thesis will be given.

3.4.1. Dependent variables

Tobin's Q is most often observed as a proxy for financial performance as Adams and Ferreira (2009), Dezsó and Ross (2012) and Carter et al. (2010) all utilize Tobin's Q as the dependent variable of their choice. Second to that is the dependent variable ROA, as Christiansen et al. (2016 and Shrader et al. (1997) utilized this as their performance measurement.

Tobin's Q represents a value based on the the market value of a companies assets to their replacement value (Tobin, 1969). It is reasoned that better performing companies create more economic value of their assets. Also, Tobin's Q is a forwardlooking measure which includes the expected future cash flows, which capatilize in the market value of the assets of a company. In contrast, three things can be said about accounting rates. Firstly, accounting rates are backward looking and because of biases in their calculation may differ from true economic rates of return (Benston, 1985). Secondly, accounting numbes may be disfugered by differences in taxes, accounting techniques and risk (Wernerfelt & Montgomery, 1988). Thirdly, earnings management distorts the accounting numbers as well (Healy & Wahlen, 1999). Benefits of Tobin's Q are the fact that is uses the correct risk-adjusted discount rate, imputes equilibirium returns and minimizes distortions from tax laws and accounting conventions (Wernerfelt & Montgomery, 1988). The estimation for the market value, needed to calculate Tobin's Q, is a company's assets plus market value of the company's common equity minus the book value of common equity and deferred taxes and the replament costs are estimated to be the book value of the company.

Following the corporate finance literature, Christiansen et al., (2016) preferred indicator of firm financial performance is Return On Assets (ROA). These authors measured ROA in three different ways: net income over total assets; profits before taxes over total assets; and earnings before interest and taxes (EBIT) over total assets. However, Shrader et al. (1997) choose ROS (Return On Sales), ROA (Return On Assets), ROI (Return On Investment) and ROE (Return On Equity) as dependent finanial performance measurements. ROA is calculated by dividing net income with total assets. The reason for this was that these are most commonly used indicators of a companies financial performance. Return on sales was choosen because it is an indicator of the firm's comptetitive advantage and resource/competitive flexibility (Hill & Jones, 1995).

Dwyer et al. (2003) utilize two performance measures. The first one is employee productivity, an important performance measurement in the service sector (Mehra, 1996). Productivity is calculated as the logarithmic transformation of net income per employee (Richard, 2000). The second one is ROA, as this represents the central measure of the financial strength of a company (Earle & Mendelson, 1991). Matsa and Miller (2013) utilize the ratio of operating profits to assets as a measure of short-term financial performance of a company. To avoid distortions from extreme outliers, many authors excluded the top and bottom five percent

of values of their firm performance variables. This and data clearing are commonly used in economic studies (Matsa & Miller, 2013).

In line with previous literature, the dependent variables of choice are Tobin's Q and ROA. Return on assets is calculated by dividing EBIT (earnings before interest and taxation) with the book value of total assets. The reason for choosing two dependent variables is twofold. Firstly, Tobin's Q is a market-based measurement of financial performance and return on assets is an internal and operational financial measurement. Secondly, scholars find contradictory results when measuring the financial performance of a company with Tobin's Q and return on assets. To have a complete and comprehensive analysis it is best to include both Tobin's Q and return on assets as dependent variables (Edmans, 2011).

3.4.2. Independent variables

Both percentages (Christiansen et al., 2016; Dezsó & Ross, 2012; Dwyer et al., 2003) and dummy variables (Dezsó & Ross, 2012) are utilized by the different research papers as independent variables for gender diversity. Christiansen et al. (2016) measure female representation as the share of the total members of the senior management and company board of directors who are female. Because gender diversity in TMT is found to be so low in the sample of Dezsó and Ross (2012), these authors accordingly operationalize gender diversity in TMT's via a dummy variable. Shrader et al. (1997) operationalize female representation with percentages for the TMT, corporate board and the middle management level. Similarly, Dwyer et al. (2003) calculate female represenation as a percentage of the females who are officials and managers. Finally, Adams and Ferreira (2009) also utilize a percentage for female representation.

3.4.3. Control variables

It is likely that gender diversity in top management team positions will influence the financial performance of a company. However, this effect may also be the cause of variables that are not the independent variables.

The literature mentions multiple control variables, but most emphasis is put on controlling for effect of the size of the top management team. This is done by studies that focus on the effect of gender diversity in top management teams by controlling for the size of top managent teams (Christiansen et al., 2016; Dezsó & Ross, 2012; Dwyer et al., 2003; Shrader et al., 1997). Similar actions are visible in studies that focus on board member gender effects by controlling for board size (Adams & Ferreira, 2009; Matsa & Miller, 2013; Shrader et al., 1997). Dwyer et al. (2003) explains the importance of the use of top management team size as a control variable, since previous research found that group size influences group dynamics and performance (Finkelstein & Hambrick, 1997; Pelled, Eisenhardt, & Xin, 1999).

Furthermore, company age and size are widely used as control variables, as this has to potential to influence the financial performance of a company (Christiansen et al., 2016; Dezsó & Ross, 2012; Dwyer et al., 2003). Company size is operationalized as the number of employees (Osterman, 1995). The reason for this is because of the fact that it is found that firm size has a direct effect on financial performance based on economies of scales and market power (Shepherd, 1975).

In a comparative manner, Christiansen et al. (2016) point out that the book value of the total assets also needs to be controlled for. Dezsó and Ross (2012) include unique control variables of which two are specifically included for their research but one holds promise to be highly relevant. Leverage seems relevant to include as a control variable, because it influences the financial performance directly by its interest payments and investments possibilities. The other control variables are innovation and marketing intensity and are both included in their study because these authors hypothesize that the benefits of gender diverisity materialize more

in highly innovated companies. Board-level control variables are included by Adams and Ferreira (2009) to prevent these to distort the effect of gender diversity on corporate governance practices.

The variable for controlling for company size is book value of total assets. The reason for this is that later analysis reveals that this variable has the highest correlation with other variables. Although previous literature advocates the inclusion of the control variable size TMT, high correlation between this variable and the independent variables, gender diversity TMT, suggests problematic analyses later on and is therefore not included. Other control variables regarded as common in the literature are company age and leverage. The log function of total assets is utilized in order te reduce skewness (Dezsó & Ross, 2012).

Finally, country and industry effects needs to be controlled for. Country fixed effect is controlled for my introducing a dummy variable that turn 1 (0) if the company (does not) operate in the four biggest countries of the sample of this master thesis. These countries are the United Kingdom, France, Sweden and Germany. Besides this, industries are also controlled. This is done by a dummy variable that takes the value 1 (0) if the company (does not) operate(s) in the manufacturing, information & communication or retail trade industry. Controlling for country and industry effects is common practice in other research papers (Adams & Ferreira, 2009; Christiansen et al., 2016; Dezsó & Ross, 2012).

Table 3 – Variable definition and references summarizes all variables (dependent, independent and control) and gives an explanation about each variable including references.

Variable	Definition	References
Dependent variables		
Tobin's Q (TQ)	The market value divided by the replacement costs. The market value is the book value of the assets of a company plus the market value of the company's common equity minus the book value of common equity and deferred taxes. The replacement costs are estimated to be the book value of the company	(Adams & Ferreira, 2009; Bertrand and Schoar, 2003; Carter et al., 2010; Dezsó & Ross, 2012)
Return on Assets (ROA)	Earnings before interest and taxation divided by the book value of total assets	(Adams & Ferreira, 2009; Christiansen et al., 2016; Carter et al., 2010; Dezsó & Ross, 2012 Dwyer et al., 2003; Shrader et al., 1997)
Profit margin (PM)	Net profit divided by sales	(Rhode & Packel, 2014)
Return on Equity (ROE)	Earnings before interest and taxation divided by the book value of equity	(Dezsó & Ross, 2012; Shrader et al., 1997)
Independent variables		
Gender diversity TMT (GD_TMT)	Total number of female members of the top management team divided by the total number of members of the top management team	(Christiansen et al., 2016; Dezsó & Ross, 2012; Dwyer et al., 2003; Matsa & Miller, 2013; Shrader et al., 1997)
Dummy variable gender diversity TMT (DGD_TMT)	Value 1 (0) if any (none) of the top management team members are female	(Dezsó & Ross, 2012)
Innovative (INNO)	Dummy variable that consists of innovative companies versus non-innovative companies based on Appendix 4 – Innovation-intense aggregation based on NACE	(Dezsó & Ross, 2012)
Control variables		
Company age (C_AGE)	Number of years since incorporation	(Christiansen et al., 2016); (Dezsó & Ross, 2012)
Book value of total asset (TA)	Book value of total assets	(Christiansen et al., 2016)
Leverage (LEV)	Ratio of current liabilities divided by the book value of total assets	(Dezsó & Ross, 2012)

Table 3 – Variable definition and references.

4. Data and sample

4.1. Data collection, source and search strategy

In order to sufficiently test the two hypotheses, financial data specified on the firm level needs to be collected. The data needed for this study will be collected from Orbis, which is a database compiled by Bureau van Dijk. The database acquires firm-level data for many countries worldwide from local Chambers of Commerce, who have collected this administrative data. The Orbis database allows to extract financial accounting data based on balance sheets, income statements and profit and loss accounts. Christiansen et al. (2016) and Matsa & Miller (2013) assembled their samples primarily from the Orbis database.

The Orbis database distinguishes itself by its broad coverage of the corporate sector. It is estimated that 99% of the companies in Orbis database are private. Comparing this to Worldscope or Dealscan, who mostly report on large listed firms (Gopinath, Kalemli-Ozcan, & Villeges-Sanchez, 2015), this is an important distinguishment. Also, Orbis empowers researchers to access information that can be specified as non-financial. The Orbis database will be utilized to collect the data necessary to test the gender diversity-performance relationship. The year of interest will be the year of 2018.

The companies of interest in this master thesis are from 15 European countries, these countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom. The exact distribution of countries in the final sample can be found in Table 7 – Countries. The search strategy yields a raw sample of 4,244 companies.

In this sample, besides choosing for European countries, only listed firms and consolidated annual reports are included. The reason for the choice of including only listed firms is twofold. Firstly, the question of this master thesis is how female members of the TMT influence financial performance and not how entrepreneurs of different genders behave as is most often the case with companies who are not listed. Secondly, it is of the uttermost importancy that the data compiled by Orbis can be checked with factual data presented in annual reports in order to see if the data from Orbis is reliable.

4.2. The Top Management Team (TMT)

As stated before, the exact definition of the TMT varies grealy, but a clear distinction is that members should be involved with strategic decision-making (Carpenter et al., 2004). The TMT is defined as "the relatively small group of most influential executives at the apex of an organization—usually the CEO (or general manager) and those who report directly to him or her" (Finkelstein, Hambrick, & Cannella, 2009, p. 10).

It is possible to acquire information on the specific gender of managers from different deparments, senior management or the board of directors from Orbis. Orbis does not, however, provide the gender of members of the top management team as operationalized in this master thesis. The search strategy that is utilized in this master thesis includes C-suite members (CEO's and CFO's etc.) and the chairmen. C-suite members are most likely part of the senior management or can be head of the departments like Finance & Accounting, Sales & Retail, Human Resources, Marketing & Advertsing and Research & Development.

In order to comply to definition of TMT as operationalized in this master thesis chairmen are removed manually from the sample. There were certain cases that the CEO or CFO also held the position of chairmen, these persons were presented twice. In these cases the chairmen was excluded and the C-suite member included.

In order to check the data from Orbis, the job title of every member of the TMT is also acquired. This in order to fact-check the data with official annual reports.

The following job titles are common in the sample: president (vice/senior/executive), Chief Executive Officer (CEO), Chief Financial Officer (CFO), Chief Operating Officer (COO), Chief Marketing Officer (CMO), Chief Information Officer (CIO), Chief Human Resource Officer (CHRO), divisional CEO's, general manager and department head. Table 4 – Descriptive statistics learns us that the maximum value for the TMT is 15. This figure is the size of the TMT of Alstom S.A., a France multinational company active in the transportation sector. An exact overview of the members, including name, gender and picture, of the TMT of Alstom is given in Appendix 3 – Overview TMT.

4.3. Excluded records and outliers

Upon analyzing the 4,244 companies, certain industries were removed who prove to be difficult to analyze in comparison with other industries. The largest sector removed is that of the financial and insurance activities as this is common in economic studies (Marinova, Plantenga, & Remery, 2019). The total number of different sector removed from the sample is 10.

Furthermore, Christiansen et al. (2016) point out that focussing on companies that report having two or more members in the TMT is advisable. The first argument for this sample selection is that research objective is the role of gender diversity in TMT and not to investigate the difference between male and female entrepreneurs. Besides and in accordance with economic theory, Christiansen et al. (2016) argue that gender diversity in TMT's may benefit corporate companies, which do not extend to single-manager firms.

The procedures mentioned above bring the sample to 2,256 companies. Of this number, 1,753 companies report their data for the year 2018. This is followed by 2017 with 503 companies. In conclusion, the sample before the process of excluding outliers consists of 1,753 companies.

First and foremost, the dependent variables are checked on outliers. This is done and in accordance with prior studies by excluding records that report values of dependent variables above and below a 5% threshold level (Christiansen et al., 2016; Matsa & Miller, 2013). This means that the upper and lower 5 % of Tobin's Q, ROA, profit margin and ROE are excluded. This procedure results in a final sample of 1,616 companies.

Finally, of these records fifteen randomly drawn companies are selected in order to check whether the financial figures and the variable gender diversity in TMT's is in accordance with the annual report. All of the checked records prove to be accurate and reliable.

4.4. Descriptive statistics

This subsection presents the descriptive statistics of the data that is collected, in order to give a general overview of this data. Table 4 – Descriptive statistics gives the number of observations, minimum, maximum, mean, first quartile, median, third quartile and standard deviation for the dependent, independent and control variables utilized in this study. An elaboration of these variables can be found in Table 3 – Variable definition and references.

Tobin's Q and ROA are the dependent variables investigated in this research as a proxy for the financial performance of a company. In addition, the variables profit margin and ROE are also discussed, since these variables are included in order to perform robustness checks later on.

The first financial performance measure, Tobin's Q, denotes a mean value of 1.086 with a standard deviation of 0.460. This value lies very close to the reported mean of 1.039 from the study of Dezsó and Ross (2012). The value reported by Adams and Ferreira (2009) is a bit higher, namely 2.09. However, the reported mean value is quite different than what is reported by Marinova et al. (2016), namely 2.139. This is quite possibly due to their data stemming from

the year of 2007. A value higher than 1.0 for Tobin's Q indicates that, on average, the market value of a company is worth more than the book value of the assets.

The second financial performance measure, return on assets (ROA), has an average value of 4.5%. This is lower compared to Adams and Ferreira (2009), who report a value of 9.5% and lower than the 3.19 reported by Dezsó and Ross (2012). However, it is very close to the value reported by (Shrader et al. (1997). These authors report an average value of 4.5.

The two rubustness test variables, profit margin and ROE are being discussed next. Profit margin displays an average of 1.57% with a standard deviation of 13.54%. As for ROE, the mean value reported is 4.32% with a standard deviation of 33.918, this indicates that the data of ROE is more dispersed than the data of profit margin. The mean value for ROE is lower compared with Dezsó and Ross (2012). The mean displayed in their research is 10.6% with a standard deviation of 33.1%, so the distribition is quite similar to.

The two dependent variables, GD_TMT and DGD_TMT get discussed next. The average percentage of female members in the TMT is 13.04% and this is lower than the mean values reported by Christiansen et al. (2016) and Dezsó and Ross (2012). These authors, respectively report values of 24.11% and 23.6% of female representation. The difference in the reported values for this variable lies in the operationalization and data collection method. The data from Dezsó and Ross (2012) is gathered via ExecuComp and the authors assume that the managers who are reported represent the TMT, the database utilized in this master thesis is Orbis. In their study, Christiansen et al. (2016) calculate gender diversity by including the senior management and the company board. In contrast, the female representation in TMT is found to be a lot lower in the study of Shrader et al. (1997), namely 4.59%. This is mainly caused by the fact that their data is from the year 1992, when females had not made significant advantages into top management positions.

The dummy variable, DGD_TMT, reveals that close to half of the sample have one or more female member(s) in the TMT. The company with the highest percentage of female representation (83.3%) has five female members and one male member. This company, Marimekko, is a Finnish design company. There are 873 companies that do not report a female member in the top management team, this is 53.8% of the sample. Finally, the innovative variable expresses that little than less of the sample is considered to be innovative.

Company age, total assets and leverage are the control variables utilized in this master thesis. Of these control variables, total assets is the proxy for company size. The reported mean for company age, namely 51.7, is in line with previous research, although this figure is higher than the reported 24.3 reported by Dezsó and Ross (2012). The two oldest companies in the sample are Compagnie De Saint Gobain and Koninklijke Brill N.V., with ages of respectively 354 and 336. Saint Gobain is a multinational company that mainly produces glass and Koninklijke Brill is an international academic publisher.

The mean of the total assets is 5,173 million. This figure is high compared to the value of 12.148 million reported by Marinova et al. (2016) and the average value of 11.7 million reported by (Dwyer et al., 2003). The company with the highest figure of total assets is Royal Dutch Shell, they report 399,195 for total assets.

As for the control variable of leverage, there are companies that are virtually debt-free, but the company with the highest leverage has around 86% of leverage. The reported mean for leverage, 32.8%, is higher but comparable to previous studies. Dezsó and Ross (2012) and Matsa and Miller (2013) report values of 23.2% and 21.2%, respectively.

Descriptive statistics – Full sample

	N	Minimum	Maximum	Mean	Q1	Median	Q3	Std. Deviation
Dependent variables – Financial performance measures								
Tobin's Q	1,616	0.089	7.103	1.086	0.9	1.1	1.3	0.46
ROA %	1,616	-49.886	36.41	4.522	2.95	3.11	5.691	5.47
Profit margin %	1,616	-79.703	74.635	5.517	1.57	5.326	10.613	13.388
ROE %	1,616	-228.629	269.313	5.785	2.013	3.81	13.694	25.156
Independent variables – Gender diversity in TMT								
GD_TMT %	1,616	0	83.333	13.041	0	0	25	17.471
DGD_TMT	1,616	0	1	0.46	0	0	1	0.499
Innovative	1,616	0	1	0.472	0	0	1	0.499
Control variables								
Total assets (millions €)	1,616	12.071	458,156	5,173.808	91.73	377.139	2,218.434	22,639.332
Leverage %	1,616	1.179	85.691	32.798	21.2	30.7	42.2	16.029
Company age	1,616	5	354	51.66	20	33	70	45.467
Industry	1,616	0	1	0.841	1	1	1	0.369

Table 4 - Descriptive statistics

The dispersion of industries can be found in Table 5 – Industries, which is based on the broad structure of NACE, which can be found in Appendix 2 – Broad structure of NACE (Eurostat, 2019). This table indicates that the largest industry is manufacturing 10-33 (55%), followed by information and communication 58-63 (18.2%) and retail trade 45-47 (10.8%). These industries together form 84% of the sample. The aforementioned industries will also be utilized to form the industry fixed effects used in the OLS regressions later on.

	NACE code	Frequency	Percent
Manufacturing	10-33	888	0.550
Construction	41-43	78	0.048
Wholesale and retail trade; repair of motor vehicles and motorcycles	45-47	174	0.108
Transportation and storage	49-53	69	0.043
Accommodation and food service activities	55-56	42	0.026
Information and communication	58-63	295	0.182
Administrative and support service activities	77-82	70	0.043
Total		1,616	100,0

Table 5 - Industries

Based on Appendix 4 - Innovation-intense aggregation based on NACE, the distinction between innovative and non-innovative sectors is defined. It is hypothesized that comparing the results of OLS regressions between innovative and non-innovative sectors leads to a stronger outcome for innovative sectors. 47.2% of the companies in the sample is active in an innovative sector versus 52.8% operating in non-innovative ones. The dispersion can be found in Table 6 - Innovative and non-innovative companies.

The descriptive statistics of both the sub samples can be found in Appendix 5 – Descriptive statistics sub samples. The layout is the same as Table 4 – Descriptive statistics.

	Frequency	Percent
Non-innovative	853	0.528
Innovative	763	0.472
Total	1,616	100,0

Table 6 - Innovative and non-innovative sectors

Table 7 – Countries showcases that the dominant country in the sample is the United Kingdom (23.6%), followed by France (16.8%), Sweden (10.5%) and Germany (10.2%). The low representation of Germany is unexpected, because Germany has the highest GDP in the European Union (International Monetary Fund, 2018). The representation of United Kingdom and France is as expected, since these two countries are the second and third countries with the highest GDP. The representation of Sweden is also unexpected, because its representation is almost the same as Germany although Germany has an eight times larger economy. Finally, since 61.2% of the sample are coming from four countries, this means that 38.8% comes from the eleven other countries. The countries of the United Kingdom, France, Sweden and Germany are utilized in order to create the country fixed effect which is used in Chapter 5 in the OLS regressions.

	Frequency	Percent
Austria (AT)	24	0.015
Belgium (BE)	55	0.034
Germany (DE)	165	0.102
Denmark (DK)	50	0.031
Spain (ES)	69	0.043
Finland (FI)	93	0.057
France (FR)	271	0.168
United Kingdom (GB)	383	0.236
Greece (GR)	72	0.045
Ireland (IE)	29	0.018
Italy (IT)	119	0.074
Luxembourg (LU)	29	0.018
Netherlands (NL)	65	0.040
Portugal (PT)	22	0.014
Sweden (SE)	170	0.105
Total	1,1616	100,0

Table 7 - Countries

5. Results

This chapter presents the results of the analyses who were discussed in Chapter 3. Subsection 5.1 contains and discusses the results of the Pearson's correlation matrix between the variables of interest. This is followed by subsection 5.2, which gives information on the possible problem of multicollinearity. Subsection 5.3 presents the OLS regression results that are executed in order to test the hypothesized relationship between gender diversity TMT and the financial performance of a company. All the models utilized include country and industry fixed effects. Subsection 5.3 also presents the results that test the second hypothesis, innovative sectors stand to benefit more from gender diversity in TMT than non-innovative ones.

5.1. Pearson's correlation matrix

Table 8 – Pearson's correlation matrix showcases the correlation coefficients of the dependent, independent and control variables utilized in this master thesis. This matrix, following the layout of Jackling and Johl (2009), indicates that there are multiple significant correlations.

First, the examination of the dependent and control variables that are correlated to the independent variables, GD_TMT and DGD_TMT, takes place. As for GD_TMT, none of the measures of financial performance are correlated. These results are not supportive of the first hypothesis. Furthermore, total assets relates positively to GD_TMT, hinting in the direction that large companies – in terms of total assets – have a more gender diverse TMT.

DGD_TMT correlates positively to one of the financial performance measurements, ROA, this result is supportive of the first hypothesis. As for the control variables, the conclusion is, once again, that the gender diversity variable correlates positively with total assets. The effect is even stronger, since this time it correlates at the 0.01% level and this indicates that companies with a high number of total assets are more likely to have a gender diverse TMT.

Surprisingly and in contrast with the expectations of this master thesis, the variables gender diversity TMT, GD_TMT and DGD_TMT, do not have significant correlations with the financial performance measurements, except for ROA. The positive correlation of ROA is supportive of the arguments of Hoffman and Maier (1961), who argue that diverse groups have a larger scale of views, knowledge and experience and that his in turn leads to better firm performance. However, the correlations with Tobin's Q are negative, although not significant. The above hints towards partial support for the first hypothesis.

The innovative independent variable associates to none of the financial performance variables significantly. The control variables total assets and company age both correlate highly to the innovative variable. The 0.01% correlation level indicates that companies operating in an innovative sector have, on average, lower levels of total assets. Company age also correlates at the 0.01% level, implying that companies operating in an innovative sector have, on average, a younger age than companies operating in non-innovative sectors.

As for the hypothesized direction of the second hypothesis, no significance with any of the financial performance variables is depicted. Therefore, the results do not support the idea that innovative sectors stand to benefit more from gender diversity in TMT than non-innovative sectors.

Second, the examination of the control variables takes place. Total assets correlates to all financial performance measurements positively at the 0.01% level, except for Tobin's Q, for which the sign is negative at the 0.01% level. This difference could be explained by the fact that Tobin's Q is the only market-based performance measure as all the other financial performance measurement are accounting-based. The negative correlation between total assets and Tobin's Q is congruent with the results presented by Dezsó and Ross (2012). A possible explanation for this occurrence is the idea of positive association between Tobin's Q and growth opportunities (Lang, Ofek, & Stulz, 1996).

In addition, total assets correlates negatively at the 0.01% level with leverage and positively at the 0.01% level for company age. As for leverage, the result could be explained by the idea that large companies with a high level of total assets are more mature, more established and out of the life-cycle that requires them to depend heavily on debt. As for company age, the correlation is logical, since older companies have had more time to acquire large levels of total assets than in comparison to young firms.

Lastly, the control variable leverage and company age are examined. Leverage associates negatively at either the 0.01% level or the 0.05% level for all the dependent financial performance variables. This is logical, since the cost of debt lowers the ability for good financial results and therefore negatively affects the financial performance measurements. As for company age, all financial performance variables except for Tobin's Q, correlate positively to company age. This can be explained by the idea that older, more mature and more established firms are better able to efficiently generate profit that leads to higher financial performance measurements.

5.2. Multicollinearity

Multicollinearity is a problem in statistics, because it makes it difficult to estimate the coefficients accurately. Multicollinearity is the phenomenon of strong correlation between the independent variables. High levels of multicollinearity means the effect of the dependent variables will be arbitrary (Grewal, Cote, & Baumgartner, 2004). As a matter of fact, multicollinearity affects the standard errors and this has the potential to display variables as wrongly significant or insignificant.

Multicollinearity between variables can be detected by utilizing the variance inflation factor (Grewal et al., 2004). The results of a Variance Inflation Factor (VIF) procedure indicates to what extent the variance of the estimated coefficient is increased. VIF results of 1 indicate that no correlation between the independent variables is found. VIF levels of above 10 indicate severe multicollinearity and causes a serious problem for data analysis. Performing multicollinearity tests for the independent variables in this study results in VIF values of 1. In accordance with previous research, the threshold level of 10 is applied in this study, therefore the conclusion is that multicollinearity is not an issue in the statistical analaysis in this master thesis.

Pearson's correlation matrix

	1. TQ	2. ROA	3. PM	4. ROE	5. GD_TMT	6. DGD_TMT	7. INNO	8. TA	9. LEV	10. C_AGE
1. TQ	1									
2. ROA	0.129**	1								
3. PM	-0.016	0.157**	1							
4. ROE	0.043*	0.408**	0.460**	1						
5. GD_TMT	-0.014	0.036	0.038	0.013	1					
6. DGD_TMT	-0.016	0.065**	0.016	0.016	0.804**	1				
7. INNO	-0.013	0.010	-0.016	-0.009	-0.036	0.029	1			
8. TA	-0.098**	0.198**	0.070**	0.193**	0.046*	0.210**	-0.074**	1		
9. LEV	-0.043*	-0.129**	-0.048*	-0.172**	0.016	0.001	-0.002	-0.163**	1	
10. C_AGE	-0.019	0.048*	0.050*	0.081**	-0.001	0.016	-0.096**	0.228**	0.026	1

Table 8 – Pearson's correlation matrix (one-tailed).
*** Correlation significant at the 0.01 level.*
** Correlation significant at the 0.05 level.*

5.3. OLS regression analyses

In order to test the two hypotheses, ordinary least squares (OLS) regressions are executed. The first two analyses that test the first hypothesis, compromise of the dependent variables ROA and Tobin's Q. The first regression is executed with ROA as the dependent variable and the second regression is executed with Tobin's Q as the dependent variable.

The second hypothesis is tested in two different ways. Firsly, regressions in which an interaction term is introduced, are presented. The interaction term constists of the variable innovative multiplied by gender diversity in TMT's. Secondly, a comparison between the OLS regression results from a sub sample of innovative firms versus non-innovative firms is made. As stated before, the distinction between innovative and non-inovative sectors is made based on the classification of the Eurostat (2019), an overview is given in Appendix 4 – Innovation-intense aggregation based on NACE. Lastly, OLS regressions for profit margin and ROE are executed as robustness checks.

5.3.1. OLS regression with ROA

Table 9 – Gender diversity TMT and ROA, column 1 and 6 report the results of an OLS regression between gender diversity TMT, dummy gender diversity TMT and ROA. No significant results become appearent with the percentage gender diversity TMT, but the dummy variable gender diversity TMT turns out to be positvely and significantly related at the 0.01% level. This result indicates support for the first hypothesis.

Column 2 adds total assets into the regression of model 1. Total assets relates positively and significantly to ROA at the 0.01% level. This relationship is also reported by Dwyer et al. (2003). This outcome can be explained by the fact that large companies – in terms of total assets – are able to more efficiently generate a higher financial return on their assets. The significance and direction of the variable remains robust and of the same magnitude across the models in which the variable is utilized.

Column 3 explores the result of introducing leverage into the regression of model 1. Leverage negatively and significantly relates to ROA at the 0.01% level. This can be explained by the fact that higher levels of debt negatively affect the financial performance of a company due to the obligation of regular debt payments (Dezsó & Ross, 2012). The same direction for this relationship is found in the study of these authors. The signficance remains of the same magnitude across the different models in which leverage is utilized, therefore the conclusions drawn are considered to be reliable.

In model 4 and 9, company age relates positively with ROA at the 0.05% and 0.1% level, respectively. This indicates that older companies are able to generate a higher return on their assets than younger companies. This is congruent with the idea of liability of newness (Marinova et al., 2019). However, column 5 and 10 do not denote any significance, indicating that the result is not robust.

As is stated before, the independent variable GD_TMT shows no significant results for ROA. However, the results for DGD_TMT denote positive significance at the 0.01% for three out of the five models. The models for which no significance is denoted are the models that include total asset in the regression. This hints into the direction that companies perform financially better with a gender diverse TMT, but only to the extent that these companies cannot exceed certain levels of total assets.

Compared to the other tables presented in this master thesis, the adjusted R-squared values reported for this table can be considereded high. R-squared measures the proportion of the variation in the dependent variable, ROA, that is explained by the use of the independent variable, GD_TMT and DGD_TMT. The adjusted R-squared values for the full models sits around 10%. This gives validity to the results of the table itself.

The significant and positive coefficients of DGD_TMT are congruent with the results reported by Christiansen et al. (2016). These results are not congruent with the results reported by Shrader et al. (1997) as these authors also do not find any significant relationship. This can be explained by the fact that Shrader et al. (1997) utilize 'older' data than Christiansen et al. (2016) and this master thesis.

5.3.2. OLS regression with Tobin's Q

The regression analaysis with Tobin's Q as dependent variable is on display in Table 10 – Gender diversity TMT and Tobin's Q. The layout is similar to that of table 9; the main difference is the change of the dependent variable. In table 8 this was an accounting-based performance measurement, ROA, in this regression analysis it is the market-based performance measurement, Tobin's Q. This change in kind of performance measure is done in order to gauge whether this affects the regression results.

Column 1 and 6 report the results of an OLS regression with the independent variables GD_TMT and DGD_TMT on Tobin's Q without any other (control) variables. Both variables do not yield any significant result.

In model 2, the control variable total assets is added into the regression model. The variable is negative and significant at the 0.01% level. This is an interesting result since total assets relates postively to ROA, however, the result is congruent with the results of Dezsó & Ross (2012), who also report his variable to be signifcantly and negatively related to Tobin's Q. These authors explain this relationship by the positive assocation between Tobin's Q and growth opportunities (Lang et al., 1996). Please note that the same effect can be seen in Pearson's correlation matrix. This result is robust and remains of the same signifcance throughout the models in which total assets is utilized (Column 5, 7 and 10).

In model 3, the control variable leverage is added into the regression model. The result is that leverage relates negatively at the 0.10% level with Tobin's Q. This indicates that companies with a high debt, have, on average, a lower Tobin's Q, because these companies are considered to be unfavourable. Dezsó and Ross (2012) explain this relationship by stating that slow-growth cash rich companies have more capacity to make regular debt payments. The variable remains of the same significance and direction across the different models (Column 4 and 8) and the significance increases in the full models (Column 5 and 10).

The results of the control variable company age are not coherent. In regression models together with leverage, the variable is negative, but in full regression models the variable becomes positive. In none of the models, company age turns out to be significant. It is surprising to note that company age is not significant in any of the models, as is the case with other studies. The regression results from ROA are much more profound. A possible reason for this could be the different mean value for company age, as Dezsó and Ross (2012) report an average age of around 24. The descriptive statistics of this study reveal that the average company age is a lot higher, namely 52.

Hypothesis 1 predicts that companies with a higher level of female representation in TMT will enjoy superior financial performance. Appendix 6 investigates this hypthesized relationship by running regression models with both the percentage gender diversity TMT and dummy gender diversity TMT. The dummy gender diversity TMT takes the value 0 (1) if any (none) of the members of the top management team are females. This apporach is congruent with the studies of Adams and Ferreira (2009) and Dezsó and Ros (2012). However, contrary to literature review of this study, the coefficient is not significant and even negative in all of the models. These result are, however, congruent with the result of the study of Adams and Ferreira (2009). These authors report that the overall effect of gender diversity on financial performance, proxied by Tobin's Q, is negative.

ROA - Full sample										
Model	1	2	3	4	5	6	7	8	9	10
(Constant)	4.243 *** (10.852)	0.395 (0.655)	5.726 *** (11.877)	4.557 *** (6.062)	1.684 ** (2.005)	4.113 *** (10.481)	0.473 (0.789)	5.595 *** (11.565)	4.469 *** (5.953)	1.764 ** (2.103)
Log total assets		1.238 *** (8.258)			1.126 *** (7.224)		1.219 *** (7.910)			1.101 *** (6.869)
Leverage			-0.044 *** (-5.180)	-0.044 *** (-5.249)	-0.033 *** (-3.924)			-0.044 *** (-5.160)	-0.044 *** (-5.227)	-0.033 *** (-3.935)
Log company age				0.752 ** (2.026)	0.117 (0.311)				0.727 * (1.961)	0.125 (0.332)
GD_TMT	0.012 (1.513)	0.008 (1.070)	0.012 (1.574)	0.012 (1.550)	0.009 (1.151)					
DGD_TMT						0.739 *** (2.681)	0.218 (0.784)	0.732 *** (2.678)	0.714 *** (2.614)	0.261 (0.348)
Country fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adj. R-squared	0.007	0.131	0.055	0.050	0.107	0.019	0.130	0.061	0.057	0.107
F-statistic	0.956	17.797	7.437	6.782	14.529	2.583	17.659	8.269	7.685	14.451
Observations	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616

*Table 9 – Gender diversity TMT and ROA. Log total assets is the natural logarithm of total assets for the year 2018. Leverage is the ratio of current liabilities divided by the book value of total assets. Log company age is the natural logarithm of the number of years since incorporation. GD_TMT is the percentage of female representation in the top management team, calculated by dividing the total number of TMT members by the number of female TMT members. DGD_TMT is a dummy variable that takes the value 1 (0) if one (none) of the members of the top management team are female. Country fixed effects indicate that the four largest country in the sample (United Kingdom, France, Sweden and Germany) are taken into account. Industry fixed effects indicate that the three largest industries (manufacturing (10-33), information and communication (58-63) and retail trade (45-47)) are taken into account. Full explanation of all the variables utilized in this master thesis can be found in Table 3 – Variable definition and references. T-values are reported in the parentheses. * Statistical significance at the 0.10% level. ** statistical significance at the 0.05% level. *** statistical significance at the 0.01% level.*

Tobin's Q - Full sample										
Model	1	2	3	4	5	6	7	8	9	10
(Constant)	1.091 *** (75.575)	1.154 *** (22.174)	1.056 *** (25.643)	1.083 *** (16.834)	1.214 *** (16.691)	1.017 *** (30.505)	1.151 *** (22.230)	1.059 *** (25.590)	1.084 *** (16.862)	1.211 *** (16.961)
Log total assets		-0.045 *** (-3.471)			-0.051 *** (-3.805)		-0.045 *** (-3.374)			-0.052 *** (-3.718)
Leverage			-0.011 * (-1.713)	-0.001 * (-1.694)	-0.002 ** (-2.367)			-0.001 * (-1.725)	-0.001 * (1.706)	-0.002 ** (-2.373)
Log company age				-0.017 (-0.529)	0.012 (0.373)				-0.016 (-0.506)	0.012 (0.373)
GD_TMT	-0.018 (0.732)	-0.013 (-0.535)	-0.018 (-0.716)	-0.018 (-0.709)	-0.012 (-0.489)					
DGD_TMT						-0.023 (-0.967)	-0.003 (0.145)	-0.023 (-0.976)	-0.022 (-0.959)	-0.001 (-0.050)
Country fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adj. R-squared	0.018	0.036	0.020	0.017	0.032	0.021	0.037	0.021	0.017	0.031
F-statistic	2.660	5.021	2.731	2.240	4.296	2.794	4.954	2.842	2.324	4.256
Observations	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616

*Table 10 – Gender diversity TMT and Tobin's Q. Log total assets is the natural logarithm of total assets for the year 2018. Leverage is the ratio of current liabilities divided by the book value of total assets. Log company age is the natural logarithm of the number of years since incorporation. GD_TMT is the percentage of female representation in the top management team, calculated by dividing the total number of TMT members by the number of female TMT members. DGD_TMT is a dummy variable that takes the value 1 (0) if one (none) of the members of the top management team are female. Country fixed effects indicate that the four largest country in the sample (United Kingdom, France, Sweden and Germany) are taken into account. Industry fixed effects indicate that the three largest industries (manufacturing (10-33), information and communication (58-63) and retail trade (45-47)) are taken into account. Full explanation of all the variables utilized in this master thesis can be found in Table 3 – Variable definition and references. T-values are reported in the parentheses. * Statistical significance at the 0.10% level. ** statistical significance at the 0.05% level. *** statistical significance at the 0.01% level.*

In conclusion, the independent variables gender diverstiy TMT and dummy gender diversity TMT seem to have no significant relationship with Tobin's Q. Therefore, no support for the first hypothesis is given. Contrary to the results noted above and the results of Adams and Ferreira (2009), the relationship between gender diversity in TMT's and Tobin's Q is reported by Dezsó and Ross (2012) as positive and significant in their study.

5.3.3. Innovative vs non-innovative

The second hypothesis – whether gender diversity in TMT's is more beneficial in innovative sectors – is tested in two different ways. The first method utilizes an interaction term between variable innovative and gender diversity TMT. The results are reported in Appendix 6 – Gender diversity TMT, Tobin's Q and innovative and Appendix 7 – Gender diversity TMT, ROA and innovative. As for the second method, the OLS regression results between an innovative and a non-innovative sub sample are compared.

Appendix 6 showcases that, for Tobin's Q, the interaction term between innovation and GD_TMT, the coefficients are all negative and insignificant. This is contrary to the expectation of the literature review in this master thesis.

As for ROA, in Appendix 7, the interaction term is not significant in any of the models. However, in two of the models (Column 5 and 7), the coefficients are now positive, but not significant. However, these results also give no support for the second hypothesis.

In order to further test the second hypothesis, the OLS regression results are compared between an innovative sub sample and a non-innovative sub sample. This is first done for ROA, Table 11 present in Panel A the results for an innovative sub sample and in Panel B for a non-innovative sub sample. Country effects are controlled for in Table 11 and the explanation of the variables is the same as is stated underneath Table 9 and 10. Industries effects are not controlled for, because the variable innovative consists of industries as well.

Comparing the results does not yield support for the second hypothesized relationship. The coefficients of GD_TMT and DGD_TMT in Panel A are not significant and in some cases the sign is even negative. As for the regression coefficients of the non-innovative sub sample, GD_TMT is positive and significant at the 0.10% level. The results are even stronger for DGD_TMT, as these coefficients are also positive but significant at the 0.05% level.

These findings contradict the hypothesized relationship. According to the results, non-innovative companies stand to benefit more from gender diversity than innovative companies. These results are contradictory to the results of Christiansen et al. (2016). These authors report strong evidence that representation of women in senior positions improves financial performance more among companies in innovative sectors. The same goes for the results reported by Dwyer et al. (2003), who report an increase in financial performance of company who are active in innovative sectors and employ more females in the TMT. A possible reason for this difference may be the utilization of a broader definition of the top management team by these authors.

ROA - Innovative and non-innovative sub sample										
Model	1	2	3	4	5	6	7	8	9	10
	Panel A - Innovative sub sample									
(Constant)	4.132 (1.381)	1.060 (0.343)	4.684 (1.559)	2.586 (0.804)	1.010 (0.310)	3.944 (1.320)	1.109 (0.358)	4.493 (1.497)	2.458 (0.766)	1.045 (0.321)
Log total assets		1.046 *** (5.375)			1.001 *** (4.792)		1.051 *** (1.014)			1.004 *** (4.620)
Leverage			-0.021 * (-1.682)	-0.022 * (-1.766)	-0.008 (-0.634)			-0.020 * (-1.656)	-0.022 * (-1.740)	-0.008 (-0.634)
Log company age				1.004 * (1.820)	0.181 (0.318)				0.976 *	0.177 (0.309)
GD_TMT	0.003 (0.248)	0.003 (0.248)	0.003 (0.248)	0.002 (0.180)	-0.004 (-0.319)					
DGD_TMT						0.515 (1.354)	-0.075 (-0.193)	0.502 (1.322)	0.470 (1.237)	-0.060 (-0.153)
Adj. R-squared	0.006	0.055	0.013	0.018	0.037	0.013	0.055	0.010	0.012	0.037
F-statistic	0.825	7.435	1.828	2.396	5.024	1.734	7.416	1.337	1.689	5.010
Observations	763	763	763	763	763	763	763	763	763	763
	Panel B - Non-innovative sub sample									
(Constant)	4.030 *** (8.795)	0.670 (0.791)	6.069 *** (10.171)	5.083 *** (5.123)	1.312 (1.121)	3.882 *** (8.351)	0.483 (0.576)	5.922 *** (9.838)	5.016 *** (5.067)	1.527 (1.311)
Log total assets		1.511 *** (6.532)			1.360 *** (5.807)		1.459 *** (6.193)			1.303 *** (5.459)
Leverage			-0.060 *** (-5.224)	-0.061 *** (-5.264)	-0.051 *** (-4.485)			-0.060 *** (-5.219)	-0.061 *** (05.255)	-0.052 *** (-4.492)
Log company age				0.637 (1.244)	0.141 (0.276)				0.589 (1.152)	0.130 (0.255)
GD_TMT	0.019 * (1.732)	0.018 * (1.708)	0.020 * (1.848)	0.020 * (1.861)	0.019 * (1.813)					
DGD_TMT						0.962 ** (2.417)	0.504 (1.272)	0.976 ** (2.491)	0.962 ** (2.456)	0.562 (1.433)
Adj. R-squared	0.008	0.085	0.056	0.048	0.083	0.015	0.083	0.062	0.051	0.081
F-statistic	1.101	11.533	7.647	6.452	11.205	2.049	11.191	8.394	6.938	10.984
Observations	853	853	853	853	853	853	853	853	853	853

Table 11 – Gender diversity TMT and ROA innovative and non-innovative sub sample.

In order to further test the second hypothesis, the same procedure is performed with only the change of the dependent variable. The variable changes from ROA to Tobin's Q, the results are presented Appendix 8. Panel A contains the regression results for the innovative sub sample and in Panel B for the non-innovative sub sample. The structure of the table is identical to Table 10. It is hypothesized that comparing the results of these OLS regression with the results from a non-innovative sub sample will lead to more positive and significant results for the innovative sub sample. However, the coefficients for GD_TMT and DGD_TMT in Panel A are all negative and not significant. The same holds true for the coefficients of GD_TMT and DGD_TMT in Panel B, as none of the coefficients are significant.

In conclusion, comparing the results of an innovative sub sample with the results of a non-innovative sub sample does not yield the hypothesized results. Since any significance is absent, the coefficients are statistically not any different than zero. This is contrary to the results of Dezsó and Ross (2012), who conclude that the more a company's strategy is focused on innovation, the more gender diversity in TMT's improves Tobin's Q.

5.4. Robustness checks

In order to check if the results of the OLS regression analyses are consistent, robust and provide reliable outcomes, extra checks are performed (Dezsó & Ross, 2012). The utilization of dummy variables is already included in the main analyses, as both gender diversity TMT and dummy gender diversity TMT are tested as independent variables. Therefore, the robustness of the results is tested with a change in the dependent variables. Extra OLS regressions are performed on the independent variables profit margin and ROE.

Appendix 9 – Gender diversity TMT and profit margin indicates that total assets are positively and significantly related at the 0.01% level to profit margin, as is the case with the dependent variable ROA. Leverage is negatively and significantly related to profit margin at the 0.01% level, as is also the case with the use of previous independent variables. The variable company age much more strongly relates with profit margin than was the case with the use of the previous dependent variables.

The variables of interst in this study, GD_TMT and DGD_TMT, showcase no significant relationship at all with profit margin. Therefore no further support is given for the first hypothesis.

The last dependent variable tested in this master thesisr is ROE and Appendix 10 – Gender diversity TMT and ROE presents the results. The direction of the control variables total assets, leverage and company age remains the same, but the significance overall decreases.

The variables GD_TMT and DGD_TMT showcase no significance with ROE. This indicates no further support for the first hypothesis, only leaving the independent variable ROA to be supportive for the first hypothesis.

6. Conclusion

The aim of this master thesis is to shed some light on the question whether gender diversity in TMT's leads to a better financial performance. The sample utilized in this study consists of 1,616 European companies. The year of interest is 2018. The hypothesized positive relationship between gender diversity in TMT's and financial performance, receives partial support. Also, no results are in support of the second hypothesis. The second hypothesis hypothesizes that innovative sectors stand to benefit more from gender diversity than non-innovative sectors, but the opposite seems to be true.

The literature review identified four theories that argue that higher levels of gender diversity in TMT's positively affect the financial performance of a company. According to the resource-based view of competitive advantage, companies are able to perform financially better when their human capital assets are unique, different to replicate and – in this master thesis highlighted – their top management teams are (gender) diverse. To the same extent, the social identity states that a company benefits from a gender diverse TMT, because interests throughout the company are then aligned and this also increases employee motivation. Lastly, upper echelons theory predicts that when the TMT is diverse this positively influences the performance through the more widely and different characteristics that the members of the TMT possess.

Based on the theories mentioned above, hypothesis 1 hypothesizes that a gender diverse TMT leads to a better financial performance. Multiple previous studies state that the benefits of a gender diverse top management team only materialize if the strategy of a company is focused on innovation or the organization is growth orientated. This is based on the rudimentary differences between males and females. Females showcase higher levels of creativity, stimulate critical thinking and are associated with innovation in general. Therefore, the second hypothesis predicts that innovative sectors stand to benefit more from gender diversity than non-innovative sectors.

The OLS regression analysis performed on Tobin's Q provides no support for the first hypothesis. The regression analysis performed on ROA yields significant results for the dummy variable gender diversity TMT, but only when total assets are not included into the regression model. Utilized independent variables in this mater thesis include both the percentage gender diversity TMT and a dummy variable gender diversity TMT. All coefficients of GD_TMT for ROA prove to be insignificant. The first hypothesis is further tested by running OLS regressions on the dependent variables profit margin and ROE. Further significant results for the two independent gender diversity variables do not emerge. Therefore, the first hypothesis only gets partial support, since there is only one dependent performance variable (ROA) that yields significant coefficients and this is only true for the dummy variable.

As for the second hypothesis, it was argued that companies operating in innovative sectors would benefit more from gender diversity than companies operating in non-innovative sectors. However, the coefficients of an interaction term between innovative and gender diversity TMT prove to be insignificant for the dependent variables of Tobin's Q and ROA. Also, comparing the coefficients of an innovative with a non-innovative sector does not yield the hypothesized results. As a matter of fact, the results indicate that non-innovative sectors stand to benefit more from gender diversity TMT than innovative ones. Therefore, no support for the second hypothesis is given.

These findings suggest that gender diversity in TMT's does not necessarily increase the financial performance of a company, although some evidence is gathered for ROA. These results are important towards policy makers, because the argument for increased gender diversity in TMT from a financial standpoint has no overwhelming support.

Limitations

This master thesis is not without its limitations. From a researcher's perspective it unfortunate that Orbis is not able to provide gender diversity changes over the years with their financial performance, leaving only one year to be analysed. It is of course possible to manually collect the data needed from annual reports, but this method was not engaged due to time limitations.

Furthermore, the top management team, operationalized as it is in this master thesis is a limitation on itself. The percentage of females found in TMT's sits around 13% and this makes it difficult to interpret significant relationships. In light of this, a dummy variable is utilized. The results justified this usage, since significant results emerge when this variable is utilized.

Also, as mentioned in the literature review it is also possible that there are certain negative aspects that reduce the financial benefits of gender diversity in TMT's. This basically stems from the fact that heterogeneous and gender diverse teams are counterproductive for routine tasks. This indicates that homogeneous teams perform slightly better on simple tasks, but that heterogeneous – thus gender diverse – teams perform better on difficult tasks. Lastly, the extra costs it takes to settle disputes that arise due to gender diversity in the top management team may lower the financial benefits or may even cause a negative performance.

Avenues for further research

Further research should explore the effect of changes in the gender composition of the TMT and how this relates to the financial performance of companies.

Measuring gender diversity beyond the TMT, in for example middle management levels should increase the total overall percentage found. Therefore, enabling the interpretation of perhaps more clear significant relationships. To the same extent, companies that have female representation in its TMT are also likely the same companies that had female managers just below that level prior to the years they obtained senior positions. Female representation just below the TMT-level may provide these companies with the financial benefits as hypothesized by the different theories.

Another avenue for further research is to amplify the effect that a higher gender diversity in TMT has on financial performance in sectors or with companies that are known to have a very high level of female customers. According to social identity theory, these companies should benefit disproportionate from higher levels of gender diversity in their TMT. The same may be true for company characteristics like size, structure, composition of the company's workforce and company culture, although the direction of these relationships are not clear yet. For example, companies with greater levels of female representation may experience an increase in motivation by female managers below the top management team level caused by an increase in the gender diversity level of the TMT. On the other hand, companies that do not employ a large percentage of female managers below the top management team level may benefit from increasing gender diversity in the TMT by assisting the recruitment of females in middle and lower management levels.

Lastly, there is prove that indicates that the results of gender diversity studies vary across different places, settings and time. For example, it is possible that younger generations of new managers influence the way that gender diversity affects the financial performance of a company. It is interesting to examine the relationship between gender diversity and the financial performance of a company if, at some point in the future, greater gender equality in the upper echelons of the corporate world is established. This avenue and other questions need further examining in order to fully understand the gender diversity-performance relationship.

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Appendices

Appendix 1 – Literature review gender diversity by Rhode and Packel (2014).

Overview of the Literature on the Impact of Women on Boards

Paper	*Scope*	*Period*	*Number of firms*	*Listing status*	*Method*	*Dependent variables*	*Explanatory variables*	*Impact*	*Finding*
Adams and Ferreira (2009)	U.S.	1996–2003	1,939	Public	Panel regressions & GMM estimation	Attendance problem; Tobin's Q; ROA; compensation	Dummy for at least one female manager; fraction of female directors	Negative	Whereas female directors have a significant impact on board inputs and firm outcomes, the average effect of gender diversity on firm performance is negative.
Ahern and Dittmar (2012)	Norway	2001–2009	248	Public	Event study; panel IV regressions	Cumulative abnormal returns; Tobin's Q; leverage; asset turnover	Dummy for at least one female director; percentage of female board members	Negative	The law quota announcement caused a significant drop in the stock price, less experienced boards, increase in leverage and acquisitions, and a deterioration in firm performance.
Matsa and Miller (2009)	Norway & other Nordic countries	2006 and 2009	1,620	Public/ private	Cross-section; difference-in-difference regressions	Operating ROA; employment; labor costs; large decrease in employment	Firms affected by the quota matched with non-affected firms	Negative	Firms affected by the quota in Norway undertook fewer workforce reductions than other firms, increasing their relative costs and lowering profitability, especially for firms without female board members beforehand. Other corporate decisions were unchanged.
Du Rietz and Henrekson (2000)	Sweden	1985	4,200	Private	Logistic regression of survey results	Sales, profitability; employment; orders	Gender	Insignificant	Systematic differences between female- and male-headed firms, but no evidence of female underperformance, especially at firms with only one employee.
Lam and others (2013)	China	2000–2008	1,574	Public	Panel regressions	Woman CEO; ROA; ROE	Female CEO in profitability regressions	Limited evident of a link	Female CEOs are more likely to emerge in firms where at least one female director is present but their compensation has less favourable terms compared to male CEOs.
Smith and others (2005)	Denmark	1993–2001	2,500	Public/ private	Panel regressions	Net turnover; net assets	Proportion of female CEO & other top executives	Varies from none to positive	Gender diversity in top management positively affects firm performance.
Campbell and Vera (2010)	Spain	1989–2001	4,050	Public	Event study & GMM estimation	Cumulative abnormal returns; Tobin's Q	Dummy for presence of women on boards and share of women on boards	Positive	Positive stock market reaction to appointment of female director and also over the long run.
Castellano, Infante, and Sunnova (2014)	Italy	2004 and 2001	58,410	Public/ private	OLS and 2SLS	Labor productivity	Dummy for at least one female manager; number of female managers	Positive	The presence of female managers increases productivity differential due to geographical localization. Also, management-diverse firms are more productive than female- or male-only managed firms.
Dezso and Ross (2012)	U.S.	1992–2006	1,500	Public	Panel regressions	Tobin's Q	Dummy if any of the managers is female	Positive	Gender diversity in top management brings in informational and performance benefits to the extent that the firm's strategy is focused on innovation.
Farrell and Hersch (2005)	U.S	1990–1999	1,000	Public	Poisson model	Number of female directors added	ROA	Positive	Female additions on boards are not a result of better qualified female labor but a gender call, and they do not generate significant market reaction.
Huang and Kisgen (2013)	U.S.	1993–2005	1,866	Public	Difference-in-difference; 2SLS	Acquisitions; asset growth; financing; cumulative abnormal announcement return	Dummy for executive male-to-female transition firm; Dummy for female CEO	Positive	Male executives exhibit overconfidence in decision making relative to female executives: they undertake more acquisitions and issue more debt, but their decisions yield lower announcement returns.
Kang, Ding, and Charoenwong (2010)	Singapore	1994–2004	45	Public	Event study	Cumulative abnormal returns	Proportion of independent women directors; separate CEO and chair	Positive	Investors are most receptive to announcement of female appointment when the new director is independent and least receptive when the director assumes the role of CEO.
Khan and Vieito (2013)	U.S.	1992–2004	1,043	Public	2SLS	Compensation; ROA; volatility	Dummy for female CEO	Positive	Firms managed by a female CEO associate with better performance compared to male CEO firms; equity compensation packages can act as an incentive for female CEOs to take risks.

Appendix 2 – Broad structure of NAVE Rev. 2

Broad Structure of NACE Rev. 2

Section	Title	Divisions
A	Agriculture, forestry and fishing	01 – 03
B	Mining and quarrying	05 – 09
C	Manufacturing	10 – 33
D	Electricity, gas, steam and air conditioning supply	35
E	Water supply; sewerage, waste management and remediation activities	36 – 39
F	Construction	41 – 43
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	45 – 47
H	Transportation and storage	49 – 53
I	Accommodation and food service activities	55 – 56
J	Information and communication	58 – 63
K	Financial and insurance activities	64 – 66
L	Real estate activities	68
M	Professional, scientific and technical activities	69 – 75
N	Administrative and support service activities	77 – 82
O	Public administration and defence; compulsory social security	84
P	Education	85
Q	Human health and social work activities	86 – 88
R	Arts, entertainment and recreation	90 – 93
S	Other service activities	94 – 96
T	Activities of households as employers; u0ndifferentiated goods- and services-producing activities of households for own use	97 – 98
U	Activities of extraterritorial organisations and bodies	99

Appendix 3 – Overview TMT

Management Team

Henri Poupart-Lafarge *

Chairman of the Board of Directors and Chief Executive Officer

Jean-François Beaudoin *

Senior Vice-President - Alstom Digital Mobility

Thierry Best *

Senior Vice-President - Operational Excellence

Michel Boccaccio *

Senior Vice-President - Latin America

Anne-Sophie Chauveau-Galas*

Senior Vice-President - Human Resources and Sustainable Development

Gian Luca Erbacci *

Senior Vice-President – Europe

Jean-Baptiste Eyméoud *

Senior Vice-President - France

Ling Fang *

Senior Vice-President - Asia Pacific

Bruno Marguet*

Senior Vice-President - Platforms

Laurent Martinez *

Chief Financial Officer

Emmanuelle Petrovic*

Senior Vice-President – General Counsel

Didier Pfleger *

Senior Vice-President - Middle-East and Africa

Jérôme Wallut *

Senior Vice-President - North America

Marc Granger

Chief Strategy Officer

Bruno Tourne

Vice President - Communications

Top management team of Alstom S.A. Retrieved from https://www.alstom.com/company/corporate-governance on 19-10-2019.

Appendix 4 – Innovation-intense aggregation based on NACE

Aggregations of manufacturing industries based on NACE (technology)

Manufacturing Industries	NACE Rev. 2 codes – 2-digit level	
High-technology	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations;
	26	Manufacture of computer, electronic and optical products
Medium-high-technology	20	Manufacture of chemicals and chemical products;
	27 to 30	Manufacture of electrical equipment; Manufacture of machinery and equipment n.e.c. ; Manufacture of motor vehicles, trailers and semi-trailers; Manufacture of other transport equipment
Medium-low-technology	19	Manufacture of coke and refined petroleum products;
	22 to 25	Manufacture of rubber and plastic products; Manufacture of other non-metallic mineral products; Manufacture of basic metals; Manufacture of fabricated metals products, excepts machinery and equipment;
	33	Repair and installation of machinery and equipment
Low technology	10 to 18	Manufacture of food products, beverages, tobacco products, textile, wearing apparel, leather and related products, wood and of products of wood, paper and paper products, printing and reproduction of recorded media;
	31 to 32	Manufacture of furniture; Other manufacturing

Aggregations of services industries based on NACE (knowledge)

Knowledge based services	NACE Rev. 2 codes – 2-digit level	
Less knowledge-intensive services (LKIS)	45 to 47	Wholesale and retail trade; Repair of motor vehicles and motorcycles (section G);
	49	Land transport and transport via pipelines;
	52 to 53	Warehousing and support activities for transportation; Postal and courier activities;
	55 to 56	Accommodation and food service activities (section I);
	68	Real estate activities (section L);
	77	Rental and leasing activities;
	79	Travel agency, tour operator reservation service and related activities;
	81	Services to buildings and landscape activities;
	82	Office administrative, office support and other business support activities;
	94 to 96	Activities of membership organisation; Repair of computers and personal and household goods; Other personal service activities (section S);
	97 to 99	Activities of households as employers of domestic personnel; Undifferentiated goods- and services-producing activities of private households for own use (section T); Activities of extraterritorial organisations and bodies (section U).
Less knowledge-intensive market services	45 t6 47	Wholesale and retail trade; Repair of motor vehicles and motorcycles (section G);
	49	Land transport and transport via pipelines;
	52	Warehousing and support activities for transportation;
	55 to 56	Accommodation and food service activities (section I);
	68	Real estate activities (section L);
	77	Rental and leasing activities;
	79	Travel agency, tour operator reservation service and related activities;
	81	Services to buildings and landscape activities;
	82	Office administrative, office support and other business support activities;
	95	Repair of computers and personal and household goods;
Other less knowledge-intensive services	53	Postal and courier activities;
	94	Activities of membership organisation;
	96	Other personal service activities;
	97 to 99	Activities of households as employers of domestic personnel; Undifferentiated goods- and services-producing activities of private households for own use (section T); Activities of extraterritorial organisations and bodies (section U).

Knowledge based services	NACE Rev. 2 codes – 2-digit level	
Knowledge-intensive services (KIS)	50 to 51	Water transport; Air transport;
	58 to 63	Publishing activities; Motion picture, video and television programme production, sound recording and music publish activities; Programming and broadcasting activities; Telecommunications; computer programming, consultancy and related activities; Information service activities (section J);
	64 to 66	Financial and insurance activities (section K);
	69 to 75	Legal and accounting activities; Activities of head offices, management consultancy activities; Architectural and engineering activities, technical testing and analysis; Scientific research and development; Advertising and market research; Other professional, scientific and technical activities; Veterinary activities (section M);
	78	Employment activities;
	80	Security and investigation activities;
	84 to 93	Public administration and defence, compulsory social security (section O); Education (section P), Human health and social work activities (section Q); Arts, entertainment and recreation (section R).
Knowledge-intensive market services (excluding high-tech and financial services)	50 to 51	Water transport; Air transport;
	69 to 71	Legal and accounting activities; Activities of head offices, management consultancy activities; Architectural and engineering activities, technical testing and analysis;
	73 to 74	Advertising and market research; Other professional, scientific and technical activities;
	78	Employment activities;
	80	Security and investigation activities;
High-tech knowledge-intensive services	59 to 63	Motion picture, video and television programme production, sound recording and music publish activities; Programming and broadcasting activities; Telecommunications; computer programming, consultancy and related activities; Information service activities;
	72	Scientific research and development;
Knowledge-intensive financial services	64 to 66	Financial and insurance activities (section K).
Other knowledge-intensive services	58	Publishing activities;
	75	Veterinary activities;
	84 to 93	Public administration and defence, compulsory social security (section O); Education (section P), Human health and social work activities (section Q); Arts, entertainment and recreation (section R).

Appendix 5 – Descriptive statistics sub samples

Descriptive statistics – Innovative sub sample

	N	Minimum	Maximum	Mean	Q1	Median	Q3	Std. Deviation
Dependent variables – Financial performance measures								
Tobin's Q	763	0.089	5.033	1.080	0.800	1.100	1.300	0.424
Profit margin %	763	-79.703	72.576	5.317	1.820	5.707	11.093	14.009
ROA %	763	-37.252	36.140	4.570	2.950	3.110	5.094	5.110
ROE %	763	-497.319	130.719	3.410	2.070	4.170	14.921	37.828
Independent variables – Gender diversity in TMT								
GD_TMT %	763	0	75	12.362	0	0	22.222	16.269
DGD_TMT	763	0	1	0.480	0	0	1	0.500
Control variables								
Company age	763	5	336	46.100	20	31	57	40.694
Total assets (millions €)	763	12.071	458,156	6,281.269	67.874	290.484	1,859.200	28,601.212
Leverage %	763	2.452	82.589	32.854	21.530	31.604	41.604	15.042

Descriptive statistics – Non-innovative

	N	Minimum	Maximum	Mean	Q1	Median	Q3	Std. Deviation
Dependent variables – Financial performance measures								
Tobin's Q	856	0.093	7.103	1.091	0.800	1.100	1.300	0.497
Profit margin %	856	-76.671	74.635	5.474	1.820	5.707	11.093	13.105
ROA %	856	-49.886	34.203	4.466	2.950	3.110	5.094	5.776
ROE %	856	-228.63	269.313	5.137	2.070	4.170	14.921	29.985
Independent variables – Gender diversity in TMT								
GD_TMT %	856	0	83.333	13.581	0	0	22.222	18.432
DGD_TMT	856	0	1	0.450	0	0	1	0.498
Control variables								
Company age	856	5	354	56.570	20	31	57	48.450
Total assets (millions €)	856	13.164	246,441.797	4,319.694	67.874	290.484	1,859.200	15,274.004
Leverage %	856	1.179	85.694	32.912	21.530	31.604	41.604	16.957

Appendix 6 – Gender diversity TMT, Tobin's Q and innovative

Tobin's Q - Full sample						
Model	1	2	3	4	5	6
(Constant)	1.218 *** (16.756)	1.221 *** (16.748)	1.219 *** (16.521)	1.218 *** (16.756)	1.218 *** (16.747)	1.208 *** (16.431)
Innovative	-0.033 (-1.319)	-0.034 (-1.331)	-0.031 (-1.011)	-0.033 (-1.319)	-0.033 (-1.318)	-0.016 (-0.468)
GD_TMT		-0.013 (-0.522)	-0.010 (-0.303)			
DGD_TMT					-0.024 (0.060)	0.018 (0.549)
Innovative * GD_TMT			-0.021 (-0.158)			
Innovative * DGD_TMT						-0.039 (-0.831)
Log total assets	-0.051 *** (-3.783)	-0.051 *** (-3.783)	-0.051 *** (-3.768)	-0.051 *** (-3.783)	-0.051 *** (-3.709)	-0.051 *** (-3.644)
Leverage	-0.002 ** (-2.326)	-0.002 ** (-2.326)	-0.002 ** (-2.326)	-0.002 ** (-2.326)	-0.002 ** (-2.335)	-0.002 ** (-2.337)
Company age	0.007 (0.208)	0.007 (0.205)	0.007 (0.207)	0.007 (0.208)	0.007 (0.208)	0.006 (0.198)
Country fixed effects	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y
Adj. R-squared	0.034	0.029	0.025	0.034	0.029	0.026
F-statistic	4.550	3.937	3.446	4.550	3.897	3.496
Observations	1,616	1,616	1,616	1,616	1,616	1,616

*Appendix 6 – Gender diversity TMT, Tobin's Q and innovative. Log total assets is the natural logarithm of total assets for the year 2018. Leverage is the ratio of current liabilities divided by the book value of total assets. Log company age is the natural logarithm of the number of years since incorporation. GD_TMT is the percentage of female representation in the top management team, calculated by dividing the total number of TMT members by the number of female TMT members. DGD_TMT is a dummy variable that takes the value 1 (0) if one (none) of the members of the top management team are female. The variable innovative is a dummy variable that consists of innovative companies versus non-innovative companies based on Appendix 4 – Innovation-intense aggregation based on NACE. Country fixed effects indicate that the four largest country in the sample (United Kingdom, France, Sweden and Germany) are taken into account. Industry fixed effects indicate that the three largest industries (manufacturing (10-33), information and communication (58-63) and retail trade (45-47)) are taken into account. Full explanation of all the variables utilized in this master thesis can be found in Table 3 – Variable definition and references. T-values are reported in the parentheses. * Statistical significance at the 0.10% level. ** statistical significance at the 0.05% level. *** statistical significance at the 0.01% level.*

Appendix 7 – Gender diversity TMT, ROA and innovative

	ROA - Full sample					
Model	1	2	3	4	5	6
(Constant)	1.724 ** (2.050)	1.656 * (1.966)	1.449 * (1.700)	1.724 ** (2.050)	1.740 ** (2.069)	1.515 * (1.774)
Innovative	0.117 (0.400)	0.126 (0.429)	0.443 (1.248)	0.117 (0.400)	0.108 (0.369)	0.484 (1.257)
GD_TMT		0.009 (1.161)	0.019 * (1.905)			
DGD_TMT					0.257 (0.926)	0.630 * (1.696)
Innovative * GD_TMT			-2.461 (-1.587)			
Innovative * DGD_TMT						-0.809 (-1.509)
Log total assets	1.135 *** (7.294)	1.125 *** (7.214)	1.138 *** (7.291)	1.135 *** (7.294)	1.100 *** (6.864)	1.116 *** (6.953)
Leverage	-0.033 *** (-3.911)	-0.033 *** (-3.934)	-0.033 *** (-3.935)	-0.033 *** (-3.911)	-0.033 *** (-3.943)	-0.033 *** (-3.947)
Company age	0.135 (0.356)	0.137 (0.361)	0.143 (0.377)	0.135 (0.356)	0.142 (0.374)	0.135 (0.357)
Country fixed effects	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y
Adj. R-squared	0.105	0.092	0.089	0.105	0.092	0.082
F-statistic	14.235	12.473	11.239	14.235	12.400	11.143
Observations	1,616	1,616	1,616	1,616	1,616	1,616

*Appendix 7 – Gender diversity TMT, ROA and innovative. Log total assets is the natural logarithm of total assets for the year 2018. Leverage is the ratio of long-term debt to total assets. Log company age is the natural logarithm of the number of years since incorporation. GD_TMT is the percentage of female representation in the top management team. DGD_TMT is a dummy variable that takes the value 1 (0) if one (none) of the members of the top management team are female. # males TMT is the total number of male members of the top management team. The variable innovative is a dummy variable that consists of innovative companies versus non-innovative companies based on Appendix 4 – Innovation-intense aggregation based on NACE. Country fixed effects indicate that the four largest country in the sample (United Kingdom, France, Sweden and Germany) are taken into account. Industry fixed effects indicate that the three largest industries (manufacturing (10-33), information and communication (58-63) and retail trade (45-47)) are taken into account. Full explanation of all the variables utilized in this master thesis can be found in Table 3 – Variable definition and references. T-values are reported in the parentheses. * Statistical significance at the 0.10% level. ** statistical significance at the 0.05% level. *** statistical significance at the 0.01% level.*

Appendix 8 – Gender diversity TMT and Tobin's Q innovative and non-innovative sub sample.

Tobin's Q - Innovative and non-innovative sub sample

Model	1	2	3	4	5	6	7	8	9	10
	Panel A - Innovative sub sample									
(Constant)	0.272 (1.104)	0.498 * (1.932)	0.290 (1.171)	0.420 (1.585)	0.591 ** (2.178)	0.282 (1.145)	0.488 * (1.891)	0.301 (1.217)	0.427 (1.612)	0.583 ** (2.148)
Log total assets		-0.046 *** (-2.811)			-0.048 *** (-2.733)		-0.043 ** (-2.545)			-0.045 ** (-2.740)
Leverage			-0.001 (- 0.6800	-0.001 (-0.617)	-0.001 (-1.235)			-0.001 (-0.713)	-0.001 (-0.650)	-0.001 (-1.212)
Log company age				-0.062 (-1.369)	-0.023 (-0.488)				-0.060 (-1.326)	-0.025 (-0.521)
GD_TMT	-0.001 (-0.765)	-0.017 (-0.460)	-0.001 (-0.764)	-0.001 (-0.713)	-0.016 (-0.426)					
DGD_TMT						-0.048 (1.522)	-0.024 (-0.721)	-0.048 (1.535)	-0.046 (-1.471)	-0.022 (-0.689)
Adj. R-squared	0.033	0.040	0.026	0.023	0.029	0.037	0.040	0.029	0.026	0.029
F-statistic	4.489	5.373	3.480	3.162	3.902	5.075	5.453	3.931	3.500	3.953
Observations	763	763	763	763	763	763	763	763	763	763
	Panel B - Non-innovative sub sample									
(Constant)	1.022 *** (28.857)	1.141 *** (15.268)	1.078 *** (20.650)	1.051 *** (12.103)	1.180 *** (11.323)	1.017 *** (25.331)	1.137 *** (15.374)	1.074 *** (20.355)	1.047 *** (12.063)	1.176 *** (11.355)
Log total assets		-0.038 * (-1.878)			-0.046 ** (-2.218)		-0.040 * (-1.924)			-0.048 ** (-2.271)
Leverage			-0.002 (-1.644)	-0.002 (-1.655)	-0.002 (-1.957)			-0.002 (-1.650)	-0.002 (-1.661)	-0.002 ** (-1.978)
Log company age				0.017 (0.381)	0.034 (0.749)				0.017 (0.383)	0.034 (0.754)
GD_TMT	-0.012 (-0.340)	-0.011 (-0.322)	-0.011 (-0.312)	-0.011 (-0.30*)	-0.009 (-0.277)					
DGD_TMT						0.002 ** (0.961)	0.014 (0.407)	0.002 (0.060)	0.002 (0.049)	0.016 (0.472)
Adj. R-squared	0.012	0.016	0.014	0.011	0.016	0.012	0.016	0.014	0.011	0.016
F-statistic	1.637	2.113	1.906	1.552	2.119	1.599	2.129	1.882	1.533	2.144
Observations	853	853	853	853	853	853	853	853	853	853

Appendix 9 – Gender diversity TMT and profit margin

	Profit margin - Full sample									
	1	2	3	4	5	6	7	8	9	10
(Constant)	7.400 *** (7.740)	1.222 (0.826)	12.333 *** (10.538)	7.483 *** (4.111)	1.826 (0.372)	7.330 *** (7.628)	1.215 (0.826)	12.279 *** (10.439)	7.469 *** (4.103)	1.850 (0.906)
Log total assets		2.775 *** (7.543)			2.217 *** (5.842)		2.861 *** (7.572)			2.286 *** (5.861)
Leverage			-0.146 *** (-7.099)	-0.148 *** (-7.235)	-0.126 *** (-6.119)			-0.145 *** (-7.089)	-0.148 *** (-7.224)	-0.125 *** (5.861)
Log company age				3.120 *** (3.471)	1.869 ** (2.042)				3.105 *** (3.453)	1.854 ** (2.026)
GD_TMT	0.013 (0.653)	0.004 (0.233)	0.014 (0.731)	0.013 (0.690)	0.007 (0.355)					
DGD_TMT						0.596 (0.883)	-0.626 (-0.917)	0.574 (0.863)	0.498 (0.752)	-0.444 (-0.658)
Country fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adj. R-squared	0.015	0.117	0.105	0.102	0.129	0.016	0.118	0.105	0.102	0.129
F-statistic	2.029	15.797	14.168	13.822	17.443	2.147	16.002	14.223	13.840	17.498
Observations	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616

*Appendix 11 – Gender diversity and profit margin. Log total assets is the natural logarithm of total assets for the year 2018. Leverage is the ratio of long-term debt to total assets. Log company age is the natural logarithm of the number of years since incorporation. GD_TMT is the percentage of female representation in the top management team. DGD_TMT is a dummy variable that takes the value 1 (0) if one (none) of the members of the top management team are female. # males TMT is the total number of male members of the top management team. Country fixed effects indicate that the four largest country in the sample (United Kingdom, France, Sweden and Germany) are taken into account. Industry fixed effects indicate that the three largest industries (manufacturing (10-33), information and communication (58-63) and retail trade (45-47)) are taken into account. Full explanation of all the variables utilized in this master thesis can be found in Table 3 – Variable definition and references. T-values are reported in the parentheses. * Statistical significance at the 0.10% level. ** statistical significance at the 0.05% level. *** statistical significance at the 0.01% level.*

Appendix 10 – Gender diversity TMT and ROE

	ROE - Full sample									
Model	1	2	3	4	5	6	7	8	9	10
(Constant)	8.161 *** (4.543)	2.752 (0.975)	10.878 *** (4.878)	5.173 (1.488)	1.978 (0.501)	8.472 *** (4.689)	3.158 (1.124)	11.179 *** (4.984)	5.500 (1.581)	2.360 (0.599)
Log total assets		1.741 ** (2.480)			1.252 * (1.711)		1.779 ** (2.466)			1.277 * (1.697)
Leverage			-0.080 ** (-2.052)	-0.083 ** (-2.124)	-0.071 * (-1.777)			-0.079 ** (-2.033)	-0.082 ** (-2.1050	-0.070 * (-1.755)
Log company age				3.670 ** (2.137)	2.963 * (1.679)				3.667 ** (2.134)	2.968 * (1.680)
GD_TMT	0.054 (1.495)	0.049 (1.353)	0.055 (1.516)	0.054 (1.491)	0.050 (1.389)					
DGD_TMT						0.878 (0.692)	0.118 (0.090)	0.866 (0.683)	0.776 (0.613)	0.250 (0.192)
Country fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adj. R-squared	0.016	0.023	0.020	0.022	0.022	0.011	0.020	0.016	0.020	0.020
F-statistic	2.124	3.135	2.649	3.037	3.022	1.537	2.677	2.188	2.665	2.703
Observations	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616

*Appendix 10 – Gender diversity TMT and ROE. Log total assets is the natural logarithm of total assets for the year 2018. Leverage is the ratio of long-term debt to total assets. Log company age is the natural logarithm of the number of years since incorporation. GD_TMT is the percentage of female representation in the top management team. DGD_TMT is a dummy variable that takes the value 1 (0) if one (none) of the members of the top management team are female. # males TMT is the total number of male members of the top management team. Country fixed effects indicate that the four largest country in the sample (United Kingdom, France, Sweden and Germany) are taken into account. Industry fixed effects indicate that the three largest industries (manufacturing (10-33), information and communication (58-63) and retail trade (45-47)) are taken into account. Full explanation of all the variables utilized in this master thesis can be found in Table 3 – Variable definition and references. T-values are reported in the parentheses. * Statistical significance at the 0.10% level. ** statistical significance at the 0.05% level. *** statistical significance at the 0.01% level.*