

Top management team gender diversity and productivity: the role of board gender diversity

TMT gender diversity and productivity

71

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Abstract

Purpose – Based on the significance of context, the purpose of this paper is to investigate a positive top management team (TMT) gender diversity–productivity relationship derived from the upper echelons theory, and a moderating effect of board gender diversity on the TMT gender diversity–productivity relationship derived from the relational framework.

Design/methodology/approach – The hypotheses were tested in 172 organisations listed on the Australian Securities Exchange. This research uses archival data from multiple secondary sources, with a one-year time lag between the predictor and outcome.

Findings – The findings indicate a positive effect of TMT gender diversity on employee productivity and a strong positive TMT gender diversity–employee productivity relationship in organisations with a low level of board gender diversity.

Originality/value – This study provides pioneering evidence for a positive effect of TMT gender diversity on employee productivity and for a moderating effect of board gender diversity.

Keywords Gender diversity, Top management team, Upper echelons theory, Board gender diversity, Employee productivity, Social justice theory

Paper type Research paper

Introduction

Over the past decades, gender diversity has increasingly been embraced and encouraged by many public and private organisations (Hillman *et al.*, 2002; Smith *et al.*, 2006). The Australian Government and relevant regulatory bodies, such as the Australian Securities Exchange (ASX), have taken initiatives to increase women's representation in leadership positions (Kang *et al.*, 2007; Klettner *et al.*, 2016). One of the most notable examples is the introduction of the Workplace Gender Equality Act 2012, which requires organisations with 100 plus employees to annually report their gender equality initiatives, including the percentage of women at various organisational levels (Australian Institute of Company Directors, 2017; KPMG, 2016; WGEA, 2017). Another example is that all ASX-listed companies are required as part of the ASX's "Listing Rule 4.10.3" to disclose gender diversity-related measurable objectives regardless of their organisation size unless they can justify why the recommendations cannot be complied with (KPMG, 2016). Despite these efforts, women represent only 19 per cent of the senior executive level in the ASX 500 companies, ranked by market capitalisation companies as of 2015 (KPMG, 2016).

For organisations, motivations behind improving women's representation in leadership positions are diverse. For instance, as mentioned above, in some countries the laws and regulations require organisations to embrace gender diversity. In some cases, legally mandated quotas have been introduced in countries such as Norway (Seierstad, 2016). These are termed as the legal case for diversity. However, laws set minimal standards (Gilbert *et al.*, 1999). A society may expect organisations to do more than what is legally required. It expects fair and just treatment of their women members, reflecting in a gender-balanced leadership. This is termed as social justice case for diversity



(Mackinnon, 2009; Rawls, 1971). Given a lack of accountability of societal responsibilities, many for-profit organisations might not do anything beyond the minimum legal requirements unless evidence shows that a gender-diverse leadership team can also bring economic benefits for the organisation. This is often referred to as economic or business case for diversity (Robinson and Dechant, 1997). This can be termed as pull factor for diversity while the legal and social justice cases being push factors for diversity. The literature provides evidence for a business case for leadership gender diversity (e.g. Ali and Konrad, 2017; Dezsö and Ross, 2012). However, research evidence for the impact of leadership gender diversity on additional operational and financial outcomes is needed. Similarly, additional research is needed to investigate the context that might strengthen the positive impact of diversity. This study addresses these gaps.

This research focusses on top management team (TMT) and board of directors of organisations. TMT is defined as “the relatively small group of most influential executives at the apex of an organization [...] the top three to ten executives” (Finkelstein *et al.*, 1996, p. 8). It comprises the top executives (C-suite executives including the chief executive officer) who have a direct influence on the formulation of a firm’s strategy (Nielsen, 2010). The findings from previous research on the TMT gender diversity–performance relationship are inconsistent and inconclusive (e.g. Dezsö and Ross, 2012; Krishnan and Park, 2005; Quintana-Garcia and Benavides-Velasco, 2016). Homberg and Bui’s (2013) systematic review also suggests that the studies examining the impact of TMT diversity (including gender diversity) on organisational performance have produced mixed findings. Some previous empirical studies reported positive effects of TMT gender diversity (Dezsö and Ross, 2012; Phillips *et al.*, 2009; Van Knippenberg *et al.*, 2004). Other found that a TMT with an excessive level of gender diversity can lead to employee dissatisfaction and decreased performance (Homberg and Bui, 2013; Tsui *et al.*, 1992; Wiersema and Bantel, 1992). The mixed findings suggest the value of testing contextual variables (Johns, 2006). Previously studied moderators include: innovation intensity (Dezsö and Ross, 2012); country-level managerial discretion and autonomous organisational structure (Jeong and Harrison, 2017); environment characteristics of munificence, dynamism and complexity (Krishnan and Park, 2005); proportion of female employees (Lyngsie and Foss, 2017); and management structure (Opstrup and Villadsen, 2015).

This research advances the knowledge of gender diversity in TMTs. First, it predicts and tests a pioneering positive relationship between TMT gender diversity and productivity in Australia, derived from the upper echelons theory (Hambrick and Mason, 1984). Second, given the inconsistent findings of past research, it predicts and tests a pioneering moderating effect of board gender diversity on the TMT gender diversity–productivity relationship, derived from the relational framework (Syed and Kramar, 2009; Syed and Özbilgin, 2009). The board of directors’ primary roles are to advise and monitor management (Welbourne *et al.*, 2007). The interaction between a TMT and its board of directors demands a test of interactive effects of diversity at these two levels on outcomes (Ali *et al.*, 2014; Daily and Schwenk, 1996). Third, this study uses archival data from multiple sources to ensure a one-year time lag between TMT gender diversity and productivity; it allows both the predictor and moderator to precede the outcome (Ali, 2016; Hambrick and Mason, 1984). The predictions are tested in organisations listed on the ASX.

Australian context

Australia shares many similarities with western democratic nations (e.g. Canada, the UK and the USA), particularly on the cultural dimension of masculinity (where gender has a moderate to high level of impact on social behaviours and roles) and the low number of legal regulations (Hofstede, 2001). As such, the results of this study can be meaningful and useful for firms in other western nations (Hofstede, 2001). In Australia, gender diversity in the

workplace has been one of the key diversity issues. Various Australian Governments have attempted to minimise the gap between male and female workforce participation by introducing several key direct and indirect pieces of legislation, such as the Equal Opportunity for Women in the Workplace Act 1999 and its replacement, the Workplace Gender Equality Act 2012 (Ali *et al.*, 2014; Cotter, 2016; Strachan *et al.*, 2007; WGEA, 2017). Employers from non-public sectors with 100 employees or over are required under the Workplace Gender Equality Act 2012 to annually submit reports to the Workplace Gender Equality Agency (WGEA) on their board and employee gender composition, and on the initiatives they have implemented to improve gender diversity (Ali *et al.*, 2014; WGEA, 2017). According to KPMG's (2016, p. 11) corporate governance council principles and recommendations on diversity report, "under Listing Rule 4.10.3, ASX-listed entities are required to benchmark their corporate governance practices against the recommendations and, where they do not conform, to disclose that fact and the reasons why." These requirements highlight the significance of research on gender diversity for practitioners.

Theoretical underpinning and hypotheses development

TMT and employee productivity

The upper echelons theory suggests that the strategic decisions made by TMT members are in part influenced by or result from these members' background characteristics, such as their gender (Hambrick and Mason, 1984; Roberson and Park, 2007). TMT members are responsible for making various important organisational and strategic decisions (Carpenter *et al.*, 2004; Dezsö and Ross, 2012). Thus, this suggests that productivity outcomes improve when the quality of the TMT members' decisions improve.

As most of today's issues and problems facing many TMTs are non-routine by nature, having gender-diverse TMTs can provide resources, such as market insight, enhanced creativity, innovation, decision making and problem solving (Dezsö and Ross, 2012; Hillman *et al.*, 2007; Hunt *et al.*, 2015). For instance, the needs or preferences of female customers, which can be different to those of male customers, might be better understood by having more female leaders on the TMTs who may possess higher sensitivity and more accurate insight in this regard (Ali *et al.*, 2011; Mensi-Klarbach, 2014; Van Knippenberg *et al.*, 2004). The access-and-legitimacy paradigm suggests that organisations can benefit from having a demographically diverse workforce as it can provide greater access to and legitimacy with different demographically diverse consumer segments (Thomas and Ely, 1996). The diverse workforce (i.e. including gender-diverse TMTs) may have experiences, knowledge and skills required to understand and provide better products and/or services to diverse consumer groups, giving the organisation legitimacy with these consumer groups (Ely and Thomas, 2001; Thomas and Ely, 1996). Gender diversity can help organisations to be more customer-oriented which, consequently, may positively influence an organisation's market share and bottom-line (Dwyer *et al.*, 2003; Mensi-Klarbach, 2014).

Moreover, the levels of creativity and innovation can be enhanced through the increase in and combination of the diverse pool of knowledge and skills associated with gender diversity (Hoffman and Maier, 1961; Taylor and Greve, 2006). It is argued that creativity and diverse perspectives in a TMT can lead to higher-quality group decision-making processes and outputs by minimising or eliminating the tendencies of having "groupthink", where some members in the group avoid challenging and/or disagreeing with the decisions or ideas of other team members (Egan, 2005; Janis, 1972; Smith *et al.*, 1994). This can also support the argument made earlier based on the upper echelons theory (Hambrick and Mason, 1984), which suggests that the quality of the strategic decisions made by TMT members can be influenced by the team's gender diversity (Hambrick and Mason, 1984). Additionally, the problem-solving capacity of a TMT can be improved by having a wider range of perspectives and skills, and more information resulting from having more

demographically diverse TMT members, particularly on the gender aspect (Roberson and Park, 2007; Smith *et al.*, 1994).

While an excessive level of diversity may create some communication problems (Wiersema and Bantel, 1992), leading to more conflicts and less social cohesion among the TMT members (Roberson and Park, 2007), many studies argue that certain levels of conflict and affective discomfort resulting from diversity can be beneficial, as these may lead to better group decision making (Phillips *et al.*, 2009; Van Knippenberg *et al.*, 2004). Furthermore, as most of the issues facing many TMTs are non-routine by nature, the potential benefits of having gender-diverse TMTs, particularly the aforementioned enhanced problem-solving capacity, can counter its potential costs (Dezső and Ross, 2012; Hillman *et al.*, 2007). The empirical results provide evidence that there is a positive relationship between TMT gender diversity and organisational outcomes (e.g. Jurkus *et al.*, 2011; Krishnan and Park, 2005; Smith *et al.*, 2006). The performance indicators, for example, return on equity and total returns to shareholders (e.g. Catalyst, 2004, 2013), and short-term measures, such as Tobin's q (e.g. Dezső *et al.*, 2016; Welbourne, 1999; Welbourne *et al.*, 2007), all show positive results.

Thus, based on the theoretical arguments and empirical evidence, the following hypothesis is proposed:

H1. TMT gender diversity is positively related to employee productivity.

Although we use the upper echelons theory to predict positive effects of TMT gender diversity on productivity, we firmly believe in social justice case for gender diversity regardless of its economic effects. Social justice is defined as thoughts and behaviours that help reduce discrimination, prejudice and oppression in a society (McClintock, 2000). Social justice theory suggests that providing equal opportunities and access to all groups in a society is essential for a sustainable society (Mackinnon, 2009; Rawls, 1971). From the justice perspective, inequalities in employment are unjust and the key underlying principle is an equal and just society (Kirton and Greene, 2005; Seierstad, 2016). With women comprising half of the population, about half of the leadership position should be filled with women candidates (Seierstad, 2016). Due to systematic, structural and subtle discrimination against women, including glass-ceiling effects, women have been in a disadvantaged position in organisations. The presence of women in a leadership team helps an organisation to improve on social performance (Byron and Post, 2016).

Moderating effect of board gender diversity

The positive relationship between TMT gender diversity and employee productivity might show different strengths depending the level of gender diversity in the board of directors.

The relational framework of diversity management suggests that an alignment of factors across and within the various levels (national level such as laws, organisational level such as TMT diversity, and individual level such as supportive diversity climate perceptions) produces positive outcomes (Syed and Özbilgin, 2009). For the private sector, a focus of Australian equal employment opportunity laws on women reflects social and cultural expectations about equal opportunities for women (Strachan *et al.*, 2007). This national-level attention on women should translate into organisational-level emphasis on gender diversity at various organisational levels including TMT gender diversity and board of diversity. An alignment between the national level and organisational level and an alignment within the organisational level (between TMT gender and board gender diversity) should lead to higher employee productivity.

Board gender diversity is a valuable source of human capital (Anderson *et al.*, 2001; Pfeffer and Salancik, 2003). For firms that operate in high task uncertainty and environmental and technological changes (Ali *et al.*, 2011; Donaldson, 2001; Kerin *et al.*, 2008), board gender

diversity can provide creativity and innovation, and engagements with and links to external stakeholders (Ali *et al.*, 2014; Jackson *et al.*, 1991). The synergies between TMT gender diversity and board gender diversity can strengthen the resources provided by gender diversity (see the previous section for detailed theoretical arguments). Moreover, having a gender-diverse board can potentially help reduce some levels of conflict in a gender-diverse TMT. Nishii (2013) suggests that an increase in group gender diversity can be associated with a decrease in conflict levels when the climate for inclusion is also high (e.g. Roberson and Park, 2007; Wiersema and Bantel, 1992). It can be argued that a gender-diverse board can be a proxy for inclusion climate for the TMT (Hamann, 2017; Nishii, 2013). A gender-diverse board is more likely to be more inclusive towards a gender-diverse TMT and that “inclusion in decision making” can be seen as part of the inclusion climate for TMT members” (Nishii, 2013, p. 757). Therefore, the positive processes predicted by the upper echelons theory become stronger with support from boards that are gender diverse (Hambrick and Mason, 1984).

Based on the previously presented arguments, it is predicted that the relationship between TMT gender diversity and productivity is moderated by board gender diversity. Therefore, the second hypothesis is proposed:

- H2. Board gender diversity moderates the relationship between the TMT gender diversity and productivity, such that the positive relationship becomes stronger for organisations with high board gender diversity than for organisations with low board gender diversity.

Methods

A time-lagged research design was utilised, with a one-year time lag between TMT gender diversity (year 2016) and productivity (year 2017). This allowed the predictor and moderator to precede the outcome (Ali, 2016; Huselid, 1995). The selection of the one-year time lag between these variables can be considered as a conservative approach, and has been utilised by previous diversity studies (e.g. Bonn *et al.*, 2004; Jeong and Harrison, 2017).

Population, sample and data collection

The study population comprised all for-profit organisations operating in Australia. The initial sample included all 2,217 organisations listed on the ASX in September 2017. Data were collected from publicly available archival databases. Data on the number of women in TMT and board for 2016 were collected from Thomson Reuters Connect 4. The database includes information on directors and senior executives of companies listed on the ASX. These data were matched with data on productivity for 2017 from MorningStar DatAnalysis Premium and Orbis. As a result of the missing data, the sample size was reduced to the final sample size of 172 organisations. Data on control variables for 2017 were collected as follows: organisation size and organisation age (Thomson Reuters Connect 4 and EIKON), and industry type (ASX website). The companies in the final sample ranged as follows: organisational age from 2 to 129 years (mean: 27) and organisational size from 7 to 220,000 employees (mean: 5,601). These firms represented 19 different industries based on the Global Industry Classification Standard used by the ASX. The three largest groups were: materials (17.7 per cent), consumer services (8.5 per cent) and retailing (8.5 per cent).

Measures

Predictor

Blau's (1977) diversity index was utilised to calculate the categorical variable of *TMT gender diversity* using gender proportions. This heterogeneity index is calculated using $1 - \sum P_i^2$,

where P is the fraction of the proportion of TMT members with one of the possible categories, and i , in this case, is the number of gender-related characteristics; that is, being male or female (Ali *et al.*, 2011; Harrison and Klein, 2007; Joecks *et al.*, 2013). When the representation of males and females in a TMT becomes more equal, the index increases because it is based on a continuous or ratio scale (Blau, 1977). Blau's gender diversity index ranges from the lowest value of 0, where one gender either represents at 0 or 100 per cent, to the highest diversity value of 0.5, where both males and females equally represent at the 50 per cent level (Ali *et al.*, 2011; Harrison and Klein, 2007). Utilising Blau's (1977) index was considered appropriate for this study because its operationalisation procedure aligns with measurements previously employed to assess the gender diversity level in management (Richard *et al.*, 2004).

Moderator

This study operationalised "board gender diversity" similarly to the abovementioned method used to operationalise TMT gender diversity; that is, using Blau's (1977) diversity index, calculated using $1 - \sum Pi^2$, where P is the fraction of the proportion of board members with one of the possible categories, and i is the number of gender-related characteristics; that is, being male or female (Ali *et al.*, 2011; Harrison and Klein, 2007; Joecks *et al.*, 2013). Another similarity to note is that the lowest (i.e. one gender represents 100 per cent in the board) and the highest (i.e. males and females represent 50 per cent) values are identical to the scale mentioned above at 0 and 0.5, respectively.

Outcome

Employee productivity can be a common and important indicator for measuring organisational performance as it can measure an organisation's financial liquidity and efficiency (Anderson *et al.*, 2001). Employee productivity was calculated by dividing the operating revenue of each firm by the number of its employees (Huselid, 1995). A natural logarithm function was employed to transform the raw data on operating revenue that was skewed (Konrad and Mangel, 2000; Sarstedt and Mooi, 2014).

Controls

This study utilised three control variables: *organisation age*, *organisation size* and *industrial type*. These controls are commonly utilised by earlier research (Ali, 2016; Dezső and Ross, 2012). Productivity can be impacted by organisation age because many new organisations have, arguably, less formalised organisational structures which can put them in a more effective position to take advantage of some benefits a diverse workforce can offer, such as creativity and innovation (Ali *et al.*, 2014; Jackson *et al.*, 1991). Consistent with previous studies, firm or organisation age was determined by the number of years since the organisation's foundation (Huselid, 1995; Perry-Smith and Blum, 2000). Organisation size can be another important control variable. Generally, large firms may have greater opportunities or potential to perform better than small firms by benefiting from economies of scale (Ali, 2016; Huselid, 1995). Additionally, these large firms tend to have more gender-diverse boards (Ali *et al.*, 2014). Organisation size was operationalised as total number of employees (Jackson *et al.*, 1991). Finally, organisations in the manufacturing industries (coded as "1") and services industries (coded as "0") can be differently affected by gender diversity (Ali *et al.*, 2011; Frink *et al.*, 2003) as the levels of demand for employees to interact among themselves and with customers in these two industry types can be different (Ali *et al.*, 2014).

Results

Table I displays a summary of descriptive statistics for all the variables employed in the study (means and standard deviations) and bivariate correlation coefficients. The weak

Table I.
Descriptive statistics and correlation coefficients

Variable	Mean	SD	1	2	3	4	5
<i>Controls</i>							
(1) Organisation age	26.51	22.69					
(2) Organisation size	5,600.83	18,325.07	-0.19*				
(3) Industry type (0 = services; 1 = manufacturing)	0.45	0.50	0.22**	-0.11			
<i>Predictor</i>							
(4) TMT gender diversity 2016	0.10	0.18	0.01	-0.08	0.05		
<i>Moderator</i>							
(5) Board gender diversity 2016	0.23	0.17	0.04	0.16*	-0.22**	0.06	
<i>Outcomes</i>							
(6) Employee productivity 2017	0.04	0.13	-0.04	-0.09	0.01	0.24**	-0.17*

Notes: $n = 172$. Two-tailed: * $p < 0.05$; ** $p < 0.01$

correlations among controls, predictor and moderator variables suggest that multicollinearity was not an issue (Allen *et al.*, 2014; Sarstedt and Mooi, 2014).

Hierarchical multiple regression analyses were conducted to test *H1* and *H2*. *H1* proposed a positive linear relationship between TMT gender diversity and productivity, while *H2* proposed that board gender diversity moderates TMT gender diversity and productivity such that the positive relationship becomes stronger for organisations with high levels of board gender diversity. The predictor and moderator variables were standardised to reduce multicollinearity with the interaction term (Aiken and West, 1991). Using standardised variables, an interaction term of TMT Gender Diversity 2016 \times Board Gender Diversity 2016 was created to test *H2*.

To test *H1*, Employee Productivity 2017 was regressed on TMT Gender Diversity 2016 (see Table II). Three control variables (*organisational age*, *organisational size* and *industry type*) were included in step 1. These controls collectively accounted for a non-significant

Variables	Employee productivity 2017		
	β (Model 1)	β (Model 2)	β (Model 3)
<i>Controls</i>			
Organisation age	-0.02	-0.03	-0.01
Organisation size	-0.09	-0.07	-0.06
Industry type (0 = services; 1 = manufacturing)	0.01	0.00	-0.02
<i>Predictor</i>			
TMT gender diversity 2016		0.23**	0.28***
<i>Moderator</i>			
Board gender diversity 2016			-0.17*
<i>Interaction term</i>			
TMT Gender diversity 2016 \times Board gender diversity 2016			-0.26**
R^2	0.01	0.06	0.16
F	0.53	2.80*	5.12***
ΔR^2	0.01	0.05	0.10
F for ΔR^2	0.53	9.51**	9.21***

Notes: $n = 172$. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table II.
Hierarchical multiple regression

1 per cent of the variance in Employee Productivity 2017. TMT Gender Diversity 2016 was entered in step 2 and it accounted for a significant additional 5 per cent of the unique variance in Employee Productivity 2017. The results also indicate that TMT Gender Diversity 2016 ($\beta=0.23, p < 0.01$) had a significant positive effect on Employee Productivity 2017. Therefore, *H1* was fully supported. To test *H2*, the moderator variable of Board Gender Diversity 2016 and the interaction term of TMT Gender Diversity 2016×Board Gender Diversity 2016 were entered in step 3, accounting for an additional statistically significant 10 per cent of variance in Employee Productivity 2017. The results, reported in Table II, indicate that Board Gender Diversity 2016 ($\beta = -0.17, p < 0.05$) had a statistically significant effect on Employee Productivity 2017, and the interaction term of TMT Gender Diversity 2016×Board Gender Diversity 2016 ($\beta = -0.26, p < 0.01$) also had a significant effect on Employee Productivity 2017.

A probing interactions analysis was also conducted to further investigate the nature of the moderation effect using the ModProbe (Hayes, 2013). The ModProbe produced the data for visualising the conditional effects of the main predictor (i.e. TMT Gender Diversity, 2016) and moderator (i.e. Board Gender Diversity, 2016) on Employee Productivity 2017, as visually displayed in Figure 1. The slope for low levels of Board Gender Diversity 2016 was significant ($b = 0.38, p < 0.001$). Although the TMT gender diversity–employee productivity relationship was also positive for high levels of Board Gender Diversity 2016, it was statistically non-significant ($b = 0.38, ns$). Ignoring the non-significant slope, the findings indicate that board gender diversity moderates the TMT gender diversity–employee productivity relationship such that the relationship is positive for low levels of board gender diversity. As the strengths of the two slopes were not in line with *H2*, *H2* was not supported.

Discussion

The main objectives of this study were to test a positive relationship between TMT gender diversity and productivity, and a moderating effect of board gender diversity on the relationship between TMT gender diversity and productivity. The findings suggest a positive relationship between TMT gender diversity and employee productivity, and that this relationship is quite strong in organisations with low levels of board gender diversity.

The pioneering significant positive linear relationship between TMT gender diversity and employee productivity is broadly consistent with several previous empirical studies which

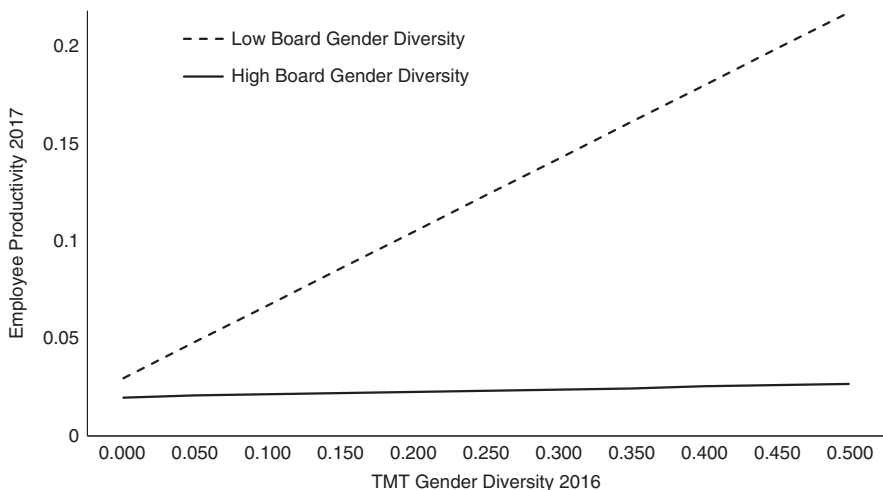


Figure 1.
Moderating effects of board gender diversity on the linear relationship

also utilise employee productivity as an outcome variable (e.g. Ali *et al.*, 2011; Ali *et al.*, 2015; Frink *et al.*, 2003). However, those studies did not focus on TMT gender diversity. For instance, Frink *et al.* (2003) examined women's representation at the organisational level, while Ali *et al.* (2015) investigated gender diversity at both non-management and management levels. Therefore, it can be implied that this study advances knowledge on the positive linear TMT gender diversity–productivity relationship by empirically suggesting that TMT gender diversity is also positively associated with employee productivity.

The pioneering finding related to board gender diversity's moderating effect on the linear relationship between TMT gender diversity and employee productivity indicates that this positive relationship was strong for firms with low levels of board gender diversity. The relationship between TMT gender diversity and employee productivity was contingent on the level of board gender diversity (Donaldson, 1987, 2001). These findings suggest the importance of organisational context and alignments in understanding the role of TMT gender diversity. The weak positive but non-significant effect at high levels of board gender diversity might be attributed to very few organisations that have a high representation of women on their boards (Ali *et al.*, 2014). Another possible explanation is that the one-year time lag used in this research might not be sufficient for the following two-staged process to occur: alignment between high TMT gender diversity and high board gender diversity generating positive processes as predicted by the relational framework (Syed and Özbilgin, 2009) and the generated positive processes to, in turn, impact employee productivity as predicted by the upper echelons theory (Hambrick and Mason, 1984).

Theoretical and research contributions

This study contributes to the theoretical underpinnings for a TMT gender diversity–productivity relationship. It supports the upper echelons theory (Hambrick and Mason, 1984) by finding a main positive linear TMT gender diversity–productivity relationship. The results suggest that TMT members' demographic characteristics, for example gender, can influence TMT processes leading to higher productivity (Krishnan, 2009). However, a direct support to the upper echelons theory would require measuring mediating processes gender diversity initiates and their effects on productivity. Moreover, the significant interaction term (even though the predicted strengths of the TMT gender diversity–productivity relationship in organisations with low or high board gender diversity were not supported) provide some support to the relational framework (Syed and Özbilgin, 2009). An alignment among laws and regulations around gender diversity, board gender diversity and TMT gender diversity would still be desirable based on the social justice case for diversity. Along these lines, additional moderating effects can be predicted. Furthermore, the use of the relational framework (Syed and Özbilgin, 2009) and the theoretical arguments presented in this paper help integrate and refine the two theories – the upper echelons theory and the relational framework. For instance, the upper echelons theory (the business case lens; Hambrick and Mason, 1984) is more accurate and precise in predicting positive processes and outcomes when it involves alignments across multiple organisational levels.

This research helps advance knowledge of the relationship between TMT gender diversity and organisational performance. It provides additional evidence for a TMT gender diversity–performance relationship, pioneering evidence for a TMT gender diversity–employee productivity relationship and pioneering evidence for a moderating effect of board gender diversity on the TMT gender diversity–productivity relationship. Although many studies have investigated the impact of women's representation at the TMT and board levels on organisational outcomes, these studies have produced inconsistent research results (Adler, 2001; Bigelow *et al.*, 2014; Francoeur *et al.*, 2008; Shrader *et al.*, 1997; Welbourne *et al.*, 2007). This research provides evidence for a contextual variable (board gender diversity) to impact the TMT gender diversity–productivity relationship.

Future research may study the moderating effect of the CEO's or managing director's gender on the relationship between TMT gender diversity and productivity. A recent study by Jeong and Harrison (2017) found that the presence of female CEOs had a positive impact on long-term financial performance. CEOs hold the highest position in TMTs and one of their key responsibilities is to make the final strategic decisions for the TMT (Crossland *et al.*, 2014; Mintzberg, 1979). It is suggested that CEOs' characteristics (e.g. gender) can influence how these CEOs make and implement their strategic decisions, and subsequently influence their TMT and organisational performance outcomes (Fredrickson *et al.*, 2010; Jeong and Harrison, 2017). Research along these lines may also benefit from the moderating effect of competitive strategy on the TMT gender diversity–productivity relationship. Future research may also focus on the possible different effects of TMT gender diversity on performance across industries and organisations of various sizes (Ali *et al.*, 2011). A qualitative inquiry might also answer some of the questions raised by this study such as why there seems to be a stronger positive TMT gender diversity–productivity relationship in organisations with low levels of board gender diversity than their counterparts.

Practical implications

The study's findings have many implications for practitioners and regulators.

First, the support found for the business case for gender diversity may help human resource managers in seeking additional commitment and resources for a gender-balanced workforce. The theoretical lenses used in this research suggest that a gender-balanced TMT generates economic benefits for organisations through processes such as improved decisions (Hambrick and Mason, 1984). The findings also have implications for regulatory agencies. Gender diversity is the most salient demographic diversity dimension in Australia (Ali *et al.*, 2014; Strachan *et al.*, 2004). The Workplace Gender Equality Act 2012 has extended gender reporting requirements and the ASX's Listing Rule 4.10.3 has introduced gender diversity disclosures (KPMG, 2016; WGEA, 2017). In the absence of a strong legal case for leadership gender diversity in Australia and no serious implications of ignoring the social justice case, the WGEA uses Australian research evidence to promote gender diversity (WGEA, 2018).

Second, the support found for positive effects of TMT gender diversity in organisations with low levels of board gender diversity indicates that these organisations should focus on improving gender diversity in their TMTs even if they have been unsuccessful in attracting women to their boards (Burke and Mattis, 2013). However, they should also continue to aim for a higher representation of women in their boards based on the social justice case for gender diversity and its impact on corporate social performance (Byron and Post, 2016).

Third, the findings also suggest that practitioners should align diversity across multiple levels and evaluate their separate and interactive effects on productivity over various time lags for accurate results (Ali *et al.*, 2011). The alignment of diversity at multiple levels (e.g. board, TMT and management) and their interactive effect on productivity might require more than one-year time lag. A successful alignment of diversity across hierarchical levels in an organisation may also help address issues such as glass-ceiling effects (Chapple and Humphrey, 2014; Hafsi and Turgut, 2013).

Limitations

Despite having many strengths, this research has three main limitations. First, this study could not incorporate other diversity dimensions, such as racial diversity, into the research. Although many previous research studies (e.g. Ely and Thomas, 2001; Pelled *et al.*, 1999; Richard *et al.*, 2007) note that race is another highly visible and salient diversity dimension which can influence productivity, the ASX-listed firms used as the study's sample, generally, are not legally demanded to disclose any racial diversity

indicators (Ali *et al.*, 2011). Second, the data from this research reflect low levels of gender diversity at both levels in the study's sample firms. It can, therefore, be implied that the data from this study's sample on the proportion of women at the TMT and board levels were skewed towards a greater representation of men. It is expected that the moderating effects of board gender diversity on the TMT gender diversity–productivity relationship might be different when these effects are investigated using a full range of gender diversity (Krishnan and Park, 2005).

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