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The impact of female top management team representation on a firm's supplier orientation and performance

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Abstract

The role and impact of females in supply chain management have received insufficient attention in extant research. In addition, research investigating the relationship between upper-echelon leadership and supply chain phenomena is extremely scant. To address these limitations, we collected archival data from 433 publicly traded Fortune 500 firms from 2007 to 2015 (3,464 firm-year observations) and analyzed them using fixed-effect regressions. Our findings indicate that female top management team representation directly and positively influences a firm's supplier orientation. This influence of female representation is attenuated for firms that have a Chief Supply Chain Officer present in their top management team and for firms operating in environments characterized by high dynamism and low munificence. Furthermore, our findings show that supplier orientation mediates the impact of female top management team representation on firm performance. We put forth several interesting theoretical and managerial contributions. Most importantly, we hope that our findings, highlighting the positive impact of female executives on supplier orientation and providing additional evidence regarding women's managerial capabilities, will contribute towards eliminating bias and discrimination faced by women in the area of supply chain management and business in general.

Keywords: supplier orientation; female representation; top management team; Chief Supply Chain Officer

1. Introduction

The underrepresentation of women in senior firm leadership has increasingly been recognized as an issue of significant importance in business literature (Perryman et al., 2016; Post et al., 2020). As such, scholars have explored how female representation in the top management team (TMT) impacts various aspects of firm performance. For example, Dezsö and Ross (2012) found that female representation in TMTs enhances firm performance, but only to the degree that the firm has a strategic focus on innovation. Perryman et al. (2016) revealed that increased gender diversity within senior leadership reduces firm risk and positively impacts firm performance. More recently, Tang et al. (2020) revealed that female presence in TMTs enhances a firm's ambidextrous strategic orientation (i.e., the ability to simultaneously pursue exploration and exploitation of a firm's strategic activities). The findings of academic research have been corroborated by managerial studies indicating that a higher percentage of female TMT presence contributes to firm success (McKinsey and Company, 2018).

While certain business domains, such as management and marketing, have devoted extensive research efforts to understanding the role and impact of females in firms (Chang et al., 2020; Khanna et al., 2019), there is a relative scarcity of studies in supply chain management (SCM) literature that focus on this phenomenon (e.g., Park and Krishnan, 2005; Smith, 2012). This is a noteworthy limitation in SCM research, considering that, globally, the share of women in senior management positions has increased to 29% (Catalyst, 2020), and past studies indicate that gender-related differences affect various facets of firm strategy (Tang et al., 2020). Therefore, without insights into the role and impact of women, SCM scholars cannot adequately explain firms' approaches to SCM as it is plausible that gender-related differences could also impact aspects of strategic SCM.

Further, there is a paucity of studies examining SCM issues from the perspective of upper-echelon leadership (Kouvelis et al., 2006; Roh et al., 2016; Wowak et al., 2021). A small number of studies have explored the impact of TMT on SCM phenomena. This is another limitation in SCM research, considering that "in the SCM context, having women in the TMT has certain distinct advantages. As noted in the SCM literature, firms employing women tend to generate perceptions of greater credibility and trustworthiness" (Kumar and Paraskevas, 2018, p. 28). Moreover, recent strategic management research indicates that the benefits of TMT gender diversity accrue from differences in interpersonal proclivities between men and women (Tang et al., 2020). For example, Post et al. (2020) found that female TMT appointments lead TMT members to be more receptive to change and less willing to take risks. This indicates that differences in interpersonal proclivities (e.g., empathy, relationship building) between men and women impact other TMT members' behavior but provide no insights into whether female TMT presence could also bias other TMT members' attitudes toward issues of interest to SCM theory and practice.

Based on the limitations and gaps identified above, we explore the following exploratory research question: How does the representation of women on TMTs influence firms' supplier orientation? To execute the research question, we collected archival data from 433 publicly traded Fortune 500 firms from 2007 to 2015 (3,464 firm-year observations) and analyzed them using fixed-effects regressions. In line with past literature (e.g., Hambrick and Mason, 1984), we define the TMT in our research as "a group of executives responsible for strategic sensemaking and for setting the strategic direction of the firm." Operationally, following the work of previous empirical researchers (e.g., Feng et al. 2015), we consider a firm's TMT to be composed of all the firm's executives with titles at or above the rank of vice president. Similarly, we adopt the following definition of supplier orientation, "a close and long-term relationship between the suppliers and the firm, who share risks and rewards, and have willingness to keep the relationship over the long term to provide value to end users" (He et al., 2011, p. 9), and consider it a strategic prerequisite of SCM. As Mentzer et al. (2001) argued, one of the key aspects of managing supply chains is a strategic orientation concerning collaborative efforts with the firm's suppliers. Thus, our research links female representation in TMTs and supplier orientation as two significant phenomena in SCM.

Our findings revealed that female TMT representation (i.e., having females on the TMT) directly and positively influences the firm's supplier orientation. In addition, our findings uncovered the fact that the positive impact of female TMT representation on firms' supplier orientation is attenuated for firms for which a Chief Supply Chain Officer (CSCO) is part of the TMT and for firms operating in environments characterized by high dynamism and low munificence. Furthermore, our findings show that supplier orientation mediates the influence of female TMT representation on firm performance.

Our research is grounded in the argument that, before engaging in successful SCM, firms must acknowledge the strategic significance of their suppliers (Gligor, 2014). Given the pivotal role of supplier orientation in SCM, different studies have investigated the positive outcomes associated with this strategic orientation (e.g., Lintukangas et al., 2019). However, little is known about the factors that lead firms to develop a supplier orientation and why some firms have a stronger supplier orientation than others. We augment this stream of literature by revealing the positive impact of female TMT representation on firms' supplier orientation. In addition, we contribute to the literature exploring the impact of female TMT representation on firm performance and discovering the mechanism leading to this impact by revealing the mediating role of supplier orientation (Dezső and Ross, 2012; Post and Byron, 2015). Thus, we directly respond to Post and Byron's (2015) call for researchers to explore the possible causal mechanisms that link female board and TMT representation to firm performance. In the process, we also add insights to the literature examining the impact of TMT on SCM phenomena (Chu et al., 2017; Hendricks et al., 2015). Our findings also allow us to offer some novel managerial insights, which we detail in the latter part of the manuscript.

2. Theoretical background

This section presents our theoretical lenses, introduces the constructs of interest, and formally develops our hypotheses.

2.1. Social role theory and upper echelons theory

Social role theory and upper echelons theory provide the theoretical lenses for examining the influence of female TMT representation on supplier orientation. Social role theory is considered one of psychology's "grand theories" and has been utilized to explain gender differences in social behaviors across various contexts (Jaffe and Hyde, 2002; Wood and Eagly, 2002). The theory argues that men and women exhibit biological differences that allow each group to perform certain activities more efficiently than the other group. The theory further argues that these differences cause a societal labor division and allocate women and men to different roles (Eagly and Wood, 1999; Tang et al., 2020), even if these roles are becoming increasingly fluid and are no longer seen as mutually exclusive. Moreover, in line with these roles, social role theory indicates that women and men possess different proclivities in social interactions. Specifically, women are more oriented toward relationship building, empathetic, and socially sensitive (communal), while men are more vocal, ambitious, and assertive (agentic) (Eagly and Wood, 1999). The theory proposes that "through both social and self-regulation, men and women internalize social role-based differences and consciously or unconsciously exhibit role-consistent behaviors" (Tang et al., 2020, p. 6).

Furthermore, recent research, while partly corroborating social role theory, advances insights provided by this theory and highlights unique business and leadership skills women possess (Hoobler et al., 2018) that could be of particular relevance to SCM and buyer-supplier relationships (Ma et al., 2021). For example, Ma et al. (2021) show that women are often more collaborative than men as boundary spanners, and buyer-supplier relationship pairing with women results in more collaborative relationships; moreover, all-women supply chain pairs outperform all other alternative gender pairings in terms of supply chain efficiency. Thus, social role theory and recent affiliated research support the notion that women can have unique assets for buyer-supplier relationships that could fill a void in SCM.

Upper echelons theory also helped guide our research. This theory is regarded as among the most impactful theories in management (Neely et al., 2020). It posits that top managers' characteristics, such as their values, background, personality, and cognitive processes, influence organizational outcomes (Hambrick and Mason, 1984). The core tenets of this theory propose two intertwined parts: 1) top managers' actions are based on their tailored understandings of the strategic issues they face; and 2) top managers' characteristics determine these tailored interpretations and subsequent organizational outcomes. In other words, "if we want to understand why organizations do the things they do, or why they perform the way they do, we must consider the biases and dispositions of their most powerful actors: their top executives" (Hambrick, 2007, p. 334). Therefore, we rely on social role theory and upper echelons theory to drive the theoretical development of our model.

2.2. Supplier orientation

Supplier orientation has emerged as a construct of interest to managers and researchers alike as it has been linked to desirable firm outcomes. Several different definitions of the concept have been offered in the literature. To illustrate, Fonseca and Lima (2015) defined supplier orientation as the intensity of the firm's orientation toward its suppliers and the extent to which SCM practices are adopted. Lintukangas et al. (2019, p. 2) describe it as “a strategic orientation towards suppliers in its upstream supply chain, which considerably enhances supplier cooperation,” while Wagner (2010) points out that the concept emphasizes external and internal co-management to disseminate supplier capabilities-related knowledge within the focal firm. In essence, supplier orientation “emphasizes the need to manage the capacity and capabilities of suppliers to improve productivity, quality, and innovation” (Allred et al., 2011, p. 132). For this study, we adopt the conceptualization by He et al. (2011) (described earlier) because of its comprehensive scope.

The research on firm orientations (e.g., market orientation, supply chain orientation) recognizes them as firm-level philosophies and thus understands that TMT members play a key role in determining them (Gligor, 2014; Mentzer et al., 2001; Min et al., 2007). Given that orientations determine the firm's strategic positioning and resource allocation, “top management support plays a critical role in shaping an organization's values, orientation, and direction” (Mentzer et al., 2001, p. 14).

Past SCM research has specifically recognized the crucial role of TMT support when investigating orientation drivers of successful SCM. To illustrate, when conceptualizing supply chain orientation (SCO), Min et al. (2007, p. 551) emphasize that “without top management support and recognition, members of the firm are not willing to pursue a SCO that requires time, effort, and resources.” In fact, these authors posit TMT support as a key dimension of SCO and provide empirical evidence for their argument. Using the same logic and building on this stream of literature, we posit that TMT support also plays a key role in driving the related concept of supplier orientation and that firm members will pursue a supplier orientation to the extent that the firm's top management will support it and recognize its importance.

2.3. Linking female TMT representation to supplier orientation

Upper echelons theory and social role theory provide the impetus for considering female TMT representation a driver of supplier orientation. Upper echelons theory predicts organizational outcomes by the characteristics of the organization's TMT members (Hambrick and Mason, 1984). Moreover, examining female TMT representation through the lens of social role theory suggests that females' proclivities toward relationship building and the welfare of others underly this relationship. Prior studies exploring the implications of increased female TMT representation in firms support this contention (Setó-Pamies, 2015). For example, Zhang et al. (2013) argued that women possess psychological traits that make them more sensitive to various stakeholder needs. Compared to men, women are more relationship-driven, affectionate, interpersonally sensitive, sympathetic, and more concerned overall with others' well-being (Setó-Pamies, 2015). Scholars

have argued that “women’s attention to and consideration of the needs of others may lead to women’s active involvement in issues of strategic nature that concern the firm and its stakeholders” (Nielsen and Huse, 2010). Moreover, Jaffee and Hyde’s (2000) meta-analysis on gender differences also revealed that females are more inclined to cultivate interpersonal relationships. As such, there are theoretical reasons to believe that females are more likely than males to consider the necessities of the firm’s suppliers and develop close relationships, thus promoting higher levels of supplier orientation.

In line with the tenets of social role theory, we posit that greater female TMT representation can influence the firm’s supplier orientation both directly and indirectly. Given their proclivities to develop relationships and care about others (Witt and Wood, 2010), female executives are likely to impact *directly* the firm’s strategic approach to supplier management by proposing, initiating, and supporting strategic initiatives that recognize the importance of relationship building.

On the other hand, females can use their relationship-building skills to influence other TMT members *indirectly* (Jeong and Harrison, 2017), thus influencing them to support and further drive strategic initiatives that value relationship building with outside parties, including suppliers. Research grounded in this theory shows that “particularly in traditionally male-dominated senior leadership teams, gender diversity reduces the pressure that women face to ‘act like men’ and enables them to openly express their communal proclivities such as being empathetic and caring about others’ feelings” (Tang et al., 2020, p. 7). In essence, females can influence the strategic choices of other TMT members (Hoobler et al., 2018) and thus further facilitate the development of a supplier orientation.

The above theoretical arguments lead us to empirically explore the following:

H1: An increase in female TMT representation has a positive impact on firms’ supplier orientation.

2.4. The moderating impact of environmental dynamism and environmental munificence

While the direct link between female TMT representation and firms’ supplier orientation can be important and interesting, it is also likely to be subject to specific boundary conditions. In particular, environmental dynamism and munificence could moderate the relationship between female TMT representation and firms’ supplier orientation. Environmental dynamism captures the volume and speed of change in a firm’s environment (Gligor et al., 2015). Stable environments are characterized by changes that occur with less magnitude and at a slower pace (Wiengarten et al., 2017). In contrast, highly dynamic environments exhibit high demand volatility, technological changes, short product cycles, and high product variety (Gligor, 2016).

Environmental munificence describes the degree to which resources are available in the environment to allow for sustained expansion (Dess and Beard, 1984). The main indicator of environmental munificence is the environment’s growth rate (Gligor, 2017). Environments characterized by low munificence exhibit intense competition for scarce resources (e.g., suppliers), high market competition, and limited growth opportunities (Dess and Beard, 1984).

Studies show that it is more imperative for firms to develop a supplier orientation and actively manage their supply base when they function in environments characterized by high dynamism and low munificence (Gligor, 2017). In essence, it is more important for firms to collaborate with their suppliers when operating in such environments (Gligor, 2017). Firms operating under high levels of environmental dynamism and low levels of environmental munificence dynamism already experience significant environmental pressure to be supplier oriented as a prerequisite for firm competitiveness (Gligor et al., 2016). Because such firms already experience such pressure, their supplier orientation will likely be high (as TMT members will already be cognizant of the importance of managing the firm's suppliers), thus weakening the distinct role of female TMT representation in the firm's supplier orientation. Thus, we posit the following:

H2a: The effect of an increase in female TMT representation on firms' supplier orientation is attenuated for firms that operate under high environmental dynamism.

H2b: The effect of an increase in female TMT representation on firms' supplier orientation is increased for firms that operate under high environmental munificence.

2.5. The moderating role of CSCO presence on the TMT

Appointing CSCOs to TMTs is a relatively new phenomenon that is increasingly gaining support within firms. To illustrate, CSCO representation in big firms more than doubled from 2004 to 2009 (Wagner and Kemmerling, 2014). The presence of CSCOs in TMTs has begun to grow dramatically due to firms' increasing reliance on their supply chains (Gligor, 2018; Roh et al., 2016). Firms like Apple and Toyota depend largely on their supply chains to satisfy their customers' demands and achieve competitive advantage (Aoki and Wilhelm, 2017). As Forbes (2016) notes, "[t]he CEO runs the company. The CFO holds the purse strings. But today, the CSCO may be the most important role in the executive suite."

The core responsibilities of CSCOs include "working with business unit partners" and developing "strategic partnerships with the business units that the SCM organization supports" (Roh et al., 2016, p. 50). CSCOs understand the necessity of SCM and the importance of being supplier oriented (Wagner and Kemmerling, 2014). They are also co-creators of business strategy, processes, and policies (Swink et al., 2013), which allows them to promote their supplier-oriented agenda to other members of the TMT. Thus, firms with a CSCO on their TMTs are expected to experience a significant TMT-level drive to be supplier oriented. Because such a drive already exists within these firms' TMTs, the distinct role female executives play in enhancing firms' supplier orientation will be limited. While there might be cases where female TMT members can join forces with a CSCO and support the CSCO in getting their strategic SCM initiatives through, we expect, on average, the role of female TMT representation in supplier orientation to be reduced when a CSCO is present in a TMT, as the CSCO is likely to already be carrying out what is expected of female TMT members with regard to firms' supplier orientation.

On the other hand, firms without CSCOs are not likely to have a strong voice in the TMT promoting a supplier orientation (unlike firms with CSCOs). They likely lack TMT members promoting strong supply chain relationships and more effective development/management of suppliers. Thus, the presence of females on such firms' TMTs can be a more impactful driver of supplier orientation. In other words, there are more opportunities within firms without CSCOs for females to make a difference and facilitate a greater increase in supplier orientation since these firms' levels of supplier orientation are probably lower due to the absence of CSCOs.

Considering these insights, we theorize that there is more room for females on TMTs to facilitate the increase of supplier orientation when the extant levels of supplier orientation are low (i.e., when firms do not have CSCOs) than when the extant levels of supplier orientation are already high (i.e., when firms have CSCOs). Formally stated:

H3: The effect of an increase in female TMT representation on firms' supplier orientation is attenuated for firms with a CSCO on the TMT.

2.6. The female TMT presence-supplier orientation-firm performance relationship

The qualities of women as business leaders have been well documented (Hoobler et al., 2018). Consequently, the presence of females in TMTs has been linked to desirable firm outcomes, including corporate social responsibility (Setó-Pamies, 2015) and financial performance (Moreno-Gómez and Calleja-Blanco, 2018). However, less is known about *how* the presence of females on TMTs impacts firms' overall performance.

With regard to the direct link between female TMT presence and firm performance, one line of argument stems from the extensively researched link between TMT diversity and firm performance (Boone and Hendriks, 2008). This line of argument suggests that a diverse TMT, including female members, can bring various perspectives, experiences, and cognitive styles to the TMT decision-making process (Perryman et al., 2016). This diversity fosters more comprehensive and innovative problem solving, leading to well-rounded strategic decisions that consider a broader range of factors. Furthermore, organizations with diverse leadership are often more attractive to a diverse talent pool. Female representation in TMTs signals an inclusive workplace culture (Shore et al., 2018), which can enhance the recruitment and retention of high-caliber employees. In turn, a talented and diverse workforce can positively drive improved firm performance. Finally, strong relationships with different stakeholders are crucial for sustained success in today's interconnected business environment (Srivastava et al., 2023). Female TMT members may bring distinct relational and communication skills to leadership roles (Setó-Pamies, 2015). Effective communication and relationship building with stakeholders, including suppliers, can positively impact the firm's reputation and performance.

Nonetheless, beyond the direct influence of female TMT presence on firm performance, the materialization of female executives' actions is likely to impact firm performance. This perspective is shared by Post and Byron (2015, p. 12), who state that "previous models linking female board representation directly

to firm performance may be overly simplistic in that they overlook mediating factors that possibly link board composition to firm performance.” This perspective is also echoed by Hambrick (2007, p. 337), who refers to the lack of theory regarding the impact of TMT member composition (e.g., the representation of females on boards) on firm performance as the “proverbial black box.” We theorize that supplier orientation is one of the mediators of this relationship.

Extant studies have provided empirical evidence that the strategic-level orientation that underpins firms’ management of their supply chains leads to superior firm performance (Gligor, 2014). Specifically, research has indicated a direct connection between supplier orientation and different measures of firm performance (Allred et al., 2011). Further, earlier in the manuscript, we offered substantial arguments that female TMT presence directly impacts supplier orientation (see the arguments supporting H1).

Combined, these theoretical reasons indicate that supplier orientation not only directly impacts firm performance but also mediates the effect of female TMT representation on firm performance. Thus, we explore the following:

H4: An increase in female TMT representation positively impacts firms’ performance.

H5: The impact of an increase in female TMT representation on firms’ performance is partially mediated by firms’ supplier orientation.

Figure 1 presents the hypothesized relationships.

*****INSERT FIGURE 1 ABOUT HERE*****

3. Methodology

3.1. Data and sample

Our sample consisted of 433 publicly traded Fortune 500 firms. We observed these firms from 2007 to 2015. To reach our sample, we first selected all Fortune 500 companies in 2007. Second, we restricted ourselves to public firms and those that remained part of the Fortune 500 for at least two years during the 2007 to 2015 window. We constructed a panel dataset comprising eight years of observations in which the independent variables were measured annually at time t (with t ranging from 2007 to 2014), and the mediator (supplier orientation) and dependent variable (firm performance) were measured annually at time $t+1$ (i.e., from 2008 to 2015). Overall, we were left with 433 firms, with each firm observed for eight years, resulting in a panel of 3,464 firm-year observations.

3.2. Measures

3.2.1. Female TMT representation. Our primary measure of female TMT representation (FTMT) was the proportion of females in the TMT. For each firm-year, we used each firm’s DEF 14A and annual report to measure the proportion of females in the TMT. We also used three alternative measures of FTMT, namely: 1) a count measure, which took the value of the number of females in the firm’s TMT, 2) a binary measure,

which took the value of 1 if a female was part of the firm's TMT and 0 otherwise; and 3) a nuanced power-based composite measure that drew on work by Feng et al. (2015). According to this last power-based measure, for each firm-year, female TMT representation was measured (using DEF 14As and annual reports) using the following four indicators: 1) the proportion of females in the TMT¹; 2) the hierarchical standing score of the most highly ranked female executive; 3) the cumulative sum of the hierarchical ranking scores of all female executives within the firm's TMT; and 4) the quantum of responsibilities female TMT executives have as indicated in the title of their jobs listed in firms' proxy statements (DEF 14As) and annual reports (10-Ks)². For the second and third indicators of our alternative power-based measure, we used the scoring scheme developed by Feng et al. (2015) and measured female hierarchical rank by coding all female TMT executive job titles listed in firms' proxy statements (DEF 14A) or annual reports (10-Ks): 5 = president and/or CEO, 4 = executive vice president, 3 = senior vice president, 2 = vice president, and 1 = no female top managers.

For our power-based measure of female representation, we used factor analysis to combine our four indicators into one. Our four indicators were strongly correlated (with bivariate correlations ranging from 0.69 to 0.89) and loaded on a single factor, accounting for 76% of the total variance, while the lowest item loaded at 0.78. The Bartlett factor scores from our factor analysis were multiplied by their respective factors. The products were summed to calculate our power-based female TMT representation (FTMT) measure for each firm-year.

3.2.2. Environmental dynamism. Using the approach of Bahadir et al. (2008), we measured environmental dynamism by first grouping industries using their two-digit SICs. Next, we regressed each firm's total industry revenues on time for the ten years preceding the focal year. We then calculated the root mean squared error (RMSE) for the regression and divided this by the mean industry sales for the ten years of data preceding the focal year to identify the sales' coefficient of variation (CV). Finally, the sales' coefficient of variation (standardized) was used to measure environmental dynamism.

3.2.3. Environmental munificence. Following Branzei and Thornhill (2006), we measured environmental munificence by the average net sales growth rate during the last five years leading up to the focal year for the firm's industry (at two-digit SIC levels). Here, higher values of the average net sales growth rate for the firm's industry indicated more munificent environments (Heeley et al., 2006).

¹ We included all executive officers mentioned in either the 10-K reports or DEF 14As with a rank of at least vice president as members of the TMT. Note that we considered all "executive officers" and not just "named executive officers." Named executive officers are a subset of executive officers that comprises the CEO and the three most highly compensated executives. In line with prior research (e.g., Kashmiri, Nicol, and Arora 2017), we defined executive officers more broadly, so we did not restrict ourselves only to named executive officers.

² For example, a female with the title "Chief Marketing and Supply Chain Officer" or "Executive Vice President Marketing and Sales" would be considered to have two responsibilities, while one with the title "Chief Marketing Officer" would be considered to have only one.

3.2.4. *Supplier orientation.* To measure supplier orientation, we followed the approach of Short et al. (2010), Brigham et al. (2014), and Kashmiri and Brower (2016). This approach has also been used more recently by Srivastava et al. (2022) to measure concepts such as customer orientation. The DICTION 7.0 text analysis software (Hart, 2001) was utilized to examine every company's 10-K reports for the focal year and record their supplier orientation-related words.

The validity of the supplier orientation measure was assessed using the approach proposed by Short et al. (2010), and Brigham et al. (2015). This methodology begins with the creation of a list of words deductively generated from current supplier orientation literature. We also carefully considered extant operationalizations of the construct. As Appendix W1 (E-companion) indicates, scholars have operationalized supplier orientation in various ways, typically using perceptual measures through surveys. While some of these operationalizations share some common themes, others have very little common ground. Given the diversity and breadth of these operationalizations, it is apparent that the construct of supplier orientation captures a wide variety of supplier-related phenomena. Current definitions and interpretations of supplier orientation were also analyzed to identify words and synonyms representative of a firm's supplier orientation. The construct's breadth and depth of operationalizations and conceptualizations informed our approach to arrive at a comprehensive and verifiable account of supplier orientation. Three SCM scholars independently compiled a list. Holsti's (1969) method was employed to evaluate interrater reliability: specifically, $PAO = 3A / (nA + nB + nC)$, where PAO represents the observed agreement, A represents the number of agreements amongst the three raters, and nA, nB, and nC represent each rater's individual number of codes. Although the literature does not provide fixed thresholds for interrater reliability, some studies indicate that coefficients ranging from .70 to .80 are acceptable. The observed interrater reliability for supplier orientation of .91 indicates high reliability. The final comprehensive list contained the following words: "supplier," "seller," "dealer," "contractor," "vendor," "provider," "wholesaler," "manufacturer," "distributor," "broker," "producer," "fabricator," "partner," "associate," "affiliate," "trader," "merchant," "third party," "3PL," "supply," "supply chain," "supply network," "value chain," and "value network."

Since we used the definition of supplier orientation as "a close and long-term relationship between the suppliers and the firm, who share risks and rewards, and have the willingness to keep the relationship over the long term to provide value to end users" (He et al., 2011, p. 9), we set the following constraints: for a firm's dictionary of supplier orientation to count towards the firm's supplier orientation score, the firm's 10-K report had to use the words "partner," "partnership," "relation," or "relationship" while referring to its suppliers (or any other terms associated with suppliers in the dictionary of words above such as "vendors," "dealers," "associates," "traders," "third party," "brokers," "distributors," etc.) at least once in its 10-K report. If this criterion was met, we used the frequency of the supplier orientation words presented earlier (normalized to per 1,000 total 10-K words) as our measure of supplier orientation. If this criterion was not met (i.e., the firm never

highlighted its partnership or relationship with the supplier), the firm was given a supplier orientation score of 0. As a robustness check, we dropped this constraint, and our overall results remained the same. Overall, the mean value of supplier orientation in our sample was 0.50 words (per 1,000 10-K report words). The mean supplier orientation value we found was roughly in line with similar orientation-related measures found by previous scholars using 10-K reports. For example, Kashmiri et al. (2017) reported average competitive aggressiveness and customer orientation measures (based on per 1,000 words of 10-K reports) to be 0.98 and 3.50, respectively.

Previous researchers have shown that because of inertia, firms are likely to change their orientation slowly (e.g., Narver and Slater, 1990). To test this prediction, we classified each firm according to its decile of supplier orientation across each year of observation. If our measure of supplier orientation was valid, we would expect the mean probability of firms remaining in the same supplier orientation decile in the next period to be significantly greater than 10%. Indeed, we found that firms in the lowest decile of supplier orientation in any one year remained in the lowest decile of supplier orientation in the subsequent year 76% of the time. Similarly, firms that were in the highest decile of supplier orientation in one year remained in that decile in the following year 72% of the time. Overall, the probabilities of firms remaining in their respective deciles in the subsequent year rather than moving to a different decile were found to be significantly higher than 10%, with the probabilities of firms moving to a different decile rapidly decreasing the more we moved away from the focal decile. These results provided additional confidence about the validity of our supplier orientation measure.

3.2.5. CSCO presence. To measure CSCO presence, we defined CSCOs as “TMT-level executives who are explicitly responsible for enterprise-wide supply chain management activities” (Roh et al., 2016, p. 50). These activities include “overseeing sourcing strategies, ensuring intra- and inter-firm integration, managing supply chain risks, building and maintaining partnerships with key customers and suppliers and supervising production and logistics operations” (Korber and Cotta, 2021, p. 496). We used firms’ 10-Ks and proxy statements to code the inclusion or absence of a CSCO in the firm’s TMT as a 1 or 0, respectively³. We assigned a 1 if the firm’s C-suite included an executive whose title or title description indicated that the executive was responsible for SCM activities such as sourcing and procurement, logistics management, and collaboration with channel partners. To keep our measurement objective, we used Hendricks et al.’s (2015) approach and looked for the keywords “chief” or “president” or “director” or “head” within ten words of the

³ Firms with a female CSCO had a CSCO score of 1, and a female CSCO was also included while measuring the firm’s female representation in the TMT overall. We did not find any significant difference in the proportion of females in the TMT and the proportion of females in the role of CSCO, with 13.5% of TMT member roles filled by females and 13.0% of CSCO positions filled by women.

word “supply” or “procurement” or “sourcing” or “manufacturing” or “logistics” or “distribution” or “purchasing⁴.”

3.2.6. Firm performance. We utilized return on assets (ROA) as an objective, accounting-based, resource-oriented measure of firm performance. We used COMPUSTAT to measure ROA and defined it as income divided by total assets. A key advantage of considering ROA as a performance measure is that since it is a resource-oriented measure, it is likely to be affected first by supplier orientation. As an alternative measure of firm performance, we used Tobin’s Q as a forward-looking, risk-adjusted measure that is considered appropriate for measuring the long-term effects of market-based assets such as customer relationships (Kashmiri and Mahajan, 2017).

3.2.7. Control variables. A wide variety of time-variant TMT and firm-level factors were employed as controls when modeling supplier orientation and ROA as dependent variables. Using data from the ISS database and DEF 14A filings, we controlled for female board representation (measured as the percentage of females on the board for each firm-year), as greater female board representation may also affect firms’ supplier orientation and, in turn, firm performance. Using 10-K reports and DEF 14A filings, we controlled for TMT size (measured as the number of TMT members for each firm-year) because larger top management teams potentially have more perspectives contributing to SCM-related decision-making processes. To account for the possibility of firms’ supplier orientation and financial performance being influenced by their executives’ tenure, we controlled for average TMT tenure (measured as the mean tenure in years of all TMT members) and average female tenure (measured as the mean tenure in years of all female TMT members), using information about executives’ tenure from firms’ 10-K reports and DEF 14A filings. Using COMPUSTAT data, we controlled for firm size (natural logarithm of the total number of employees in thousands) to account for the possibility of larger firms feeling greater pressure to invest in supplier relationships. We controlled for firm age (measured as the number of years since the firm was founded) using information on the companies’ history from their corporate websites, as younger and older firms may have different supplier orientations and firm performance. Using COMPUSTAT data, we controlled for firm leverage (long-term debt divided by total assets) as more leveraged firms may be more constrained in their efforts to build strong supplier relationships. Table 1 in the E-Companion summarizes the description of the variables’ measures and sources.

We also included year dummies to account for time-specific fixed effects. Finally, we included an endogeneity control and a sample selection bias correction. Table 2 in the E-Companion details the descriptive statistics and correlations for all the relevant variables. As this table indicates, we found the correlations between our independent variables to be below the .50 threshold. Furthermore, the variance inflation factors were found to

⁴ Many job titles comprised fewer than ten words in total. Our constraint of “within ten words” meant that for such job titles (that had fewer than ten words), as long as these job titles included one of the words from list A, and one of the words from list B, the executive would be classified as a CSCO: A) “chief,” “president,” “director,” “head”; and b) “supply,” “procurement,” “sourcing,” “manufacturing,” “logistics,” “distribution,” “planning.” For other job titles and title descriptions, the “within ten words” constraint ensured that a word from list A was used in conjunction with a word from list B qualifying the individual as a CSCO.

be less than 10, and the eigenvalues' condition indices were less than 30. These results suggest that the results in the regression models (presented next) are not unduly influenced by multicollinearity.

4. Analyses and results

4.1. Model specifications

To conduct our analyses, we used fixed-effects regressions as they are appropriate for analyzing panel data, particularly when there are concerns about unobservable time-invariant omitted variables. To test H1–H3, we employed the following equations for firm i in time period t , first testing them independently, and then (as a robustness check) simultaneously.

$$(1) SO_{it+1} = \delta_0 + \delta_1 FTMT_{it} + \delta_2 (FTMT_{it} \times EDYN_{it}) + \delta_3 (FTMT_{it} \times EMUN_{it}) \\ + \delta_4 (FTMT_{it} \times CSCO_{it}) + \delta_5 \mathbf{Z}_{it} + \delta_6 \mathbf{D}_t + \alpha_i + \varepsilon^1_{it+1}$$

$$(2) PERF_{it+1} = \beta_0 + \beta_1 SO_{it+1} + \beta_2 FTMT_{it} + \beta_3 \mathbf{Z}_{it} + \beta_4 \mathbf{D}_t + \alpha_i + \varepsilon^2_{it+1}$$

Here, SO is supplier orientation; PERF is firm performance; FTMT denotes female representation in the TMT; EDYN is environmental dynamism; EMUN is environmental munificence; CSCO is Chief Supply Chain Officer presence. The vector \mathbf{Z} comprises 12 time-varying control variables: the three moderators, female board representation, TMT size, average TMT tenure, average female tenure, firm size, firm age, firm leverage, endogeneity control (as explained later), and Mills lambda to control for sample selection bias (as explained later). The vector \mathbf{D} comprises seven-year dummies (with the year 2007 as a base). The inclusion of these year dummies (i.e., time-specific fixed effects) helped us control for exogenous shifters that might influence a firm's supplier orientation or financial performance. In Equation (1) (i.e., the mediating path), δ_1 captures the main effect of FTMT on supplier orientation (i.e., H1), δ_2 , δ_3 , and δ_4 represent the hypothesized moderating effects (i.e., H2a, H2b, and H3, respectively), δ_5 is the parameter vector corresponding to the 12 control variables in \mathbf{Z} , and δ_6 captures the effects of the seven-year dummies in \mathbf{D} . α_i are firm-specific fixed effects that capture heterogeneity across firms, and ε^1_{it+1} are the error terms.

In Equation (2), the parameters β_1 and β_2 are the performance effects of supplier orientation and FTMT, respectively. We included a direct effect of FTMT on performance for model completeness (i.e., to capture the effect of FTMT on performance beyond the variation explained by the mediating path). The parameter vector β_3 captures the effects of the 12 control variables in \mathbf{Z} (including the three moderators, the seven additional controls, an endogeneity control, and Mills lambda), and β_4 captures the effects of the seven-year dummies in \mathbf{D} . Finally, α_i and ε^2_{it+1} represent firm-specific intercepts (which capture unobserved heterogeneity) and error terms, respectively.

4.2. Addressing endogeneity concerns

In our empirical model, the inclusion of firm-specific fixed effects allowed us to rule out time-invariant firm attributes as potential omitted variables. We also controlled for an extensive list of variables that reflect observed variations in firms over time. Nevertheless, it is possible that we did not capture other time-variant

variables that influence a firm's decision to hire or promote females in their TMT. Furthermore, other time-variant variables known to the firm but not directly observable by us may exist. To address these potential endogeneity concerns, we used the control function approach that previous researchers used to deal with endogeneity concerns in linear and nonlinear models (Petrin and Train, 2010). Following this approach, we first estimated an auxiliary equation with FTMT as the dependent variable using the following specification:

$$(3) FTMT_{it} = \alpha_0 + \alpha_1 WPFTMT_{it} + \alpha_2 EDYN_{it} + \alpha_3 EMUN_{it} + \alpha_4 CSCO_{it} + \alpha_5 C_{it} + \alpha_6 D_t + \alpha_i + \varepsilon_{it}.$$

Specifically, we regressed the focal endogenous variable (FTMT) on an instrumental variable (WPFTMT) plus a set of control variables and then obtained the reduced-form residuals. We used the weighted average FTMT score of peer firms in the same SIC two-digit industry (WPFTMT) as our instrumental variable (Germann et al., 2015; Petrin and Train, 2010). Here, EDYN, EMUN, and CSCO represent our three moderators, and vector C is comprised of the other seven control variables besides endogeneity control and Mills lambda in Equations (1) and (2): firm size, firm age, firm leverage, female board representation, TMT size, average TMT tenure, and average female tenure.

We classified peer firms as sample firms that shared at least one of the focal firm's two-digit Standard Industrial Classification (SIC) codes. We used the number of sample firms in each two-digit SIC code that a focal firm was listed in (excluding the focal firm itself) to calculate the weights and used these weights to measure the weighted average of peer firms' FTMT for each firm-year.

Peer-based instruments are often criticized for insufficient systematic variation in the group composition, potentially introducing significant biases into the analyses (Angrist, 2014). For example, if the peers' average FTMT is used as an instrument with firms having the same primary two-digit SIC code considered as peers, there is little variation in the instrument's value across firms in the same industry and over time for the focal firm: The only source of variance in the instrument across firms in the same industry comes from the exclusion of the focal firm, and firms typically maintain the same primary two-digit SIC code over time. Our instrument (i.e., weighted average peer firms' FTMT scores), on the other hand, relies on: (a) considering *all* two-digit SIC codes (both primary and secondary) a focal firm belongs to; (b) the creation of groups that partially overlap in terms of the various two-digit SIC codes they belong to; and (c) different weights of peers based on the different number of sample firms in each overlapping two-digit SIC code for the focal year. Our instrument is, therefore, likely to show significant variation across firms and over time, alleviating concerns of granularity (i.e., insufficient systematic variation in group composition).

4.3. Instrument validity: relevance and exclusion condition

Building on work by Germann et al. (2015), we suggest that the weighted average peer firms' TMT score is a good instrumental variable (IV) that meets the criteria of instrument relevance (i.e., our IV WPFTMT is likely to predict FTMT), and also meets the exclusion restriction (i.e., WPFTMT is likely to be uncorrelated with the error term that contains the omitted variables).

First, firms operating in the same industry are likely to face similar market conditions and have similar expectations for the future. Indeed, choices related to the TMT of competitors in the same industry may reflect industry norms (Kashmiri and Mahajan, 2017). CEOs, board members, and hiring committees are also likely to be influenced by their peers' hiring choices while making their TMT appointment decisions (Cohen and Levinthal, 1989). Therefore, we expect our instrument to be positively associated with the focal firm's FTMT, satisfying the condition of instrument relevance.

Second, firm-level variables such as firm culture are the omitted variables that we are concerned about with regard to the exclusion restriction. To the extent that the focal firm's peers can neither collectively measure its culture nor act on it, the exclusion restriction also seems to be satisfied. Indeed, previous researchers (e.g., Grewal and Slotegraaf, 2007) have argued that a firm's organization culture is embedded in it, making it difficult for outsiders such as peers to measure it. Furthermore, because most firms have multiple two-digit SIC codes (i.e., primary and secondary codes), a large number of firms is used to calculate a focal firm's WPFTMT score. Thus, it is highly unlikely that all peer firms will cooperate to take collective action against a single focal competitor and simultaneously form partnerships to act against other competitors (Han et al., 2017). All in all, because peer firms lack the ability to measure and collectively act upon a focal firm's omitted variables (e.g., firm culture), our instrument (WPFTMT) is unlikely to be correlated with the error term that contains the omitted variables, thereby satisfying the exclusion restriction.

Table 3 in the E-companion presents the results of our auxiliary equation. As shown in this table, we found that weighted average FTMT scores of peer firms, environmental munificence, female board representation, firm age, TMT size, and average female tenure were positively and significantly related to FTMT, while CSCO presence and firm size were negatively and significantly related to FTMT. The residuals obtained from the auxiliary equation were then plugged into subsequent regressions dealing with Equations (1) and (2) as endogeneity controls.

4.4. Addressing sample selection bias concerns

Our final sample consisted of 433 Fortune 500 publicly traded firms that were part of the Fortune 500 list in 2007 and remained part of the Fortune 500 list for at least two years during the 2007–2015 window. It is possible that our analyses suffered from sample selection bias. This bias may occur if there are systematic differences in the dependent variables between our sample firms (firms that were part of the Fortune 500 and, therefore, more likely to be selected) and firms that were not part of the Fortune 500. We mitigated this possible sample selection bias by executing a two-stage Heckman analysis. We constructed a bigger sample comprising the entire COMPUSTAT database from 2007 to 2014, for which data were available. This led us to track 10,201 firms, including the 433 Fortune 500 firms from our original sample. We first estimated a probit selection model on these 10,201 firms in the database where the dependent variable was 1 for each year (during the 2007–2014 window) for which the firm was a member of the Fortune 500 list and 0 otherwise. We

obtained the inverse Mills ratio (IMR) from the Heckman first-stage selection model, which we then included as a control variable in all our subsequent second-stage regressions. The results of our first stage are presented in Table 4 in the E-Companion. Firms with greater revenue, those with greater total assets, and those with lower leverage were found to have a greater probability of being part of the Fortune 500 list and thus being selected in our sample⁵. The inclusion of the IMR as a control variable in subsequent regressions dealing with Equations (1) and (2) helped alleviate sample selection bias concerns.

4.5. Main analysis

To formally test our hypotheses, we first analyzed the relationship of FTMT with supplier orientation and ROA by modeling Equations (1) and (2) separately (via separate fixed-effects regressions), after the inclusion of the various control variables (including control function residuals and the IMR found earlier), and then conducted a robustness check to determine whether our results changed if we tested our entire conceptual model jointly by simultaneously modeling Equations (1) and (2). We included firm fixed effects by conducting a within-firm transformation of all the variables (Wooldridge, 2010). Specifically, we centered all observations around their firm means across time. By doing so, our models could explain the variations in the firm means of the dependent variables in terms of the variations in the firm means of the independent variables for each given firm. Note that according to the Frisch-Waugh theorem, the estimates obtained from within regression are numerically equivalent to the estimates obtained if we were to alternatively include firm-specific dummy variables in our regression (Wooldridge, 2010).

Models 1–3 in Table 5 present the results of our analysis testing the link between FTMT and supplier orientation. In Model 1 (Table 5), when we only added the control variables (including the moderators), we found that CSCO presence, female board representation, TMT size, firm age, and firm leverage were positively and significantly related to supplier orientation, while firm size was negatively and significantly related to supplier orientation. In Model 2 (Table 5), when we included FTMT as an explanatory variable, we found that firms with a relative increase in female TMT representation are associated with higher supplier orientation levels ($\beta = 0.99, p < 0.01$), offering support for H1. Furthermore, in support of H2a, we found in Model 3 (Table 5) that the interaction between FTMT and environmental dynamism has a negative and significant effect ($\beta = -6.92, p < 0.01$) on supplier orientation, indicating that the impact of female TMT representation on supplier orientation is attenuated when environmental dynamism is high. Similarly, we found support for H2b in Model 3 (Table 5): The interaction between FTMT and environmental munificence has a positive and significant coefficient ($\beta = 2.56, p < 0.01$), suggesting that the effect of FTMT on supplier orientation was higher under conditions of high environmental munificence. Finally, in support of H3, we

⁵ For the first stage, we employed a random-effects probit model to account for the lack of independence across multiple observations of the same firm. However, our overall results remained robust with the use of a pooled probit regression model with cluster-robust standard errors.

found in Model 3 (Table 5) that the interaction between female TMT representation and CSCO presence has a negative and significant coefficient ($\beta = -.38, p < 0.05$), indicating that the link between female TMT representation and supplier orientation is attenuated when firms have a CSCO in their TMT.

*****INSERT TABLE 5 and 6 ABOUT HERE*****

Models 4–6 in Table 6 present the results of our analysis testing the link between FTMT and ROA. We found (Model 5 in Table 6) a positive and significant relationship between FTMT and ROA ($\beta = .49, p < .01$), indicating support for H4. We also found (Model 6 in Table 6) a positive and significant relationship between supplier orientation and firm performance ($\beta = .02, p < .01$) and a slight decrease in the coefficient of FTMT ($\beta = .47, p < .01$) following the inclusion of the mediator. This finding provided preliminary evidence in support of H5, suggesting that the positive relation between FTMT and firm performance may be partially mediated by supplier orientation (Barron and Kenny, 1986).

Next, we determined whether our results held if we modeled our entire conceptual framework jointly by modeling Equations (1) and (2) simultaneously and allowing the error terms in Equations (1) and (2) to be correlated. To do this analysis, we employed STATA's `sureg` command after incorporating firm and year fixed effects. As Table 7 in the E-Companion reveals, our results did not change when we employed a simultaneous equations approach, with FTMT being positively associated with supplier orientation and ROA, and the interaction effects of the proposed moderators being significant and in the hypothesized direction.

Finally, we used a bootstrapping approach to compute the total effect of FTMT on ROA, the indirect effect of FTMT on ROA via supplier orientation, and the conditional indirect effect of FTMT on various levels of the moderators. We obtained conditional indirect effects by bootstrapping the products of the coefficients from the simultaneous equation models with selected values of the moderator variables, where high values of continuous moderators (environmental dynamism and environmental munificence) were one standard deviation above the sample mean, and low values were one standard deviation below it, and high values of the binary variable (CSCO presence) took the value of one, which corresponded to the condition where the CSCO was present in the TMT. We bootstrapped the mediation effects using STATA's `bootstrap` command, selecting 10,000 replications. As a robustness check, we used STATA's `nlcom` command, with results of the coefficients being very similar and overall conclusions remaining the same. As shown in Table 8 in the E-Companion, we found support for H4, with the total effect of FTMT on ROA being positive and significant ($\beta = .50, p < .01$). FTMT was also found to have a positive and significant indirect effect on ROA via the mediator supplier orientation ($\beta = .026, p < .01$). The indirect effect's 95% confidence interval (CI) did not contain zero (95% CI = 0.003, 0.049), thus supporting H5. Finally, as shown in Table 8, we found support for our overall moderated mediation framework: The indirect effect of FTMT on ROA via supplier orientation was higher in contexts with low environmental dynamism ($\beta = .029, CI = .002, .056$) and high environmental

munificence ($\beta = .028$, CI = .003, .054) and lower when a CSCO was present in the TMT ($\beta = .019$, CI = .001, .037).

4.6. Additional analysis: the moderating effect of female CSCOs and male CSCOs

Does the proposed moderating effect of CSCO presence on the link between FTMT and supplier orientation only occur if the CSCO is of a particular gender (female or male)? To answer this question, we categorized CSCOs separately into male and female CSCOs. We included both male and female CSCO dummy variables and their separate interaction terms with FTMT in Equation 1 and reran our fixed-effects regression with supplier orientation being the dependent variable. The results of our analysis are shown in the E-companion (Appendix 2). Our results reveal that the moderation effect of CSCO presence on the link between FTMT and supplier orientation is negative for both female and male CSCOs. However, while the negative interaction effect of female CSCO presence is significant at .05, the negative interaction effect of male CSCO presence is significant at the .10 level, and insignificant at the .05 level. All in all, our results seem to suggest that the positive effect of FTMT on supplier orientation is attenuated by CSCO presence regardless of whether the CSCO is female or male. Theoretically speaking, our results indicate that having a CSCO (whether female or male) is likely to increase the levels of supplier orientation, leaving less room for females on TMTs to facilitate further increases in supplier orientation.

4.7. Additional analysis: serial correlation and heteroskedasticity

We analyzed whether our results were robust to serial correlation and heteroskedasticity concerns by repeating the simultaneous equation modeling approach presented in Table 7, but employing Huber-White cluster-robust standard errors. The results of this analysis, presented in the E-companion (Appendix W3), are also similar to those in Table 7. However, when we employed Huber-White cluster-robust standard errors, all three moderating effects (i.e., H2a, H2b, and H3) were only significant at the .05 significance level rather than at the .01 significance level.

4.8. Additional analysis: measuring FTMT as a count, binary, and power-based variable

Our measure of female TMT representation was the proportion of females in the TMT. We tested the robustness of our results to three alternative measures of FTMT, namely: a) a count variable where FTMT was measured as the number of females in the TMT; b) a binary variable where FTMT was measured as 1 if at least one female was part of the firm's TMT in the year of observation and 0 otherwise; and c) an alternative composite measure that takes into account the number, hierarchical rank, and responsibilities of females in the TMT. In the E-Companion (Appendix W4), we share the results of this additional analysis in which (as in Table 7) we modeled our entire conceptual framework jointly by modeling Equations (1) and (2) simultaneously and allowing the error terms in these equations to be correlated. We found that all our conclusions remained the same when we used a count-based and power-based measure of FTMT. However, when we used the binary measure of FTMT, while we found a marginally positive effect of FTMT on ROA (β

= .03, $p < .10$), we did not find support for the proposed effect of FTMT on supplier orientation or the hypothesized moderating effects. These results may be driven by the fact that the overwhelming majority of firm-year observations (76%) involved having at least one female in the TMT, leading to very little variation within and across firms in our binary measure of FTMT. Furthermore, these results suggest that the mere presence or absence of females in the TMT does not influence firms' supplier orientation and, in turn, ROA: For females to have an influence, they need to have a threshold number in the TMT and power and authority in decision-making. We caution against the use of a binary variable (presence of at least one female in the TMT) as a measure of FTMT as previous researchers have demonstrated the disadvantages of converting a continuous predictor variable into a binary variable (Irwin and McClelland, 2003): These researchers have shown that the use of binary predictor variables may result in considerable loss of power. Indeed, considerable variability may be subsumed within each group (a firm that has six women in its TMT, for example, and one that has only one woman in its TMT are both considered to have an FTMT score of 1 if FTMT is measured as a binary variable, despite female representation clearly being much higher in the former firm). Furthermore, in measuring FTMT as a binary variable, we assume that firms close to, but on opposite sides of, the cutoff point (no women in the TMT vs. one woman in the TMT) have very different rather than very similar outcomes, which is also an unrealistic assumption.

4.9. Additional analysis: using Tobin's Q as a measure of firm performance

In the E-Companion (Appendix W5), we share the results of this additional analysis in which we used Tobin's Q rather than ROA to measure firm performance. We measured Tobin's Q by employing Chung and Pruitt's 1994 formula on firms' COMPUSTAT data. As in Table 7, we modeled our entire conceptual framework jointly by modeling Equations (1) and (2) simultaneously and allowing the error terms in these equations to be correlated. We found that all our conclusions remained the same when we used Tobin's Q to measure firm performance.

5. Implications

We accessed archival data from publicly traded US firms to empirically understand how the presence of women on TMTs influences supplier orientation. Next, we discuss the implications obtained from the findings.

5.1. Theoretical contributions

The current manuscript makes several theoretical contributions, as our research is among the first to explore how female executives can influence supplier orientation. First, we augment the scarce literature investigating the role and impact of females in SCM (Park and Krishnan, 2005; Smith, 2012). Past research showed that men and women use different criteria for evaluating and selecting suppliers (Park and Krishnan, 2005) and exhibit different perceptions concerning their firm's approach to SCM initiatives (Smith, 2012). We augment

this limited literature by revealing that TMT females promote closer supplier relationships than their male counterparts.

Second, we contribute to the research on supplier orientation by revealing strategic-level factors (e.g., TMT composition) that facilitate its development. Although past studies provided important insights, they primarily focused on the consequences of supplier orientation while providing few insights into its drivers (Allred et al., 2011). To the best of our knowledge, the current manuscript is one of the first to offer insights into the strategic-level drivers that contribute to the development of supplier orientation. The results indicate that female TMT representation positively and directly influences the firm's supplier orientation.

Third, we present a more detailed perspective on the relationship between firms' TMT composition and supplier orientation by exploring the moderating role of CSCO presence on TMTs. Thus, we respond to Roh et al.'s (2016) call to address the lack of studies on the connection between upper-echelon leadership and SCM phenomena. As Roh et al. (2016, p. 48) noted, "in light of the rising number of CSCO appointments and the growing importance of CSCO roles..., more research on CSCOs is needed." Our findings indicate that the relationship between female TMT representation and firms' supplier orientation is attenuated for firms with a CSCO on the TMT. This finding helps offer another building block in the process of building theory in the severely limited literature exploring the impact of CSCOs.

Fourth, by exploring the moderating role of environmental dynamism and munificence, we augment the literature examining the influence of these environmental conditions on supplier orientation (Gligor, 2014; Patel et al., 2013). We put forth a more comprehensive perspective on the determinants of supplier orientation as our findings suggest that the effect of female TMT representation on firms' supplier orientation is attenuated for firms that operate in environments characterized by high dynamism and low munificence. We found evidence that this is because firms operating in such environments already experience significant environmental pressure to be supplier oriented as a prerequisite for firm competitiveness. Thus, female executives on the TMT have less room to facilitate the increase of supplier orientation because the extant levels of supplier orientation are already high.

Finally, we expand the literature by investigating the influence of female executives on various aspects of firm performance (Dezsö and Ross, 2012; Hambrick, 2007). We directly address Post and Byron's (2015) call for researchers to explore the possible mediating factors linking female TMT representation to firm performance, or what Hambrick (2007, p. 337) labels the "proverbial black box." We augment this stream of literature by revealing that supplier orientation mediates the effect of female TMT representation on firm performance.

5.2. Practical contributions

Our study also prompts several managerial observations. The findings reveal to managers how they can promote the development of supplier orientation within their organizations. The study indicates that the

presence of female executives on TMTs can help improve firms' supplier orientation. Given that supplier orientation has been connected to a plethora of benefits for firms, improving supplier orientation is a desirable goal. Firms should assess the gender composition of their TMTs to ensure adequate female representation. This would offer women equal leadership opportunities and also help improve firms' supplier orientation.

However, managers should be aware that simply appointing more females to the TMT does not automatically result in significantly higher supplier orientation. Some caveats must be disclosed. Our results posit that the influence of female TMT representation on firms' supplier orientation is attenuated for firms with a CSCO on the TMT and for firms operating in environments characterized by high dynamism and low munificence. That is not to say that, under these circumstances, female presence on the TMT cannot help improve firms' supplier orientation, but rather that the effect might not be as impactful as it would be for firms without CSCOs or operating in less dynamic or more munificent environments.

Given that women are currently underrepresented at the top corporate level, with only 7.4% of the Fortune 500 CEO positions being held by women (Ebrahimji, 2020), our research underscores the importance of having more gender-balanced TMTs. Our findings indicate to managers that female executives can improve financial performance. While we point out that firms are more likely to experience a significant increase in supplier orientation as a result of enhanced female TMT representation under certain conditions (i.e., absence of CSCOs, low environmental dynamism, high environmental munificence), it is important to point out that firms can expect to experience improved financial performance irrespective of the presence/absence of a CSCO or the firms' levels of environmental dynamism.

Managers can use the supplier orientation scale we developed in this manuscript to assess their own firms' current levels of supplier orientation. Specifically, we recommend firms benchmark against competitors in their respective industries to assess whether their extant levels of supplier orientation are adequate. To that end, the measures we have provided in this manuscript can be applied to assess firms' competitors as they are based on publicly available data, not on perceptual, self-reported data.

Importantly, we do not suggest to managers that, to experience superior performance, firms should pursue more collaborative relationships with all their suppliers. Female TMT representation promotes supplier orientation as a firm-level philosophy. However, at the operational level, supply chain managers must determine which suppliers the firm should develop close relationships with and how.

The empirical insights helped explain the link between female TMT representation and supplier orientation. Female executives impact firms' strategic approach to supplier management by initiating, proposing, and supporting strategic initiatives that recognize the importance of relationship building. This finding indicates that females may utilize their relationship-building skills to influence other TMT members and thus channel them to support and further drive strategic initiatives that value relationship building with

outside parties, including suppliers. Thus, our findings highlight the instrumental role female executives may assume in building and managing relationships across organizational boundaries.

6. Limitations and future research

The current study is not free of limitations, which offers opportunities for future research. First, our samples consisted of US firms and used ROA, a resource-oriented measure of firm performance. Considering the cultural differences across different countries, it is possible that the presence of females on TMTs might lead to different outcomes in countries in other regions, such as Asia or the Middle East. Future studies should replicate our findings with data collected in regions of the world that are culturally different from the US and explore whether our results hold true for inventory turnover and other resource-oriented measures of firm performance. Second, our sample contains firms from multiple industries. While this approach helped increase the generalizability of the findings, it does not help provide insights into specific industries. Even though we accounted for firms' SIC classification in our models, it is possible that the representation of females on TMTs has different effects across different industries. Future research should attempt to replicate our findings by focusing on specific industries. For example, significant differences might exist between industries where female representation on TMTs is relatively high and industries where female representation on TMTs is relatively low. Third, we focused on the impact of females present in firms' TMTs. It would also be interesting for future studies to examine whether females at lower organizational levels impact supplier orientation or other desirable phenomena.

Fourth, we focused on the impact of female TMT presence on supplier orientation. Future studies should examine whether the presence of females on TMTs also impacts other desirable SCM phenomena, such as supply chain agility, flexibility, or resilience. Likewise, future studies can explore whether female top managers emphasize building relationships with suppliers more than their male counterparts and express this emphasis to their TMT colleagues. Fifth, we examined the moderating roles of CSCO presence, environmental dynamism, and environmental munificence. However, as discussed earlier, other factors might play a moderating role, such as the levels of TMT conflict and power struggles.

Sixth, our findings indicate that female TMT presence impacts supplier orientation, while Tang et al. (2020) found that it impacts ambidextrous strategic orientation, so it is plausible that it might impact additional firm-level orientation. For example, future studies could examine its impact on market, innovation, or entrepreneurial orientations. Seventh, in our sample, we did not have firms with very high female TMT representation. Consequentially, in additional analysis whose results we have not shared, we were unable to find nonlinear effects where, after a certain threshold level of female representation, a further increase in female representation may decrease firm performance. However, such a nonlinear effect is possible if one tests our model with data where some firms have very high female TMT representation. We encourage future research to explore this possibility.

Eighth, future studies should focus on additional gender-related differences related to SCM. For example, given females' interdependent self-construal, future research should explore whether females are more lenient than males with their suppliers when service failures occur. This would provide practical insights into gender-related differences between female and male supply chain managers.

Ninth, while our study offers novel insights, we also acknowledge that different scenarios could exist due to various compositions of TMTs. Consider the following two scenarios: (i) only one female TMT member who is the CSCO versus (ii) one female TMT member who is not a CSCO and a male CSCO. Our empirical approach does not offer insights into the possible differences in effect between the two scenarios. Future research should consider such plausible scenarios and complement our study by offering insights into possible effect differences between these conditions.

Finally, researchers should present a balanced perspective that is not gender-biased. As such, while our study focused on the positive impact of female TMT representation, future studies should also examine the positive impact of male TMT representation on various desirable organizational outcomes. Such studies could help avoid creating negative misperceptions of male leadership.

Table 5
Association between female TMT representation and supplier orientation

Model	Model (1) (coefficient/SE)	Model (2) (coefficient/SE)	Model (3) (coefficient/SE)
Independent variable			
Female representation in TMT (FTMT)		.99(.06)***	1.42(.16)***
Controls			
Female board representation	.67(.24)***	.51(.23)**	.49 (.23)**
TMT size	.03 (.01)***	.02 (.01)***	.02 (.01)***
Avg. TMT tenure	-.01(.01)	-.01(.00)***	-.01(.00)***
Avg. female tenure	.00(.01)	-.01(.01)**	-.01(.01)**
Firm size	-.14 (.04)***	-.10 (.04)**	-.13 (.04)**
Firm age	.02(.01)**	-.00(.01)	-.01(.01)
Firm leverage	.27(.15)*	.23(.15)*	.21(.15)*
Moderator			
Environmental Dynamism	-3.41(2.43)	-3.94(2.32)*	-1.71 (2.36)
Env. Dyn. X Female Rep			-6.92(1.89)***
Env. Munificence	.54(.45)	.17(.43)	-.35(.45)
Env. Munificence X Female Rep			2.56(.79)***
CSCO presence	.14(.03)***	.22(.03)***	.24(.04)***
CSCO prs. x Female Rep			-.38(.15)**
Endogeneity control	.00(.01)	.00(.01)	.00(.01)
Mills Lambda	-.09(.12)	-.10(.12)	-.08(.12)
Year dummies added	Yes	Yes	Yes
Firm fixed effects included	Yes	Yes	Yes
Constant	-.59 (.53)	.72 (.25)***	1.12 (.52)**
N obs/N firms	3,464/433	3,464/433	3,464/433
Prob > chi2	.000	.000	.000
R-sq(within/between/overall)	.03/.02/.03	.14/.04/.05	.13/.04/.05

Notes: These results are of a fixed effects panel regression. Including firm dummies instead of running a fixed effects regression led to identical results. The coefficients for year dummies are not reported for simplicity's sake. * $p < .10$, (two-tailed), ** $p < .05$ (two-tailed), *** $p < .01$ (two-tailed).

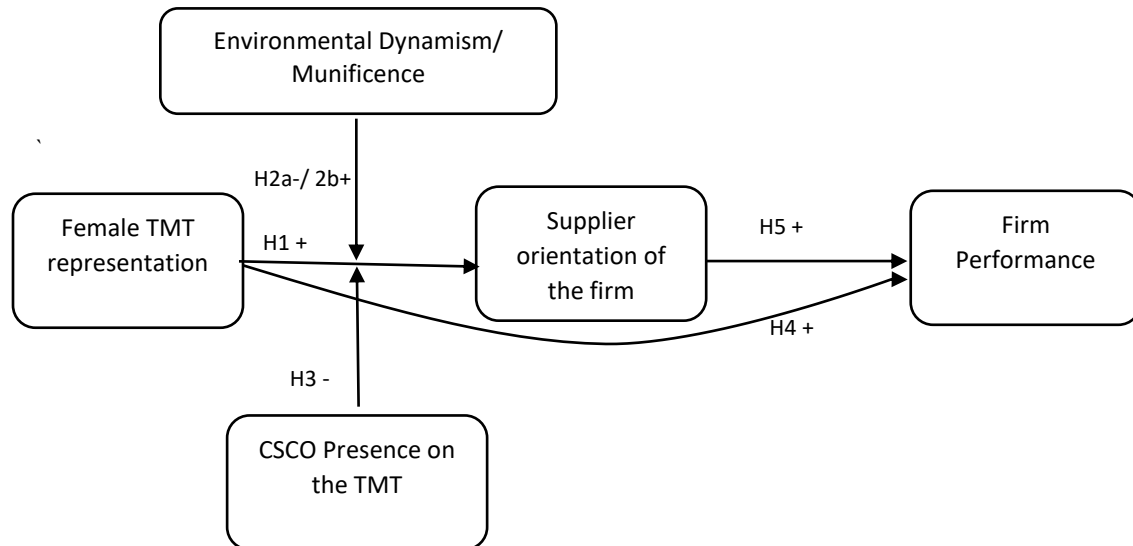
Table 6
Impact of female TMT representation on ROA

	ROA	ROA	ROA
	Model (4)	Model (5)	Model (6)
	(coefficient/SE)	(coefficient/SE)	(coefficient/SE)
Independent variable			
Female representation	--	.49(.03)***	.47(.03)***
Mediator			
Supplier orientation	--	--	.02(.01)**
Controls			
Env. Dynamism	.87(1.13)	.61(1.08)	.68(1.08)
Env. Munificence	.08(.21)	-.10(.20)	-.10(.20)
CSCO presence	-.01(.02)	.03(.02)**	.03(.02)**
Female board rep.	.24(.11)**	.16(.10)*	.15(.11)
TMT size	.002 (.002)	-.006(.002)**	-.006(.002)**
Avg. TMT tenure	-.001(.002)	-.001(.002)	-.001(.002)
Avg. female tenure	.02(.003)***	.01(.003)***	.02(.003)***
Firm size	-.04(.02)**	-.03(.02)*	-.03(.02)*
Firm age	-.02(.003)***	-.03(.003)***	-.03(.003)***
Leverage	-.30(.07)***	-.32(.07)***	-.32(.07)***
Endogeneity Control	-.01 (.003)**	-.01 (.003)**	-.01 (.003)**
Mills Lambda	.06 (.06)	.06 (.05)	.06 (.05)
Firm Fixed effects included	Yes	Yes	Yes
Year dummies included	Yes	Yes	Yes
Constant	1.45 (.25)***	2.32 (.24)***	2.30 (.24)***
N obs/N firms	3,464/433	3,464/433	3,464/433
P-value	.000	.000	.000
R-squared (within/ btw/overall)	.09/.02/.02	.18/.05/.04	.18/.05/.04

Notes: These results are of a fixed effects panel regression. Including firm dummies instead of running a fixed effects regression led to identical results. The coefficients for year dummies are not reported for simplicity's sake. * $p < .10$, (two-tailed), ** $p < .05$ (two-tailed), *** $p < .01$ (two-tailed).

Figure 1

The influence of female TMT representation on supplier orientation and firm performance



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Table 1
Description of the variables' measures and sources

Variable	Description of the measure	Data source(s)
Female TMT representation	<p>The primary measure of female TMT representation (FTMT) was the proportion of females in the TMT. For each firm-year, we used each firm's DEF-14A and annual report to measure the proportion of females in the TMT.</p> <p>We also used three alternative measures of FTMT, namely 1) a count measure which took the value of the number of females in the firm's TMT, 2) a binary measure which took the value of 1 if a female was part of the firm's TMT and 0 otherwise, and 3) a nuanced power-based composite measure that drew on work by Feng et al. (2015).</p>	DEF-14A filings; Annual reports
Firm performance	Measured as return on assets (ROA) where ROA is defined as income divided by total assets.	Compustat
Supplier orientation	<p>Measured using the DICTION 7.0 text-analysis software to examine every company's 10-K reports for the focal year and record their supplier orientation-related words. We started by reviewing operationalizations and definitions of the construct to identify words and synonyms representative of a firm's supplier orientation. Three SCM scholars independently compiled a list using Holsti's (1969) method for interrater reliability. The final comprehensive list (.91 interrater reliability) contained the following words: supplier, seller, dealer, contractor, vendor, provider, wholesaler, manufacturer, distributor, broker, producer, fabricator, partner, associate, affiliate, trader, merchant, third party, 3PL, supply, supply chain, supply network, value chain, value network.</p> <p>Consistent with the adopted definition of supplier orientation, we put the following constraints: for a firm's dictionary of supplier orientation to count towards the firm's supplier orientation score, the firm's 10-K report had to use the words "partner", "partnership", "relation" or "relationship" while referring to its suppliers (or any other terms associated with suppliers in the dictionary of words above such as vendors, dealers, associates, traders, third party, brokers, distributors, etc.) at least once in its 10-K report</p> <p>If this criterion was met, we used the frequency of the supplier orientation words presented earlier (normalized to per 1000 total 10-K words) as our measure of supplier orientation. If this criterion was not met (i.e., the firm never highlighted its partnership or relationship with the supplier), the firm was given a supplier orientation score of 0. As a robustness check, we dropped this constraint, and our overall results remained the same.</p>	10-K reports
Environmental dynamism	Measured by first grouping industries using their two-digit SICs. We regressed each firm's total industry revenues on time for the ten years preceding the focal year. We then calculated the root-mean-squared error (RMSE) for the regression and divided this by the mean industry sales for the 10 years of data preceding the focal year to identify the sales' coefficient of variation (CV). Finally, the sales' coefficient of variation (standardized) was used to measure environmental dynamism.	Compustat
Environmental munificence	Measured by the average net sales growth rate during the last five years leading up to the focal year for the firm's industry (at two-digit SIC levels). Here, higher values of the average net sales growth rate for the firm's industry indicated more munificent environments (Heeley et al., 2006).	Compustat

CSCO presence	Measured using firms' 10-Ks and proxy statements to code the inclusion or absence of a CSCO in the firm's TMT as a 1 or 0, respectively. We indicated a 1 if the firm's C-suite included an executive whose title or title description indicated that the executive was responsible for supply chain activities such as sourcing and procurement, logistics management, and collaboration with channel partners. To keep our measurement objective, we used Hendricks et al. (2015)'s approach and looked for the keywords "chief" or "president" or "director" or "head" within 10 words of "supply" or "procurement" or "sourcing" or "manufacturing" or "logistics" or "distribution" or "purchasing".	10-K reports; proxy statements
Female board representation	Measured as a percentage of females on the board for each firm-year	ISS database; DEF-14A filings
TMT size	Measured as the number of TMT members for each firm-year	10-K reports; DEF-14A filings
Average TMT tenure	Measured as the mean tenure in years of all TMT members	10-K reports and DEF-14A filings
Average female tenure	Measured as the mean tenure in years of all female TMT members	10-K reports and DEF-14A filings
Firm size	Measured as the number of employees expressed as a natural log	Compustat
Firm age	Measured as the number of years since the firm was founded	Corporate websites
Firm leverage	Measured as long-term debt divided by total assets	Compustat

Table 2
Correlations coefficients and descriptive statistics

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Female representation	0.14	0.15												
2. ROA	0.04	0.24	.35**											
3. Supp. orientation	0.50	0.80	.41**	.24**										
4. Env. Dynamism	0.07	0.03	-.01	-.03	-.01									
5. Env. Munificence	0.04	0.06	.07**	.13**	-.04*	-.13**								
6. CSCO presence	0.14	0.34	-.24**	-.07*	.08**	-.02	-.18**							
7. Female Board Rep	0.13	0.07	.26**	.11**	.13**	-.07**	.11**	-.09**						
8. TMT size	9.63	3.93	.33**	.07**	.09**	.05**	.02	-.08**	.17**					
9. Avg. TMT tenure	7.43	4.62	.11**	-.03	.04*	-.05**	-.05**	.06**	.02	.02				
10. Avg. female tenure	3.55	3.97	.42**	.19**	.16**	-.02	.10**	-.09**	.21**	.24*	.05**			
11. Firm size	2.90	1.46	.16**	.03	.01	-.06**	.06**	.00	.25**	.26**	-.01	.16**		
12. Firm age	75.65	48.89	.17**	.06**	.12**	-.00	.02	-.04*	.23**	.19**	.03	.09**	.20**	
13. Firm leverage	0.21	0.15	.01	-.05**	.04*	-.15**	-.06**	-.01	.04*	-.09**	-.02	-.09**	-.17**	-.04*

Notes: N = 3,464.

* $p < .10$ (two-tailed).

** $p < .01$ (two-tailed) The distribution of firm size is right-skewed with 24 firms (or 192 firm year observations) having outliers on the right side of the firm size distribution (i.e. with age more than 2 standard deviation from the mean, or in other words age more than 174 years). These include firms like Du-Pont, Colgate Palmolive, and Proctor and Gamble, whose ages in the year 2014 were 212 years, 208 years, and 177 years respectively. The median firm age in our sample was 60 years.

Table 3**Control function analysis (auxiliary equation: First stage of endogeneity check)**

Dependent variable	Female TMT representation (FTMT)
Independent variables	(Coefficient, SE)
Weighted average FTMT score of peer firms	.17 (.06)***
Environmental dynamism	.35(.47)
Environmental munificence	.32(.14)**
CSCO presence	-.11(.01)***
Female board representation	.14(.06)**
Firm size	-.02 (.01)**
Firm age	.02(.002)***
Firm Leverage	.07 (.05)
TMT size	.07 (.01)***
Average TMT tenure	.00(.001)
Average female tenure	.02(.002)***
Constant	-1.64 (.12)***
Firm Fixed effects included	Yes
Year Fixed effects included	Yes
N obs/N firms	3,464/433
P-value	.000
R-sq (overall)	.06

Notes: standard errors are presented in parentheses; *** $p < .01$, * $p < .10$ (two-tailed). Results show the outputs of a panel fixed effects regression with firm and year fixed effects. These results were used to predict female TMT representation for each firm-year, and the difference between the actual female TMT representation (as measured) and the predicted female TMT representation from the panel fixed effects model was used to calculate the control function residuals.

Table 4**Results of probit regression with presence in fortune 500 list as dependent variable**

Independent Variable	Coefficient (Standard Error)
Ln(Total Revenue)	.29*** (.03)
Ln(Total Assets)	.25**(.02)
Firm leverage	-.69**(.07)
58 SIC 2-digit dummies included	Yes
Constant	-6.61*** (.20)
N obs/N firms	46,719/10,201
P-value	.000
R-square (overall)	.31

Notes: * $p < .10$, ** $p < .05$, *** $p < .01$, two-tailed significance levels. Total revenue and total assets were recorded in \$ million. The table shows the results of a pooled probit regression with cluster-robust standard errors. However, our overall conclusions for both steps of the Heckman analysis remained the same when we employed a random effects model. 58 industry dummy variables (based on 2-digit SIC codes) were included in the regression to control for industry effects.

Table 5

Estimation results: Effect of female TMT representation on firm performance mediated by supplier orientation using simultaneous equation panel mediation modeling

Estimate	Hypothesis	Model 7 (main effects and fixed effects)		Model 8 (main effects, fixed effects, and controls)		Model 9 (main effects, fixed effects, controls, and interactions)	
		Estimate		Estimate		Estimate	
		Mean	SE	Mean	SE	Mean	SE
A. Effect of FTMT on Supplier orientation		DV: Supplier Orientation		DV: Supplier Orientation		DV: Supplier Orientation	
Intercept		.02	.02	-.04***	.01	-.04***	.01
Main effect							
Female TMT representation (FTMT)	H1 (+)	.97***	.05	.99***	.05	1.42***	.15
Moderating effects							
Environmental dynamism x FTMT	H2a (-)					-6.92***	1.76
Environmental munificence x FTMT	H2b (+)					2.56***	.73
CSCO presence x FTMT	H3 (-)					-.38***	.14
Control variables (including moderators)							
Environmental dynamism				-3.94*	2.16	-1.71	2.20
Environmental munificence				.17	.40	-.35	.42
CSCO presence				.22***	.03	.24***	.03
Female board representation				.51**	.22	.50**	.21
TMT size				.02***	.005	.02***	.005
Avg. TMT tenure				-.01***	.004	-.01***	.004
Avg. female tenure				-.01**	.006	-.01**	.006
Firm size				-.12***	.04	-.13***	.04
Firm age				-.005	.005	-.005	.005
Firm leverage				.23*	.14	.22*	.14
Endogeneity control (control function residual)				.00	.01	.00	.01
Mills Lambda				-.10	.10	-.08	.11
Firm fixed effects included		Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects included		Yes	Yes	Yes	Yes	Yes	Yes
B. Effect of Supplier orientation on firm performance		DV: Performance		DV: Performance		DV: Performance	
Intercept		.05***	.01	-.08***	.01	-.08***	.01
Mediating mechanism							
Supplier Orientation		.02**	.01	.02***	.01	.02**	.01
Direct effect							
Female TMT representation (FTMT)		.48***	.03	.47***	.03	.47***	.03
Control variables (including moderators)							
Environmental dynamism				.68	1.00	.68	1.00
Environmental munificence				-.10	.19	-.10	.19
CSCO presence				.03*	.01	.03*	.01
Female board representation				.15	.10	.15	.10
TMT size				-.01**	.00	-.01**	.00
Avg. TMT tenure				-.00	.00	-.00	.00
Avg. female tenure				.02***	.003	.02***	.003
Firm size				-.03*	.02	-.03*	.02
Firm age				-.03***	.002	-.03***	.002
Firm leverage				-.32***	.06	-.32***	.06
Endogeneity control (control function residual)				-.01**	.003	-.01**	.003
Mills Lambda				.06	.05	.06	.05
Firm fixed effects included		Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects included		Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table shows the results of simultaneous equation panel mediation modeling where equations (1) and (2) were modelled jointly, accommodating for firm fixed effects and year fixed effects and correlations between the error terms in equations (1) and (2). * $p < .10$ (2-tailed). ** $p < .05$ (2-tailed). *** $p < .01$ (2-tailed)

Table 6
Mediation of female TMT representation on firm performance (ROA) via supplier orientation at different levels of moderators

Total Effect of FTMT on ROA (with continuous moderators at their mean value and CSCO not present) S. Coeff. (Bootstrap SE)	Direct Effect of FTMT on ROA S. Coeff. (Bootstrap SE)	Indirect Effect of FTMT on ROA via supplier orientation (with continuous moderators at their mean value and CSCO not present)			Proportion of total effect mediated
		S. Coeff. (Bootstrap SE)	95% CI lower	95% CI upper	
H4 (+) .50***(.03)	.47***(.03)	H5(+) .026**(.012)	.003	.049	6.0 %

Indirect effect of FTMT on ROA via Supplier Orientation	S. Coeff. (Bootstrap SE)	95% CI lower	95% CI upper
At low environmental dynamism†	.029**(.013)	.002	.056
At high environmental dynamism†	.022**(.010)	.002	.042
At low environmental munificence†	.023**(.011)	.002	.044
At high environmental munificence†	.028** (.013)	.003	.054
With CSCO not present †	.026**(.012)	.003	.049
With CSCO present†	.019** (.009)	.001	.037

Notes: * $p < .10$ (2-tailed). *** $p < .01$ (2-tailed). † Low values of continuous moderators represent values one standard deviation lower than their sample mean. High values of continuous moderators represent values one standard deviation higher than their sample mean. When calculating the indirect effect of FTMT on ROA at low and high values of environmental dynamism, environmental munificence was kept at its mean value, and CSCO was assumed not to be present. Similarly, when calculating the indirect effect of FTMT on ROA at low and high values of environmental munificence, environmental dynamism was kept at its mean value, and CSCO was assumed not to be present. Finally, when calculating the indirect effect of FTMT on ROA with CSCO not present, the remaining two moderators were kept at their mean values. Total, direct and indirect effects, standard errors, and confidence intervals are obtained through bootstrapping with 10,000 replications with errors assumed to be normally distributed. Coefficients were very similar when we employed the *nlcom* command in the statistics software STATA

APPENDICES

Appendix W1: Supplier orientation scales

Author(s)	Supplier orientation scale items
Langerak (2001)	<ol style="list-style-type: none"> 1. Your primary customer audits the technological expertise of your customer. 2. Your primary customer looks together with your company for ways to achieve cost reductions. 3. Your primary customer monitors the research and development capabilities of your company. 4. Your primary customer involves your company in decisions that affect the relationship. 5. Your primary customer uses your company to generate ideas for products. 6. Your primary customer shares confidential information with your company. 7. Your primary customer uses a formal program to evaluate your company. 8. Your primary customer provides your company with one central point of contact. 9. Your primary customer monitors the quality standards of your company suppliers. 10. Your primary customer treats your company as partner.
Allred and Fawcett (2008)	<ol style="list-style-type: none"> 1. Supplier performance is closely monitored and is the basis for future business. 2. Suppliers are carefully screened and assessed before they are selected. 3. High levels of trust have been achieved with tier 1 suppliers.
Hult et al. (2008)	<p style="text-align: center;">We believe that it is important to:</p> <ol style="list-style-type: none"> 1. Constantly monitor our commitment to understanding suppliers as a part of our value chain activities. 2. Communicate information about suppliers across all units as a part of our value chain activities. 3. Develop value chain strategies based on our understanding of suppliers. 4. Assess suppliers systematically and frequently as a part of our value chain activities. 5. Disseminate data on suppliers at all levels on a regular basis as a part of our value chain activities. 6. Understand our suppliers, as a part of our value chain activities, to be prepared for developments in our markets. 7. Try to discover additional actions of our suppliers, as a part of our value chain activities, of which we may be unaware. 8. Seek opportunities, as a part of our value chain activities, in areas where our suppliers have difficulty delivering to us. 9. Try to recognize supplier actions, as a part of our value chain activities, before the majority of the market recognizes them. 10. Extrapolate key trends, as a part of our value chain activities, to understand what suppliers may do in the future.
He et al. (2011)	<ol style="list-style-type: none"> 1. We focus on long-term relationships with our suppliers. 2. We have clear standards to evaluate suppliers. 3. We have a policy to share information with suppliers.
Allred et al. (2011)	<ol style="list-style-type: none"> 1. My firm aggressively shares resources to help suppliers improve their capabilities. 2. Supplier performance is closely monitored and is the basis for future business. 3. Supplier scorecards are used to communicate expectations for performance levels.
Bronzo et al. (2013)	<ol style="list-style-type: none"> 1. Development of relationships with suppliers 2. Integration level of information flows 3. Integration level of physical flows 4. Collaborative Planning and Forecast with suppliers 5. Joint plants for process improvement
Fonseca and Lima (2015)	<ol style="list-style-type: none"> 1. Suppliers orientation. 2. Best SSM practices. 3. Suppliers management. 4. Supplier management program.
Hallikas and Lintukangas (2016)	<ol style="list-style-type: none"> 1. Supplier collaboration is measured regularly. 2. The measurement criteria for supplier collaboration are jointly agreed. 3. The supplier relationships have clear and concrete objectives. 4. New areas for collaboration are actively looked for with suppliers. 5. Business processes are developed jointly with suppliers. 6. In supplier relationships there are clear procedures concerning errors.
Lintukangas et al. (2019)	<ol style="list-style-type: none"> 1. Supplier collaboration is measured regularly. 2. In supplier relationships, there are clear procedures concerning errors. 3. Supplier relationships have clear and concrete objectives. 4. Supplier relationships are identified and categorized.

	5.	Business processes are developed jointly with suppliers.
	6.	The measurement criteria for supplier collaboration are jointly agreed upon.
	7.	Joint strategic planning is included in supplier relationships.
	8.	New areas of collaboration are actively sought with suppliers.
Nawi et al. (2020)	1.	Our company evaluated each collaboration with suppliers regularly.
	2.	Our company has jointly formed criteria for evaluating collaboration with suppliers.
	3.	Our company thinks suppliers are involved in developing business processes.
	4.	Our company has clear objectives for the supplier relationship.
	5.	Our company and suppliers are actively looking for new collaborative areas.
	6.	Our company repeatedly tells employees to share valuable strategic or tactical information with our supplier.
	7.	Our company repeatedly tells employees that building, maintaining, and enhancing long-term relationships with our supplier.
Lestari et al. (2020)	1.	The ability to collaborate with suppliers.
	2.	Involve suppliers in developing new products.
	3.	Involving suppliers in the selection of raw materials or products.
Sisay et al. (2022)	1.	We feel that suppliers have been on our side.
	2.	We work together with suppliers to be successful.
	3.	We are patient with suppliers when they make mistakes that cause us trouble.
	4.	We communicate with seed and other input suppliers.
	5.	Our seed suppliers do have experts (to give support) about the seed they are supplying.
Celikyay et al. (2023)	1.	In the company I work for, care is taken to maintain communication and ties with suppliers to be prepared for developments in the market.
	2.	As part of the value chain in the company I work for, information is exchanged regularly with suppliers at all levels.
	3.	In the company I work for, suppliers are evaluated systematically and frequently as part of the value chain.
	4.	Estimates are made by consulting the opinions of the suppliers on the feasibility of future investments in the company I work for.
	5.	In the company I work for, the loyalty of the suppliers is constantly monitored as a part of the value chain activities.
	6.	In the company I work for, new suppliers are tried to be discovered in the supply chain against any setback.

Appendix W2: Additional analyses: Analyzing separate moderating effects of female and male CSCO presence on the link between FTMT and supplier orientation

Model	(coefficient/SE)	(coefficient/SE)
Independent variable		
Female representation in TMT (FTMT)	.99(.06)***	1.44(.16)***
Controls		
Female board representation	.51(.23)**	.49 (.23)**
TMT size	.02 (.01)***	.02 (.01)***
Avg. TMT tenure	-.01(.00)***	-.01(.00)***
Avg. female tenure	-.01(.01)**	-.01(.01)**
Firm size	-.10 (.04)**	-.13 (.04)**
Firm age	-.00(.01)	-.01(.01)
Firm leverage	.23(.15)*	.21(.15)*
Moderator		
Environmental Dynamism	-3.94(2.32)*	-1.62 (2.36)
Env. Dyn. X Female Rep		-7.06(1.89)***
Env. Munificence	.17(.43)	-.33(.45)
Env. Munificence X Female Rep		2.48(.79)***
Female CSCO presence	.17(.07)**	.36(.11)***
Female CSCO prs. x Female Rep		-.51(.21)**
Male CSCO presence	.23(.04)**	.23(.04)***
Male CSCO prs. * Female Rep		-.62(.36)*
Endogeneity control	.00(.01)	.00(.01)

Mills Lambda	-10(.12)	-08(.12)
Year dummies added	Yes	Yes
Firm fixed effects included	Yes	Yes
Constant	.72 (.25)***	1.12 (.52)**
N obs/N firms	3,464/433	3,464/433
Prob > chi2	.000	.000
R-sq(within/between/overall)	.14/.04/.05	.13/.04/.05

Notes: These results are of a fixed effects panel regression. Including firm dummies instead of running a fixed effects regression led to identical results. The coefficients for year dummies are not reported for simplicity's sake. * $p < .10$, (two-tailed), ** $p < .05$ (two-tailed), *** $p < .01$ (two-tailed)

Appendix W3: Additional analyses: Effect of female TMT representation on firm performance mediated by supplier orientation with robust standard errors

	Hypothesis	Estimate Mean	Robust SE
A. Effect of FTMT on Supplier orientation			
		DV: Supplier orientation	
Intercept		-.04**	.02
Main effect			
Female TMT representation (FTMT)	H1 (+)	1.42***	.28
Moderating effects			
Environmental dynamism x FTMT	H2a (-)	-6.92**	3.15
Environmental munificence x FTMT	H2b (+)	2.56**	1.29
CSCO presence x FTMT	H3 (-)	-.38**	.19
Control variables (including moderators)			
Environmental dynamism		-1.71	2.59
Environmental munificence		-.35	.42
CSCO presence		.24***	.05
Female board representation		.50**	.43
TMT size		.02***	.005
Avg. TMT tenure		-.01***	.004
Avg. female tenure		-.01**	.006
Firm size		-.13*	.08
Firm age		-.005	.008
Firm leverage		.22	.24
Endogeneity control (control function residual)		.00	.01
Inverse Mills ratio		-.08	.18
Firm fixed effects included		Yes	Yes
Year fixed effects included		Yes	Yes
B. Effect of Supplier orientation on firm performance			
		DV: Performance	
Intercept		-.08**	.05
Mediating mechanism			
Supplier orientation		.02*	.01
Direct effect			
Female TMT representation (FTMT)		.47***	.04
Control variables (including moderators)			
Environmental dynamism		.68	.81
Environmental munificence		-.10	.16
CSCO presence		.03	.02
Female board representation		.15	.11
TMT size		-.01**	.00
Avg. TMT tenure		-.00	.00
Avg. female tenure		.02***	.003

Firm size		-.03*	.02
Firm age		-.03***	.004
Firm leverage		-.32***	.07
Endogeneity control (control function residual)		-.01**	.003
Inverse Mills ratio		.06	.08
Firm fixed effects included	Yes	Yes	Yes
Year fixed effects included	Yes	Yes	Yes

Notes: The table shows the results of simultaneous equation panel mediation modeling where equations (1) and (2) were modeled jointly where errors were robust standard errors, accommodating for firm fixed effects and year fixed effects and correlations between the error terms in equations (1) and (2). * $p < .10$ (2-tailed). ** $p < .05$ (2-tailed). *** $p < .01$ (2-tailed).

Appendix W4: Additional analyses: Effect of female TMT representation on firm performance mediated by supplier orientation with female TMT representation measured as a count (number of females in TMT), a binary (presence or absence of females in TMT), and power-based variable

Estimate	Hypothesis	Estimate		Estimate		Estimate	
		Mean	SE	Mean	SE	Mean	SE
A. Effect of FTMT on Supplier orientation		DV: Supplier Orientation		DV: Supplier Orientation		DV: Supplier Orientation	
Intercept		.92	.51	-.56	.53	-.22	.48
Main effect							
Female TMT representation (FTMT) count measure	H1 (+)	.22***	.03				
Female TMT representation (FTMT) binary measure				-.05	.10		
Female TMT representation (FTMT) power-based measure						.63***	.05
Moderating effects							
Environmental dynamism x FTMT	H2a (-)	-1.18***	.31	1.61	1.31	-3.25***	.60
Environmental munificence x FTMT	H2b (+)	.42***	.12	.22	.47	1.43***	.23
CSCO presence x FTMT	H3 (-)	-.08***	.02	-.01	.06	-.16***	.03
Control variables (including moderators)							
Environmental dynamism		-.87	2.39	-4.56*	2.59	-1.96	2.17
Environmental munificence		-.48	.47	.38	.54	.30	.40
CSCO presence		.32***	.04	.15***	.05	.17***	.03
Female board representation		.46**	.23	.65***	.24	.32	.22
TMT size		.01**	.005	.03***	.01	.002	.005
Avg. TMT tenure		-.01***	.004	-.01***	.004	-.012***	.004
Avg. female tenure		-.02**	.006	-.003	.006	-.028***	.006
Firm size		-.10**	.04	-.14***	.04	-.082**	.039
Firm age		.02***	.01	.02***	.003	.015***	.005
Firm leverage		.12	.15	.27*	.15	.039	.14
Endogeneity control (control function residual)		.001	.007	.001	.007	.00	.006
Mills Lambda		-.04	.12	-.08	.12	.03	.11
Firm fixed effects included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects included	Yes	Yes	Yes	Yes	Yes	Yes	Yes
B. Effect of Supplier orientation on firm performance		DV: Performance		DV: Performance		DV: Performance	
Intercept		1.45***	.24	1.46***	.25	1.55***	.25
Mediating mechanism							
Supplier Orientation		.03***	.009	.06***	.01	.028***	.009
Direct effect							
Female TMT representation (FTMT) count measure		.04***	.004				
Female TMT representation (FTMT) binary measure				.03*	.02		
Female TMT representation (FTMT) power-based measure						.07***	.009
Control variables (including moderators)							
Environmental dynamism		.94	1.11	1.04	1.12	.99	1.11

Environmental munificence	.002	.20	.05	.21	.01	.21
CSCO presence	.007	.016	-.01	.02	.004	.016
Female board representation	.17	.11	.19	.11	.16	.11
TMT size	-.003	.002	-.00	.00	-.003	.003
Avg. TMT tenure	-.0008	.002	-.00	.00	-.0005	.002
Avg. female tenure	.018***	.003	.02***	.003	.017***	.003
Firm size	-.026	.02	-.03	.20	-.026	.02
Firm age	-.021***	.003	-.02***	.002	-.022***	.003
Firm leverage	-.33***	.070	-.32***	.07	-.33***	.070
Endogeneity control (control function residual)	-.007**	.003	-.01**	.00	-.007**	.003
Mills Lambda	.070	.056	.07	.06	.079	.056
Firm fixed effects included	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects included	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table shows the results of simultaneous equation panel mediation modeling where equations (1) and (2) were modeled jointly, accommodating for firm fixed effects and year fixed effects and correlations between the error terms in equations (1) and (2). * $p < .10$ (2-tailed). ** $p < .05$ (2-tailed). *** $p < .01$ (2-tailed). The number of females in the TMT was used as the count measure of FTMT, and the presence or absence of any female in the TMT was used as the binary measure of FTMT, with a 1 meaning the firm had at least one female in its TMT and 0 otherwise. The power-based measure used factor analysis and incorporated the power of females in the TMT (details of this measure are provided in the main text).

Appendix W5: Additional analyses: Effect of female TMT representation on firm performance mediated by supplier orientation with Tobin's Q used as the measure of firm performance

	Hypothesis	Estimate	
		Mean	SE
A. Effect of FTMT on Supplier orientation			
		DV: Supplier orientation	
Intercept		-.04***	.01
Main effect			
Female TMT representation (FTMT)	H1 (+)	1.42***	.16
Moderating effects			
Environmental dynamism x FTMT	H2a (-)	-6.92***	1.75
Environmental munificence x FTMT	H2b (+)	2.56***	.74
CSCO presence x FTMT	H3 (-)	-.38***	.15
Control variables (including moderators)			
Environmental dynamism		-1.71	2.23
Environmental munificence		-.35	.42
CSCO presence		.24***	.04
Female board representation		.50**	.20
TMT size		.02***	.005
Avg. TMT tenure		-.01***	.004
Avg. female tenure		-.01**	.006
Firm size		-.13***	.05
Firm age		-.005	.005
Firm leverage		.22*	.14
Endogeneity control (control function residual)		.00	.01
Inverse Mills ratio		-.08	.11
Firm fixed effects included		Yes	Yes
Year fixed effects included		Yes	Yes
B. Effect of Supplier orientation on firm performance (Tobin's Q)			
		DV: Performance	
Intercept		.00	.02

Mediating mechanism		
Supplier orientation	.77***	.06
Direct effect		
Female TMT representation (FTMT)	.79***	.18
Control variables (including moderators)		
Environmental dynamism	-6.33	8.30
Environmental munificence	-1.12	1.26
CSCO presence	-.09	.10
Female board representation	.06	.86
TMT size	.03	.03
Avg. TMT tenure	.01	.01
Avg. female tenure	.03*	.02
Firm size	.20*	.12
Firm age	.06***	.02
Firm leverage	-.06	.42
Endogeneity control (control function residual)	.01	.03
Inverse Mills ratio	.06	.33
Firm fixed effects included	Yes	Yes
Year fixed effects included	Yes	Yes

Notes: The table shows the results of simultaneous equation panel mediation modeling where equations (1) and (2) were modeled jointly, accommodating for firm fixed effects and year fixed effects and correlations between the error terms in equations (1) and (2). * $p < .10$ (2-tailed). ** $p < .05$ (2-tailed). *** $p < .01$ (2-tailed).