Chapter 11
The Role of Women on Board for Innovation: Lessons from the High-tech Companies

Sara Saggese and Fabrizia Sarto

Abstract Building on previous research on gender diversity in corporate governance, the article empirically examines the implications of women on board for the company commitment to innovation by focusing on the presence, the critical mass and the human capital diversity of female directors. To this purpose, it relies on a unique dataset of Italian companies belonging to the high-tech industry as this context is considered male-dominated. Findings document that female directors positively affect the company commitment to innovation only when boards are characterized by a critical mass of women. Moreover, the analyses show that the human capital diversity of female directors enhances the firm commitment to innovation. Thereby, the study offers contributions to both scholars and practitioners. Indeed, it fuels the debate on the role played by women on board and emphasizes the importance of fostering the appointment of female directors, especially as critical mass. In addition, it highlights that the critical mass of female directors can exploit the benefits of gender diversity as it limits the emerging conflicts within the boardroom as well as hampers the risk-aversion, the skill underestimation and the sense of inferiority that is typical of women on board in masculine industries. Finally, the research emphasizes the relevance of mixing the diverse educational/professional backgrounds of female directors to foster the development of new ideas and improve the cross-functional discussions among board members to the benefit of company innovation.

Keywords Women on board · Innovation · High-tech companies

S. Saggese · F. Sarto (✉)
Department of Economics, Management, Institutions, University of Naples "Federico II", Via Cinthia, Monte S. Angelo, Naples, Italy
e-mail: fabrizia.sarto@unina.it

S. Saggese
e-mail: sara.saggese@unina.it

P. Paoloni and R. Lombardi (eds.), *Advances in Gender and Cultural Research in Business and Economics*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-00335-7_11

11.1 Introduction

The involvement of women in managerial positions has attracted increasing attention amongst scholars and policy-makers, especially with respect to roles and activities that are traditionally entrusted to men. One of the most debated issue concerns the influence of female directors on firm innovation (Galia and Zenou 2012; Ruiz-Jiménez et al. 2016; Ruiz-Jiménez and Fuentes-Fuentes 2016). On the one hand, literature suggests that gender diversity is able to positively affect innovation as it improves the board decision-making quality (Torchia et al. 2011; Hillman et al. 2002; Huse 2007; Miller and Triana 2009). On the other hand, some scholars claim that female directors can hamper firm innovation as board gender heterogeneity enhances the conflicts among its members (Bunderson and Sutcliffe 2002; Lückerath-Rovers 2013; Joecks et al. 2013), and the presence of women on board boosts the risk-aversion of companies (Jianakoplos and Bernasek 1998; Charness and Gneezy 2012; Faccio et al. 2016; Sila et al. 2016).

From a different standpoint, the attention of scholars in this tradition has been also intensely devoted to examine the relationship between board gender diversity and innovation outcomes (Torchia et al. 2011), but limited efforts have been made to shed light on the firm commitment to innovation, especially in male-dominated settings (Chau and Quire 2018).

This article aims to fill the gap by exploring the implications of board gender diversity for the company commitment to innovation. For this purpose, it focuses on Italian high-tech companies and examines the influence of the presence, the critical mass and the human capital heterogeneity (i.e. educational and professional backgrounds) of female directors on the company commitment to innovation. In this regard, it is worth noting that the high-tech industry is the ideal setting to investigate the above mentioned relationships as it is traditionally characterized by limited involvement of women in top mnagerial positions and innovation is considered as being one of the main outcomes of the related firms (Gavious et al. 2012; Chau and Quire 2018).

Data has been collected from the AIDA database and the curriculum vitae (CVs) of women appointed to the boards. Then, it has been empirically analysed through the pooled ordinary least squares (OLS) regression.

The empirical analyses report that, except if female directors play as critical mass, women on board negatively affect the firm commitment to innovation. However, results highlight that the heterogeneity of female director human capital in terms of educational and professional background diversity improves the firm commitment to innovation.

Thereby, the study attempts to contribute to both theory and practice. Indeed, it not only sheds some light on a relatively explored topic in the governance domain, but it also differentiates the effects of the critical mass and the human capital heterogeneity of female directors by taking the debate on gender diversity to the next step.

The rest of the article is structured as follows. First, it presents the review of the literature and develops the hypotheses. Then, it describes the research methodology and the findings. Lastly, it discusses the results and concludes by highlighting contributions, implications and limitations of the study.

11.2 Review of the Literature and Hypotheses

Literature dealing with gender diversity has extensively debated the effects of female directors on company innovation (Galia and Zenou 2012; Ruiz-Jiménez et al. 2016; Ruiz-Jiménez and Fuentes-Fuentes 2016).

A first strand of studies highlights that the presence of women on board positively affects innovation (Chen et al. 2005; Miller and Triana 2009) as female directors bring to the boardroom new skills/professional experiences (Hillman et al. 2002; Huse 2007) and enhance its knowledge base (Díaz-García et al. 2013). Thereby, following this reasoning, academics emphasize that gender diversity improves the quality of board decisions pointing them to the identification of more effective and innovative options/opportunities (Torchia et al. 2011; Galia and Zenou 2012; Bandura and Bussey 2004; Manolova et al. 2007). In this regard, some studies report that gender diversity fosters radical and incremental innovation (Dezsö and Ross 2012; Díaz-García et al. 2013) as women on board are strongly committed to R&D (Terjesen et al. 2016). Furthermore, other research in this tradition documents that the influence of female directors on board activity, expertise and creativity, leads to the launch of new products and services (Østergaard et al. 2011).

Different conclusions are drawn by a second stream of studies suggesting that women on board are not motivated to support innovation initiatives. Indeed, scholars claim that the appointment of female directors hinders the board decision-making process and the company innovation as it rises new conflicts and increases the options to take into consideration (Adams and Flynn 2005; Lückerath-Rovers 2013; Rose 2007). In addition, academics highlight that female directors are often risk adverse and tend to sacrifice the value creation in the long-term for the short-term (Jianakoplos and Bernasek 1998; Charness and Gneezy 2012; Sila et al. 2016), thus overlooking risky innovation projects that require long-run investments (Zahra 1996; Faccio et al. 2016). It is worth noting that the above mentioned effect can be even more severe in technological male-dominated industries (Chau and Quire 2018) where women on board suffer of a strong sense of inferiority and skill underestimation (Watts 2009; Arena et al. 2015).

Drawing upon the critical mass theory (Kanter 1977, 1987), a third stream of studies highlights that the ability of women on board to affect the company results is not a matter of presence of female directors but rather of proportion (Torchia et al. 2011). Indeed, scholars claim that, when women do not build up a critical mass, they are considered simple tokens and are not able to positively affect the board decision-making, especially in male-dominated industries (Adams and Kirchaier

2013). Conversely, in these contexts, the presence of a critical mass of female directors strengthens their ideas (Eagly and Carli 2007) and limits their risk-aversion, sense of inferiority and skill underestimation (Chau and Quire 2018; Arena et al. 2015).

The empirical research supports this prediction and reports that the presence of a critical mass, made at least of three female directors, enhances the quality of company governance and has positive implications for board processes (Schwartz-Ziv 2017; Kramer et al. 2006; Erkut et al. 2008; Konrad et al. 2008) and firm performance (Joecks et al. 2013; Arena et al. 2015). In this regard, the scholarly evidence documents that the ability of the critical mass of female directors to enhance the company performance is also confirmed for innovation outcomes (Torchia et al. 2011). Indeed, the appointment to the board of at least three women boosts their ability to give voice to the related ideas, conditions the choices of male directors, and supports innovative investments (Erkut et al. 2008; Konrad et al. 2008).

Following this reasoning, we predict that:

H1: In the high-tech industry, the presence of women on board and their critical mass affect the firm commitment to innovation.

From a board human capital standpoint, it is worth noting that the ability of board gender diversity to influence the company outcomes can be also driven by their background and experiences (Peterson and Philpot 2007).

In this respect, literature suggests that female directors are more frequently characterized by specific expertise in human resources, CSR, marketing and advertisement (Zelechowski and Bilimoria 2004) than in financial and accounting functions (Ruigrok et al. 2007). In addition, women on board often present non-business backgrounds, advanced degrees and international work experience/expertise, bringing to the boardroom different values, perspectives and knowledge that are fundamental for its effective decision-making (Kim and Rasheed 2014; Hillman et al. 2002; Singh et al. 2008).

Based on these premises, scholars claim that the combination of diverse educational and expertise backgrounds due to the board gender diversity can have implications for company strategic innovation (Wincent et al. 2014).

Indeed, studies emphasize that board heterogeneity, in terms of educational and professional backgrounds, improves the decision-making quality as it fosters the boardroom discussion (Hambrick et al. 1996; Van der Vegt and Janssen 2003) and the identification of innovative options (Gradstein and Justman 2000). In this regard, it is important to highlight that the cognitive processes of boards where diverse expertise/experience are mixed together encourage more innovative ideas (Hillman et al. 2002) and support innovation investments (Cannella et al. 2008).

The empirical evidence corroborates these conclusions and reports that the board diversity in terms of expertise/experience has positive implications for firm innovation as it addresses the strategic orientation of companies to innovation (Wincent et al. 2014; Heyden et al. 2018; Kim and Kim 2015; Midavaine et al. 2016).

Following this reasoning, we predict that:

H2: In the high-tech industry, the human capital heterogeneity of women on board enhances the firm commitment to innovation.

11.3 Methodology and Findings

The research hypotheses have been tested on high-tech firms as, in this context, innovation is especially relevant (Ruiz-Jiménez et al. 2016; Ruiz-Jiménez and Fuentes-Fuentes 2016). In addition, the high-tech industry is considered as male-dominated since women are still underrepresented in top managerial positions (Chau and Quire 2018).

We have focused on the Italian setting and selected all the companies with more than 50 employees at the end of the fiscal year 2012 (i.e. 11.019). Then, we have retained firms belonging to three industries: (i) information technology, (ii) electrical and electronic equipment, and (iii) telecommunications (Gharbi et al. 2014). From this initial sample of 349 firms, we have excluded those with missing financial and governance data for the whole observation window 2012–2015 (i.e. 200), leading to a final sample of 149 companies.

For these firms, we have collected information on the commitment to innovation and the presence/characteristics of female directors from the AIDA database. In addition, we have manually gathered data on the level/area of expertise/experience of women appointed to the board of the companies in our sample from their CVs.

We have tested the hypotheses formulated by the pooled ordinary least squares regression analyses. The dependent variable of our models is the firm commitment to innovation as measured by R&D expenditures (Midavaine et al. 2016; Chen and Hsu 2009). As for our independent variables, we have proxied for the appointment of female directors to the board by both a dummy variable assuming value "1" in the presence of at least one woman (WOMEN), and the proportion of women appointed to the board (P_WOMEN). Moreover, we have measured the presence of a critical mass of women by a dummy variable assuming value "1" in the presence of a board characterized by at least three female directors (CRIT_MASS) (Joecks et al. 2013; Arena et al. 2015; Torchia et al. 2011).

In order to catch the human capital diversity both in terms of educational and professional backgrounds of female directors, we have measured the Blau's index (Harrison and Klein 2007) related to (i) the level of education, (ii) the area of education, and (iii) the area of experience of female directors. In particular, we have classified the level of education (DIV_LEV_EDU) as follows: (i) undergraduate degree, (ii) bachelor degree, (iii) master degree, and (iv) Ph.D. (Midavaine et al. 2016). At the same time, we have categorized the area of education (DIV_AREA_EDU) in nine groups: (i) engineering, (ii) mathematics and physics, (iii) economy, (iv) informatics, (v) law, (vi) life science and pharmacy, (vii) sociology and psychology, (viii) literature and philosophy, (ix) others (Kim and Lim

2010). Moreover, we have divided the area of professional expertise (DIV_EXP) into six categories of business functions based on the previous working experience of board members: (i) R&D, (ii) commercial, (iii) finance, (iv) human resources, (v) legal, (vi) others (Kor 2006; Clarysse et al. 2007). We have also controlled for the percentage of independent directors (INDEP), the firm size (SIZE) and the firm leverage (LEVERAGE) (Campbell and Mínguez-Vera 2008; Arena et al. 2015; Midavaine et al. 2016; Chen and Hsu 2009).

Turning the attention to the research findings, Table 11.1 reports the descriptive statistics for the above mentioned variables. It shows that, in our sample, boards are more likely to be heterogeneous in terms of area than level of education, and at least one female director characterizes the majority of them.

Table 11.2 illustrates the results of the regression analyses aiming to test the hypothesis H1. Specifically, Models 1 and 2 assess the relationship between our independent variables proxing for the presence of women on board and R&D expenditures, while Model 3 reports the effect of the critical mass of female directors on this measure of firm commitment to innovation.

The first two models highlight that the involvement of women on board both in terms of presence (WOMEN) and percentage (P_WOMEN) of female directors is negatively and significantly related to R&D expenditures (Model 1: $\beta = -0.096$, $p < 0.01$; Model 2: $\beta = -0.233$, $p < 0.1$). Different conclusions can be drawn for the critical mass as Model 3 shows that the variable CRIT_MASS is positively and significantly related to the firm commitment to innovation ($\beta = 0.084$, $p < 0.05$).

By focusing on the implications of the human capital diversity of female directors for the firm commitment to innovation, Table 11.3 illustrates the results of the OLS regression analyses run on a subsample of companies characterized by the presence of at least one woman director.

Model 1 documents that the human capital heterogeneity of female directors as proxied by the level of education (DIV_LEV_EDU) is significantly and positively related to the firm commitment to innovation ($\beta = 0.146$, $p < 0.01$). Similarly, Models 2 and 3 show that the human capital diversity of female directors as

Table 11.1 Descriptive statistics

Variable	N.	Min	Mean	Median	Max	Sd
R&D	596	0.000	0.119	0.000	3.588	0.415
WOMEN	596	0.000	0.564	1.000	1.000	0.496
P_WOMEN	596	0.000	0.110	0.091	0.567	0.128
CRIT_MASS	596	0.000	0.242	0.000	1.000	0.428
DIV_LEV_EDU	336	0.000	0.464	0.500	1.000	0.373
DIV_AREA_EDU	336	0.220	0.525	0.650	1.000	0.398
DIV_EXP	336	0.100	0.438	0.444	1.000	0.408
INDEP	596	0.000	0.039	0.000	0.600	0.094
SIZE	596	23.000	424.034	190.000	6612.000	869.514
LEVERAGE	596	0.000	0.738	0.050	10.130	1.389

Table 11.2 OLS regression models testing H1

Variable	Model 1	Model 2	Model 3
WOMEN	−0.096***		
	(0.036)		
P_WOMEN		−0.233*	−0.408***
		(0.126)	*(0.139)*
CRIT_MASS			0.084**
			(0.040)
INDEP	0.245	0.223	0.177
	(0.255)	*(0.256)*	*(0.240)*
SIZE	−3.760	−8.640	−1.810
	(0.000)	*(0.000)*	*(0.000)*
LEVERAGE	0.045***	0.049***	0.051***
	(0.013)	*(0.014)*	*(0.014)*
CONSTANT	0.205***	0.197***	0.193***
	(0.069)	*(0.070)*	*(0.070)*
YEAR DUMMY	YES	YES	YES
FIRM DUMMY	YES	YES	YES
OBSERVATIONS	596	596	596
F	3.01***	2.62***	2.46***
R^2	0.059	0.051	0.055

Levels of significance: * < 0.1; ** < 0.05; *** < 0.01
Standard errors in parentheses

measured by the area of education (DIV_AREA_EDU) (Model 2: $\beta = 0.157$, $p < 0.01$) and the professional expertise (DIV_EXP) (Model 3: $\beta = 0.125$, $p < 0.01$) are positively and significantly related to R&D expenditures.

Finally, concerning the control variables, in line with prior studies findings report that the proportion of independent directors is always significantly and positively related to the firm commitment to innovation (Rossi and Cebula 2015).

11.4 Discussion and Conclusions

The paper investigates the implications of female directors for the board commitment to innovation in high-tech firms by examining a sample of 149 Italian companies.

The empirical evidence supports the hypothesis H1 and, unlike previous studies (Torchia et al. 2011), reports that female directors restrain the company commitment to innovation. The above mentioned finding is consistent with the conclusion that the board gender diversity worsens the board decision-making process (Lückerath-Rovers 2013; Rose 2007; Adams and Ferreira 2009) and improves the related risk-aversion (Jianakoplos and Bernasek 1998; Sila et al. 2016)

Table 11.3 OLS regression models testing H2

Variable	Model 1	Model 2	Model 3
DIV_LEV_EDU	0.146***		
	(0.045)		
DIV_AREA_EDU		0.157***	
		(0.050)	
DIV_EXP			0.125***
			(0.040)
INDEP	0.591*	0.632*	0.585*
	(0.355)	*(0.354)*	*(0.354)*
SIZE	0.000	0.000	0.000
	(0.000)	*(0.000)*	*(0.000)*
LEVERAGE	0.064**	0.069***	0.064***
	(0.019)	*(0.020)*	*(0.019)*
CONSTANT	−0.041	−0.037	−0.031
	(0.045)	*(0.045)*	*(0.046)*
YEAR DUMMY	YES	YES	YES
FIRM DUMMY	YES	YES	YES
OBSERVATIONS	336	336	336
F	2.27**	2.13**	2.26**
R^2	0.284	0.142	0.132

Levels of significance: * < 0.1; ** < 0.05; *** < 0.01
Standard errors in parentheses

to the detriment of more innovative options (Charness and Gneezy 2012; Faccio et al. 2016). This is especially true in the high-tech industry where the ability of female directors to provide a contribution to innovation is strongly hampered by their skill underestimation and sense of inferiority (Chau and Quire 2018; Watts 2009; Arena et al. 2015).

However, in line with the critical mass perspective (Kanter 1977), the results of the multivariate analysis also reports that the presence of a critical mass of female directors positively influences the company commitment to innovation. This circumstance confirms that the critical mass improves the effectiveness of board decision-making, limits the related risk-aversion and fosters the active involvement of female directors in supporting innovation activities (Torchia et al. 2011; Erkut et al. 2008; Konrad et al. 2008).

Turning the attention to the implications of the human capital diversity of female directors for the firm commitment to innovation, the research findings support the hypothesis H2. Indeed, the analyses provide evidence on the positive effect of the level of education, the educational area and the professional expertise heterogeneity on the firm commitment to innovation. These results suggest that the appointment of female directors with diverse educational/professional backgrounds is able to improve the effectiveness of board activity as combining heterogeneous experiences

and expertise produces more innovative ideas (Van der Vegt and Janssen 2003; Gradstein and Justman 2000; Hillman et al. 2002).

Taken together, the results of this article have implications for both scholars and practitioners.

From a theoretical standpoint, the paper complements the existing literature on the topic (e.g. Midavaine et al. 2016; Chau and Quire 2018; Arena et al. 2015) by examining the contribution of both the critical mass and the human capital heterogeneity of female directors to the firm commitment to innovation in a male-dominated setting. Indeed, the research highlights that gender diversity affects the board decision-making process and positively influences the company results in the presence of a critical mass (Schwartz-Ziv, 2017; Joecks et al. 2013; Nielsen and Huse 2010). Thereby, future studies should investigate how different board factors and firm characteristics can influence the commitment to innovation of high-tech companies in different settings.

Finally, from a practical standpoint, the article highlights the importance of fostering the achievement of a critical mass of female directors (Chau and Quire 2018; Arena et al. 2015; Eagly and Carli 2007) and the combination of their heterogeneous educational/professional backgrounds to improve the board decision-making and the company innovation (Heyden et al. 2018; Kim and Kim 2015; Midavaine et al. 2016).

References

Adams, B. R., & Kirchaier, T. (2013). Making it to the top: From female labour force participations to boardroom gender diversity, Financial Markets Group Discussion Paper 715, London School of Economics.

Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics, 94*(2), 291–309.

Adams, S. M., & Flynn, P. M. (2005). Local knowledge advances women's access to corporate boards. *Corporate Governance: An International Review, 13*(6), 836–846.

Arena, C., Cirillo, A., Mussolino, D., Pulcinelli, I., Saggese, S., & Sarto, F. (2015). Women on board: Evidence from a masculine industry. *Corporate Governance: The International Journal of Business in Society, 15*(3), 339–356.

Bandura, A., & Bussey, K. (2004). On broadening the cognitive, motivational, and sociostructural scope of theorizing about gender development and functioning: Comment on Martin, Ruble, and Szkrybalo. *Psychological Bulletin, 130*(5), 691–701.

Bunderson, J. S., & Sutcliffe, K. M. (2002). Comparing alternative conceptualizations of functional diversity in management teams: Process and performance effects. *Academy of Management Journal, 45*(5), 875–893.

Campbell, K., & Mínguez-Vera, A. (2008). Gender diversity in the boardroom and firm financial performance. *Journal of Business Ethics, 83*(3), 435–451.

Cannella, A. A., Park, J. H., & Lee, H. U. (2008). Top management team functional background diversity and firm performance: Examining the roles of team member colocation and environmental uncertainty. *Academy of Management Journal, 51*(4), 768–784.

Charness, G., & Gneezy, U. (2012). Strong evidence for gender differences in risk taking. *Journal of Economic Behavior & Organization, 83*(1), 50–58.

Chau, V. S., & Quire, C. (2018). Back to the future of women in technology: Insights from understanding the shortage of women in innovation sectors for managing corporate foresight. *Technology Analysis & Strategic Management*, *30*(6), 747–764.

Chen, G., Liu, C., & Tjosvold, D. (2005). Conflict management for effective top management teams and innovation in China. *Journal of Management Studies, 42*(2), 277–300.

Chen, H. L., & Hsu, W. T. (2009). Family ownership, board independence, and R&D investment. *Family Business Review, 22*(4), 347–362.

Clarysse, B., Knockaert, M., & Lockett, A. (2007). Outside board members in high-tech start-ups. *Small Business Economics, 29*(3), 243–259.

Dezsö, C. L., & Ross, D. G. (2012). Does female representation in top management improve firm performance? A panel data investigation. *Strategic Management Journal, 33*(9), 1072–1108.

Díaz-García, C., González-Moreno, A., & Sáez-Martínez, F. J. (2013). Gender diversity within R&D teams: Its impact on radicalness of innovation, Innovation. *Organization and Management, 15*(2), 149–160.

Eagly, A. H., & Carli, L. L. (2007). Women and the labyrinth of leadership. *Harvard Business Review, 85*(9), 62–70.

Erkut, S., Kramer, V.W., Konrad, A.M. (2008). Critical mass: Does the number of women on a corporate board make a difference? In: S. Vinnicombe, V. Singh, R. Burke, D. Bilimoria & M. Huse (Eds.), *Women on corporate boards of directors: International research and practice*, Edward Elgar: Cheltenham.

Faccio, M., Marchica, M. T., & Mura, R. (2016). CEO gender, corporate risk-taking, and the efficiency of capital allocation. *Journal of Corporate Finance, 39,* 193–209.

Galia, F., & Zenou, E. (2012). Board composition and forms of innovation, does diversity make a difference? *European Journal of International Management, 6*(6), 630–650.

Gavious, I., Segev, E., & Yosef, R. (2012). Female directors and earnings management in high-technology firms. *Pacific Accounting Review, 24*(1), 4–32.

Gharbi, S., Sahut, J. M., & Teulon, F. (2014). R&D investments and high-tech firms' stock return volatility. *Technological Forecasting and Social Change, 88,* 306–312.

Gradstein, M., & Justman, M. (2000). Human capital, social capital, and public schooling. *European Economic Review, 44*(4), 879–890.

Hambrick, D. C., Cho, T. S., & Chen, M. J. (1996). The influence of top management team heterogeneity on firms' competitive moves. *Administrative Science Quarterly, 41*(4), 659–684.

Harrison, D. A., & Klein, K. J. (2007). What's the difference? Diversity constructs as separation, variety, or disparity in organizations. *Academy of Management Review, 32*(4), 1199–1228.

Heyden, M. L., Sidhu, J. S., & Volberda, H. W. (2018). The conjoint influence of top and middle management characteristics on management innovation. *Journal of Management, 44*(4), 1505–1529.

Hillman, A. J., Cannella, A. A., Jr., & Harris, I. C. (2002). Women and racial minorities in the boardroom: How do directors differ? *Journal of Management, 28*(6), 747–763.

Huse, M. (2007). *Boards, governance and value creation*. Cambridge: Cambridge University Press.

Jianakoplos, N. A., & Bernasek, A. (1998). Are women more risk averse? *Economic Inquiry, 36* (4), 620–630.

Joecks, J., Pull, K., & Vetter, K. (2013). Gender diversity in the boardroom and firm performance: What exactly constitutes a 'critical mass'? *Journal of Business Ethics, 118*(1), 61–72.

Kanter, R. (1977). *Men and women of the organization*. New York: Basic Books.

Kanter, R. (1987). Men and women of the corporation revisited. *Management Review, 76*(3), 14–16.

Kim, H., & Lim, C. (2010). Diversity, outside directors and firm valuation: Korean evidence. *Journal of Business Research, 63*(3), 284–291.

Kim, K. H., & Rasheed, A. A. (2014). Board heterogeneity, corporate diversification and firm performance. *Journal of Management Research, 14*(2), 121–139.

Kim, N., & Kim, E. (2015). Board capital and exploration: From a resource provisional perspective. *Management Decision, 53*(9), 2156–2174.

Konrad, A. M., Kramer, V., & Erkut, S. (2008). Critical mass: The impact of three or more women on corporate boards. *Organizational Dynamics, 37*(2), 145–164.

Kor, Y. (2006). Direct and interaction effects of top management team and board compositions on R&D investment strategy. *Strategic Management Journal, 27*(11), 1081–1099.

Kramer, V. W., Konrad, A. M., Erkut, S., & Hooper, M. J. (2006). *Critical mass on corporate boards: Why three or more women enhance governance*. Wellesley, MA: Wellesley Centers for Women.

Lückerath-Rovers, M. (2013). Women on boards and firm performance. *Journal of Management and Governance, 17*(2), 491–509.

Manolova, T. S., Carter, N. M., Manev, I. M., & Gyoshev, B. S. (2007). The differential effect of men and women entrepreneurs' human capital and networking on growth expectancies in Bulgaria. *Entrepreneurship Theory and Practice, 31*(3), 407–426.

Midavaine, J., Dolfsma, W., & Aalbers, R. (2016). Board diversity and R&D investment. *Management Decision, 54*(3), 558–569.

Miller, T., & Triana, M. d. C. (2009). Demographic diversity in the boardroom: Mediators of the board diversity–firm performance relationship. *Journal of Management Studies, 46*(5), 755–786.

Nielsen, S., & Huse, M. (2010). Women directors' contribution to board decision-making and strategic involvement: The role of equality perception. *European Management Review, 7*(1), 16–29.

Østergaard, C. R., Timmermans, B., & Kristinsson, K. (2011). Does a different view create something new? *The effect of employee diversity on innovation, Research Policy, 40*(3), 500–509.

Peterson, C. A., & Philpot, J. (2007). Women's roles on U.S. Fortune 500 boards: Director expertise and committee memberships. *Journal of Business Ethics, 72*(2), 177–196.

Rose, C. (2007). Does female board representation influence firm performance? *The Danish evidence, Corporate Governance: An International Review, 15*(2), 404–413.

Rossi, F., & Cebula, R. J. (2015). Does the board of directors affect the extent of corporate R&D? Evidence from Italian listed companies. *Economics Bulletin, 35*(4), 2567–2580.

Ruigrok, W., Peck, S., & Tacheva, S. (2007). Nationality and gender diversity on Swiss corporate boards. *Corporate Governance: An International Review, 15*(4), 546–557.

Ruiz-Jiménez, J. M., Fuentes-Fuentes, M. d. M., & Ruiz-Arroyo, M. (2016). Knowledge combination capability and innovation: The effects of gender diversity on top management teams in technology-based firms. *Journal of Business Ethics, 135*(3), 503–515.

Ruiz-Jiménez, J. M., & Fuentes-Fuentes, M. d. M. (2016). Management capabilities, innovation, and gender diversity in the top management team: An empirical analysis in technology-based SMEs. *BRQ Business Research Quarterly, 19*(2), 107–121.

Schwartz-Ziv, M. (2017). Gender and board activeness: The role of a critical mass. *Journal of Financial and Quantitative Analysis, 52*(2), 751–780.

Sila, V., Gonzalez, A., & Hagendorff, J. (2016). Women on board: Does boardroom gender diversity really affect firm risk? *Journal of Corporate Finance, 36,* 26–53.

Singh, V., Terjesen, S., & Vinnicombe, S. (2008). Newly appointed directors in the boardroom: How do women and men differ? *European Management Journal, 26*(1), 48–58.

Terjesen, S., Couto, E. B., & Francisco, P. M. (2016). Does the presence of independent and female directors impact firm performance? *A multi-country study of board diversity, Journal of Management & Governance, 20*(3), 447–483.

Torchia, M., Calabrò, A., & Huse, M. (2011). Women directors on corporate boards: From tokenism to critical mass. *Journal of Business Ethics, 102*(2), 299–317.

Van der Vegt, G. S., & Janssen, O. (2003). Joint impact of interdependence and group diversity on innovation. *Journal of Management, 29*(5), 729–751.

Watts, J. H. (2009). Allowed into a man's world' meanings of work-life balance: Perspectives of women civil engineers as 'minority' workers in construction. *Gender, Work & Organization, 16*(1), 37–57.

Wincent, J., Thorgren, S., & Anokhin, S. (2014). Entrepreneurial orientation and network board diversity in network organizations. *Journal of Business Venturing, 29*(2), 327–344.

Zahra, S. A. (1996). Technology strategy and new venture performance: A study of corporate-sponsored and independent biotechnology ventures. *Journal of Business Venturing, 11*(4), 289–321.

Zelechowski, D. D., & Bilimoria, D. (2004). Characteristics of women and men corporate inside directors in the US. *Corporate Governance: An International Review, 12*(3), 337–342.