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3 Chapter 14

Does Board Structure Matter for Innovation?

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15 14.1 Introduction

16 Innovation is defined as a creative and complex activity that needs
 17 human capacities such as imagination, ingenuity, and creativity
 18 (Torchia *et al.*, 2011). However, to face the increasingly tough com-
 19 petition and maintain a sustainable competitive advantage, firms are
 20 forced to innovate and increase their capacity to integrate individu-
 21 als displaying diverse types of knowledge, abilities, and networking.
 22 In recent years, policymakers have shown that innovation perfor-
 23 mance varies according to market regulation and governance mech-
 24 anisms. Several initiatives and programs have been introduced in
 25 order to increase diversity in the board, such as gender quota laws
 26 and the presence of minorities in top management positions. These
 laws are intended to push companies to renew the composition of

2 *Financial and Economic Systems: Transformations & New Challenges*

1 their board of directors, to select new profiles, and to detect the pro-
2 files of women, make them visible. Moreover, many decisions have
3 been introduced to foster innovation and R&D activities (The EU
4 agency for disruptive innovation, 2017). For instance, OECD coun-
5 tries, the United States (Paff, 2005; Wu, 2005), Japan (Kobayashi,
6 2014), China, (Chen *et al.*, 2019), and Canada (Czarnitzki *et al.*,
7 2011) tend to rely on tax incentives to promote R&D spending in
8 the business sector. In order to facilitate access to financial resources
9 and stimulate innovation activities, the government provides public
10 R&D funding as public subsidies or R&D tax credit to innovative
11 firms. The R&D tax credits and subsidies are two of the most popu-
12 lar instruments for governments to support R&D activities (Hall and
13 Van Reenen, 2000).

14 Over the last fifteen years, a significant number of studies have
15 analyzed the influence of corporate governance on innovation (Lodh
16 *et al.*, 2014; George and Lin, 2016; Lu *et al.*, 2018; Wang *et al.*, 2017).
17 Innovation literature has investigated several aspects of innovation
18 such as how innovation affects firm performance (Hitt *et al.*, 1996),
19 how leaders affect employees' innovativeness (Scott and Bruce, 1994),
20 and how CEO (chief executive officer) and top management char-
21 acteristics could lead to more innovations (Hirshleifer *et al.*, 2012;
22 Chemmanur *et al.*, 2014). Moreover, several studies have focused,
23 especially, on the impact of ownership structure on innovation deci-
24 sions (Chang *et al.*, 2006; Belloc, 2012; Choi *et al.*, 2012; Shapiro
25 *et al.*, 2013; Lodh *et al.*, 2014; Diéguez-Soto *et al.*, 2016). For
26 instance, Choi *et al.* (2012), Shapiro *et al.* (2013) show that the own-
27 ership structure is a critical factor in helping companies realize inno-
28 vative projects. Belloc (2012) shows that concentrated ownership is
29 important for innovation activities because it provides effective mon-
30 itoring mechanisms. Chang *et al.* (2006) confirm that the majority of
31 shareholders have positive effects on firms' innovation performance,
32 while Chen *et al.* (2011), Lodh *et al.* (2014), and Shapiro *et al.* (2013)
33 argue that foreign ownership has a positive influence on innovation
34 performance.

35 Furthermore, innovation literature has strongly shown how direc-
36 tors could have a positive impact on innovation (Torchia *et al.*, 2011
37 and Pathan and Faff, 2013). Empirical evidence has largely sup-
38 ported the idea that the board involvement is a key factor in inno-
39 vation projects (Torchia *et al.*, 2011; Pathan and Faff, 2013; Galia

1 and Zenou, 2013; Galia *et al.*, 2015). Beyond its role of ensuring
2 the alignment of interests between shareholders and managers, dom-
3 inated by agency theory and focusing on the monitoring and control-
4 ling role of boards (Daily *et al.*, 2003), research brings evidence that
5 another crucial role of the board of directors is to provide strategic
6 advice, knowledge, resources and networking to the company (Hill-
7 man *et al.*, 2000; Huse, 2007), which could be value-enhancing for
8 innovation (Talke *et al.*, 2010). In fact, according to resource depen-
9 dence theory (Pfeffer and Salancik, 1978), the personal characteris-
10 tics of CEOs and directors affect a firm’s innovation investment and
11 value. Specifically, the educational background is an important cog-
12 nitive variable for a firm to undertake complex corporate strategies.
13 Moreover, drawing on upper-echelons and the human capital theories
14 (Westphal and Zajac, 1995), directors may bring to the board differ-
15 ent backgrounds, experiences, and opinions which may lead to bet-
16 ter performance. Consequently, corporate governance mechanisms,
17 particularly board member attributes [demographic characteristics,
18 culture, experiences], influence and increase managerial risk-taking.
19 So, innovation strategies can be influenced by the personal traits of
20 directors (Barker and Mueller, 2002; Kor, 2006).

21 However, several areas in innovation literature are not yet fully
22 explored: First, beyond the traditional role of monitoring and control
23 (Ruigrok *et al.*, 2006) and the alignment of shareholders and
24 managers’ interests, mostly explained by agency theory (Daily *et al.*,
25 2003), studies did not focus on the analysis of the directors’ charac-
26 teristics and their influence on the decision-making process. Actually,
27 few studies have examined the relationship between demographic
28 characteristics of directors and innovation. Most of them confirm the
29 fact that independent directors could influence innovation strategies.
30 The literature has taken into account the influence of independent
31 directors but has neglected the influence that foreign directors might
32 have on innovation strategies due to their different nationalities and
33 cultures. Moreover, some papers provide evidence that the educa-
34 tional level of board members is positively associated with innova-
35 tion (Kuo *et al.*, 2018); however, previous studies have ignored the
36 influence of academic degree type and the professional background of
37 directors on innovation. Another group of studies has analyzed the
38 impact of female directors on innovation these studies have focused
39 on one specific pattern of diversity (Gender) (see among others

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1 Torchia *et al.*, 2011; Østergaard *et al.*, 2011; Díaz-García *et al.*, 2013;
2 Galia and Zenou, 2013; Pathan and Faff, 2013; Galia *et al.*, 2015).
3 Focusing on the existing finding, we notice that literature marginal-
4 izes several forms of diversity in boards, such as age, nationality, aca-
5 4 demic background, and professional experience. There is not enough
6 evidence on the effects of different board characteristics of innovative
7 firms.

8 Then, despite the central role of boards in corporate governance,
9 there is relatively little understanding of how the internal organiza-
10 tion of boards, specifically the structure of board committees, could
11 shape strategic decisions such as innovation. In fact, governance lit-
12 erature has strongly underlined the importance of committees in the
13 functioning of the board (Adams, 2003; Adams *et al.*, 2010; Guo and
14 Masulis, 2015). The composition and functions of committees have
15 a strong influence on the board's composition as well as committee's
16 activities. Turning to studies which discuss the composition of board
17 committees, the literature focuses, especially, on audit committee: it
18 shows how composition of audit committees could influence the qual-
19 ity of financial disclosure, internet reporting, earnings management,
20 and financial performance (Karamanou and Vafeas, 2005; Mangena
21 and Pike, 2005, Kelton and Yang, 2008; Bédard *et al.*, 2004; Klein,
22 2002; Zhou *et al.*, 2018). Moreover, most of papers have studied the
23 effect of appointing independent members in committees (Deli and
24 Gillan, 2000; Klein, 2002; Zhang *et al.*, 2007; Krishnan, 2005; Choi
25 *et al.*, 2007). We point out that the literature neglects several forms
26 of directors' attributes in key committees and their influence on the
27 firm's activities. To the best of our knowledge, the effects of diversity
28 on committees have not been fully established.

29 To fulfill this gap in the literature, this contribution aims to inves-
30 tigate how diverse attributes could influence corporate innovation.
31 In the first section, we focus on individual characteristics and their
32 influence on innovation effort and performance. Then, we examine
33 how the internal organization of boards, specifically the committees'
34 roles and their composition and to what extent they could be mean-
35 ingful to innovation processes. Specially, we discuss the influence of
36 the committee size, the frequency of meetings, and the presence of
37 independent and female members. Finally, the chapter sheds light on
38 the effectiveness of initiatives and programs introduced to increase
39 diversity on boards.

1 14.2 Do Directors' Attributes in Boards Influence 2 Innovation?

3 14.2.1 *Board diversity: Theoretical perspectives*

4 The most commented functions of the board in the literature are
5 monitoring the senior management to protect the company against
6 opportunistic behavior and advising the management on strategic
7 decisions (Agency theory, Fama and Jensen, 1983). However, beyond
8 these functions, the board provides necessary resources, competen-
9 cies, and networking to the firms (Hillman *et al.*, 2000; Huse, 2007).
10 According to the resource-dependence theory (Pfeffer and Salancik,
11 1978), members of the board constitute a source of knowledge, exper-
12 tise, and skills, and therefore a source of a better performance. In
13 fact, personal cognition and knowledge are important corporate gov-
14 ernance variables for a firm to perform complex investments. There-
15 fore, the personal characteristics of CEOs and directors could affect
16 a firm's innovation investment.

17 Moreover, based on the theory of human capital (Westphal
18 and Zajac, 1995), directors with different experiences and sets of
19 educational backgrounds may lead to more diverse boards, and
20 thus benefit the overall performance of the firms (Terjesen *et al.*,
21 2009). In addition, boards with varied skills and perspectives may
22 lead a better quality of management, and hence better innovation
23 performance (Torchia *et al.*, 2011; Pathan and Faff, 2013; Galia
24 and Zenou, 2013; Galia *et al.*, 2015). In the same vein, many
25 studies highlight that diversity on the board has been associated
26 with positive cognitive effects such as creativity, new ideas, and
27 insights, which could influence the ideas and types of innovation
28 in the firm (Torchia *et al.*, 2011; Pathan and Faff, 2013; Galia
29 and Zenou, 2013; Galia *et al.*, 2015). Therefore, human capital
30 theory brings new insights supported also by the resource depen-
31 dence theory: under specific conditions, board diversity is a valu-
32 able mechanism to improve innovation performance (Torchia *et al.*,
33 2011).

34 However, the social-psychological concept of minority status,
35 which is derived from social impact theory (Latané, 1981), states
36 that majority status groups are powerful and more influential over
37 the decision-making process (Carter *et al.*, 2010). Therefore, females,

1 being usually considered as minorities on diverse boards, may not
 2 have the power to influence the board as the result of the internal
 3 group dynamics of the board (Westphal and Milton, 2000). Moreover,
 4 more diverse boards may lead to more conflict and divergent opin-
 5 ions, which make the decision-making process time-consuming and
 6 less effective (Campbell and Vera, 2008, and Carter *et al.*, 2010).

7 **14.2.2 Board composition and innovation**

8 Early research on board diversity focused on task-related director
 9 attributes such as educational and functional background, as well
 10 as organizational and board tenure factors (Goodstein *et al.*, 1994;
 11 Westphal and Zajac, 1995). However, with the wider acceptance
 12 of the value in diversity proposition and the greater pressures to
 13 increase diversity on corporate boards (Daily and Dalton, 2003),
 14 new dimensions of diversity in board composition are emerging. For
 15 instance, in North America, attention is increasingly paid to race,
 16 ethnicity, and gender of corporate directors (Carter *et al.*, 2003;
 17 Daily *et al.*, 1999; Erhardt *et al.*, 2003), while in Europe, national-
 18 ity (Ruigrok *et al.*, 2007) and gender (Singh and Vinnicombe, 2004;
 19 Singh *et al.*, 2001) appear to be important dimensions of board diver-
 20 sity. In fact, research based on the European context confirms that
 21 the introduction of gender and / or nationality diversity on boards
 22 has important implications for board dynamics (Galia and Zenou,
 23 2013; Galia *et al.*, 2015).

24 Indeed, diversity as well as board composition vary according
 25 to the country, market regulation such as gender quota laws, and
 26 governance mechanisms (Hoskisson *et al.*, 2002).

27 For instance, referring to the (Table 14.1), which shows the
 28 descriptive statistics of the boards composition of companies listed on
 29 the SBF120 index between 2002 and 2016^{1,2,3} the average board size
 30 is almost 12, which is larger than boards in other countries: Torchia
 31 *et al.* (2011) find an average board size of 7 in Norwegian companies,

¹Board structure datasets are hand-collected from annual reports available on the firms' websites.

²This work supported by a partnership between the University of Montpellier and CASD [reference: ANR-10-EQPX-17 - Center d' secure data access - CASD].

Table 14.1. Board composition: French context.

Variables	Obs	Mean	Std, Dev	Min	Max
B-Gen	1468	17.45547	14.15293	0	63.6363
B-Ind	1466	49.03985	22.28997	0	100
B-For	1470	20.32871	20.43091	0	100
B-Size	1502	12.37617	3.568168	3	24
B-Age	1470	59.87434	5.4997	21	81
B-Edu	1470	64.0529	22.29494	0	100
B-Bus	1470	63.29881	18.45479	0	100

Note: B-Gen: Percentage of female directors on board. B-Ind: Percentage of independent directors on board. B-For: Percentage of foreign directors on board. B-Size: Total number of directors on board. B-Age: Average age of directors. B-Edu: Percentage of directors who have Master, MBA or PhD degree. B-Bus: Percentage of directors who have a business/management/corporate law education.

1 Kang (2007) find an average board size of 8 in Australian companies,
 2 and Godard and Schatt (2005) also notice a higher average board size
 3 on French firms [more than 11] in 2002. These differences can vary
 4 significantly among countries.

5 Moreover, despite the introduction of gender quota law, very few
 6 women are in board positions; the percentage of female directors
 7 on boards almost is 17.5%, since, most often, males are appointed
 8 to director positions (82.5%). This low level is consistent with
 9 other countries: Kang *et al.* (2007) showed a percentage of 10% on
 10 Australian firms, and Mahadeo *et al.* (2012) showed it as only 3% on
 11 Mauritanian firms.

12 In addition, in line with Godard and Schatt (2005), half of the
 13 board (49%) are independent and two of them (20%) have a foreign
 14 nationality. The percentages of independent and foreign directors sig-
 15 nificantly vary among firms, particularly in multinational companies
 16 [between 0 and 100%]. However, Lu *et al.* (2018), using panel data
 17 on United States public firms, found that almost 70% of the board
 18 are independent directors. Regarding the academic background, 64%
 19 of the directors are highly educated (Master, MBA, or PhD degree),
 20 and 63% of directors are business or management educated. In fact,
 21 France is well known for its elitist world based on prestigious educa-
 22 tion (Ecole Nationale de l'Administration, engineer's schools: Mines,
 23 Ponts, Centrale, ENSAE, Télécoms..., and business schools: HEC,

1 ESSEC, ESCP, and INSEAD). People who graduated from these
 2 schools run the biggest French firms and accumulate directorships
 3 in large public and private firms. Most of them had governmental
 4 functions or worked in ministries for several years.

5 Turning to innovation, only 15.38% of firms have introduced a
 6 new or a significantly improved product or service, and 14.46%
 7 have implemented a new or a significantly improved process. For
 8 patents, there are on average, 27.48 patents filed. Regarding the
 9 R&D team structure, almost 80 hours on average is dedicated to
 10 R&D projects.^{4,5}

11 Regarding studies that have examined the relationship between
 12 board composition and innovation, most of them confirm the fact
 13 that independent directors could influence innovation strategies.
 14 Based on panel data on the largest German companies, Balsmeier
 15 *et al.* (2014) show a positive influence of external executives on the
 16 performance of innovative firms, measured by patent applications.
 17 Using panel data on U.S. public firms, Lu *et al.* (2018) found a posi-
 18 tive effect of board independence on corporate innovation, whereas
 19 Sena *et al.* (2018), based on a sample of manufacturing subsidiaries
 20 controlled by British multinationals, tested the hypothesis that inde-
 21 pendent boards can insulate a company from the detrimental impact
 22 of corruption on innovation. The literature has taken into account
 23 the influence of independent directors but has neglected the influ-
 24 ence that foreign directors might have on innovation strategies due
 25 to their different nationalities and culture.

26 Also, some papers provide evidence that the educational level
 27 of board members is positively associated with innovation in the
 28 Taiwanese context (Lin *et al.*, 2011). Moreover, Kuo *et al.* (2018),
 29 based on a sample of 437 Taiwanese listed firms, concluded that the
 30 directors' education does affect R&D firm investment and suggested
 31 that highly educated directors lead the firm to invest more in R&D

⁴Statistics of innovation are provided by the surveys on Innovation conducted by the INSEE [Project Governance and Innovation in France 2016]. This work is supported by a public grant overseen by the French National Research Agency [ANR] as part of the “Investissements d’avenir” program, specifically Governance and Innovation in France GOUINFR, 2016.

⁵<https://www.insee.fr/en/metadonnees/source/serie/s1001>.

1 projects. However, previous studies have ignored the influence of aca-
2 demic degree type and the professional background of directors on
3 innovation: to the best of our knowledge, drawn on Asian data, Lin
4 *et al.* (2011); Kuo *et al.* (2018) are among the rare papers to address
5 this question.

6 Another group of studies has analyzed the impact of female direc-
7 tors on innovation in Spain (Diaz-Garcia *et al.*, 2013). It improves
8 interaction and dynamics in R&D teams (Teruel *et al.*, 2015), and
9 specifically fosters the firm's ability to introduce organizational inno-
10 vations (Torchia *et al.*, 2011). All these studies, however, have focused
11 on one specific pattern of diversity (gender) and one specific form of
12 innovation (organizational innovation). Very few studies have investi-
13 gated the effect of gender diversity on innovation (Miller and Triana,
14 2009). In fact, the existing literature marginalizes other forms of
15 diversity in boards and the impact of directors' attributes on different
16 forms of innovations

17 14.2.2.1 *Presence of outside directors on board and* 18 *innovation: Independent, foreign directors*

19 In the past few years, many studies have examined how outside board
20 members could impact innovation performance (see among others
21 Chen and Hsu, 2009; Choi and Lee, 2011; Choi *et al.*, 2012; Shapiro
22 *et al.*, 2013; Chen 2013, Lodh *et al.*, 2014; Balsmeier *et al.*, 2014).
23 Drawing on agency theory, a higher proportion of independence may
24 lead to a better monitoring function of the board. Therefore, boards
25 should include the appropriate mix of experience and backgrounds
26 to better exercise their monitoring role and to evaluate management
27 and assess business strategies (Hillman and Dalziel, 2003 and Adams
28 and Ferreira, 2009). In fact, independent directors increase monitor-
29 ing, which helps companies to effectively allocate their R&D bud-
30 get and to provide access to resources for technological innovation
31 activities (Shapiro *et al.*, 2013). They have a wide range of resources
32 that could boost innovation activities (Choi *et al.*, 2012). Based on
33 a sample of Taiwanese business, Chen (2013) found that the pres-
34 ence of independent directors has a positive moderating effect on the
35 director's contribution to innovation. One explanation could be that
36 independent directors exercise better monitoring of managers and
37 facilitate access to the resources needed for innovation. In the same

1 vein, recent results support that external knowledge and expertise
2 on boards are especially valuable resources when complex operations
3 are considered (Chen and Hsu, 2009). External directors on boards
4 can provide specific monitoring and advising competencies needed to
5 improve innovative performance because of their own proven leader-
6 ship skills and market experiences.

7 Furthermore, the management literature points out that the mon-
8 itoring and advising competences of outside directors, or generally
9 the human capital they bring to the board, strongly depend on
10 their specific professional experiences (see among others Kor and
11 Sundaramurthy, 2009; Kor and Misangyi, 2008). Hence, in terms of
12 innovation, firms might benefit particularly from having an external
13 director who is experienced in similar technological areas (Carpenter
14 and Westphal, 2001). Directors might also bring valuable organiza-
15 tional capital to the board by providing insights on suitable ways of
16 organizing innovative activities. Nevertheless, the negative influence
17 of outside directors is still conceivable. In fact, the financial eco-
18 nomics literature provides evidence suggesting that outside board
19 members might be more concerned about their private benefits than
20 about the performance of the firms they are supposed to monitor and
21 advise (Fahlenbrach *et al.*, 2010a). Independent directors are not the
22 only outside directors that could be appointed to boardrooms. For
23 instance, more foreign members are sitting on boards, specifically in
24 large corporations.

25 On the one hand, in line with dependence resource theory (Pfeffer
26 and Salancik, 1979), foreign directors may provide diverse perspec-
27 tives, valuable ideas, and problem-solving abilities and may facili-
28 tate the achievement of optimal and creative solutions. They may
29 stimulate a firm to improve or develop new products sold abroad
30 as they also possess knowledge about global markets and customers'
31 tastes (Kerr and Lincoln, 2010). In fact, the heterogeneity of peo-
32 ple is likely to be a necessary driver for the creation of new ideas
33 (Barker and Mueller, 2002) and to stimulate innovation (Berliant
34 and Fujita, 2011). In addition, foreign directors of the same educa-
35 tional level are imperfectly substitutable groups because of cultural
36 differences. Fujita and Weber (2004) argue that cultural diversity of
37 the labor force might be a key determinant for R&D activity. In fact,
38 the generation of new products and ideas heavily relies on individual
39 talents and skills from diverse educational and cultural environments.

1 Fujita and Weber (2004) note also that knowledge production relies
 2 heavily on the talents and skills of members coming from a wide
 3 range of cultural backgrounds. The nature of R&D activity calls for
 4 interaction between different individuals and the pooling of different
 5 ideas and abilities. Likewise, Alesina and La Ferrara (2005) argue
 6 that ethical and cultural diversity may lead to innovation and cre-
 7 ativity since it involves a variety of abilities and knowledge. Berliant
 8 and Fujita (2008) also refer to the significance of cultural diversity
 9 for knowledge creation and transfer. The heterogeneity of people is
 10 important for the creation of new ideas. On the other hand, ethnic
 11 diversity could provide diverse perspectives, but not automatically
 12 valuable for innovation and solving problems (Berliant and Fujita,
 13 2011). Even though ethnic diverse directors know global markets and
 14 customer tastes, they may not lead the firm to develop new products
 15 sold abroad as they (Kerr and Lincoln, 2010).

16 14.2.2.2 *How does directors' education influence innovation?*

17 Directors' education levels have been the subject of a number of
 18 researches; most of them concluded that a high educational level
 19 is positively correlated with managerial capabilities and innovation
 20 (see among others Lin *et al.*, 2011; Kuo *et al.*, 2018). In fact, board
 21 members with postgraduate degrees have the ability to better analyze
 22 complex information (Escriba-Esteve *et al.*, 2009), to efficiently solve
 23 problems, and to adopt new technologies (Dalziel *et al.*, 2011). In the
 24 same order of ideas, Wincent *et al.* (2010) show that the number of
 25 directors who have degrees from elite institutions and who have a
 26 rich academic background⁶ positively impact innovation. Similarly,
 27 Lundvall *et al.* (2002) show that educational level reflects personality
 28 traits, cognitive styles, and values. Therefore, a firm where directors
 29 have a higher educational level is more likely to invest in innovation
 30 projects.

⁶Wincent *et al.* (2010) show that the degree of board diversity and interlocking directorates primarily influence incremental innovation, whereas education level influences radical innovation. They find that a network board's diversity of expertise and education level are important for improving all components of innovative performance [total, radical and incremental].

1 However, the diversity of educational degrees leads to exposure
2 to different knowledge and may lead to different and divergent ways
3 of thinking so that making a decision becomes time-consuming and
4 communication less effective and slower than in a more homogenous
5 groups. This could decrease investments in R&D projects, resulting
6 in a negative impact on innovation. Unlike Daellenbach *et al.* (1999)
7 and Barker and Mueller (2002), who did not find any significant
8 association between director's education level and R&D investment,
9 Dahlin *et al.* (2005) argue that educational diversity will enhance the
10 information use, while too much diversity will reduce the ability to
11 diffuse the information between members.

12 Turning to the type of academic degree, science, engineering, or
13 technology degree holders will have a better ability to understand
14 technology and innovation and are more likely to support a higher
15 level of R&D spending (Tyler and Steensma, 1998). In fact, direc-
16 tors with science and engineering degrees have better skills when
17 they have to use new technologies or to adopt new ideas. They could
18 increase the probability of accepting and introducing new changes.
19 However, management and business-educated directors have busi-
20 ness skills, specifically in finance and on accounting areas (Nekhili
21 and Gatfaoui, 2013; Gendron and Bedard, 2006). In fact, MBA pro-
22 grams attract more conservative and risk-averse students who acquire
23 analytic skills to avoid losses (Finkelstein and Hambrick, 1996). Con-
24 sequently, management and business-educated directors have better
25 skills to handle risks but prefer short-term profitable investments at
26 the expense of risky and long-term investments such as innovative
27 projects.

28 **14.2.3 Gender diversity on board**

29 In the fields of management and economics, the number of studies
30 on gender has increased in the last few years (Kang, 2007; Mahadeo
31 *et al.*, 2012; Østergaard *et al.*, 2011; Torchia *et al.*, 2011; Galia and
32 Zenou, 2013; Pathan and Faff, 2013; Galia *et al.*, 2015). For instance,
33 studies have discussed how the presence of women on boards could
34 influence a firm's financial and social performance (see among others:
35 Carter *et al.*, 2010; Carter *et al.*, 2003; Belghiti Mahut *et al.*, 2010),
36 corporate governance (Carter *et al.*, 2003; Adams and Ferreira, 2009),
37 identifying resource dependency (Hillman *et al.*, 2000), and network

1 ties (Hillman *et al.*, 2007). According to the resource dependence the-
2 ory, the appointment of women directors brings new skills and quali-
3 fications to the firm. The presence of female directors helps to better
4 understand the marketplace, particularly customers and employees,
5 as they are themselves gender diverse. It could improve the firm's
6 image in the market, particularly for stakeholders, and potential and
7 current employees, customers, and investors (Hillman *et al.*, 2007).

8 Moreover, many studies provide evidence that appointing women
9 to board positions changes the decision-making dynamics of the
10 board (Elstad and Ladegard, 2012). In fact, women on boards bring
11 different perspectives, expertise, and working styles from their male
12 counterparts (Daily *et al.*, 2003; Hillman *et al.*, 2002). Moreover,
13 Nielsen and Huse (2010) identify another aspect, that the presence of
14 women on board contributes to reducing the level of interest conflicts
15 and ensures a high quality of development activities.

16 Turning to innovation, gender diversity may deliver a broad range
17 of perspectives, increase the search for information, enhance the qual-
18 ity of brainstormed ideas, facilitate creativity, and generate more
19 strategic alternatives (Post and Byron, 2015). For instance, Torchia
20 *et al.* (2018) show that women directors contribute positively and
21 significantly to organizational innovation. They notice that some
22 decision-making culture dimensions mediate the positive relationship
23 between women directors and the level of organizational innovation:
24 among these dimensions, there are the degree of cognitive conflict
25 and the degree of preparation, and involvement during board meet-
26 ings. As organizational innovation is related to cognitive and learning
27 processes (Nonaka and Takeuchi, 1995) and is the output of vari-
28 ous intervening mental processes (Hodgkinson, 2003), gender diver-
29 sity boosts all these aspects and could be positively related to the
30 organizational innovation.

31 In addition, gender diversity influences a firm's risk-taking; female
32 directors are labelled as more risk-averse than men (Croson and
33 Gneezy, 2009). Therefore, they invest less in risky projects such as
34 innovation. In the same vein, Niederle and Vesterlund (2007) con-
35 clude that women are less competitively inclined and less overcon-
36 fident than men. Consequently, women avoid risky and challenging
37 situations. However, Nählinder (2010) shows that men and women
38 have different approach when they innovate: For instance, women
39 conduct innovations that are largely inspired by local needs to achieve

1 social ends. Therefore, women have specific knowledge of consumer
 2 markets, consumer behavior, and customer needs (Kang *et al.*, 2007;
 3 Torchia *et al.*, 2011; Díaz-García *et al.*, 2013; Teruel *et al.*, 2015).
 4 Their presence on the board can contribute to broadening the range
 5 of new products and services.

6 **14.2.4 Directors' age**

7 Social and professional experiences of directors are closely related to
 8 their age. The age will change the individual's vision, beliefs, atti-
 9 tudes, and interpersonal networks. In fact, director's career comes
 10 with age, and it can influence corporate governance (Jackling and
 11 Johl, 2009). For example, young directors are more concerned about
 12 their reputation and have shorter prior professional experience while
 13 old directors are more skillful in business decision-making. Moreover,
 14 Mahadeo *et al.* (2012) show that age diversity improves learning abil-
 15 ities and helps to develop new and innovative ideas. Therefore, age
 16 diversity among board members can help the board to consider a vari-
 17 ety of perspectives and to better target consumers' needs in different
 18 age groups, with a greater variety of products and services (Kang
 19 *et al.*, 2007). In addition, age could influence risk-taking. Old groups
 20 are less risk-tolerant (Buccioli and Miniaci, 2011). They invest in more
 21 routine and less risky investments than young directors, particularly
 22 when they are entrenched. However, based on their experience, their
 23 knowledge, and their background, old directors can detect and iden-
 24 tify the most profitable projects and are more prone to introduce suc-
 25 cessful innovations, despite their risk aversion (Mahadeo *et al.*, 2012).
 26 However, unlike stated by Kang *et al.* (2007), age diversity can lead
 27 to a lack of cohesion in decision-making, worsen the communication
 28 process, and decrease trust among board members (Mahadeo *et al.*,
 29 2012). Torchia *et al.* (2011) provide evidence that there is a negative
 30 relationship between age diversity and organizational innovation.

31 Finally, we notice that diversity in boardrooms is a booming area
 32 of research. In fact, governance literature has strongly shown how
 33 the board of directors could provide large and diverse resources to
 34 the firm, such as strategic advice, knowledge, and networking, which
 35 could be value-enhancing for innovation (Talke *et al.*, 2010; Torchia
 36 *et al.*, 2011; Pathan and Faff, 2013; Galia and Zenou, 2013; Galia
 37 *et al.*, 2015). These studies conclude that the composition of board

1 is a determinant for innovation strategy. However, despite a large
 2 number of studies on board committees, the question of diversity
 3 in committees is not yet fully explored. Hereafter, we analyze how
 4 board committees could influence innovation and to what extent.

5 **14.3 Does Diversity in Board Committees Favor** 6 **Innovation?**

7 **14.3.1 *Role of board committees and innovation***

8 Governance literature has strongly underlined the importance of
 9 committees in the functioning of the board (Adams, 2003; Adams
 10 *et al.*, 2010; Guo and Masulis, 2015). It provides a means and
 11 structure for effective governance by facilitating special tasks and
 12 addressing important corporate concerns (Adams, 2003). In fact, the
 13 most influential board decisions are taken at the committee level
 14 (Kesner, 1988; Klein, 1998; Adams, 2003; Guo and Masulis, 2015).
 15 For instance, the audit committee oversees the integrity and compli-
 16 ance of the firm's financial reporting. The compensation committee
 17 focuses on human resource policies and procedures, most notably the
 18 compensation of top executives. The governance committee recom-
 19 mends new candidates for the board and other top executive posi-
 20 tions and sets general governance procedures; directors are usually
 21 assigned to committees at the recommendation of the governance
 22 committee (Adams, 2003). Klein (1998) considers committee mem-
 23 bership to be a proxy for the duties and functions of a director on the
 24 board. Directors have a stronger and more direct impact on executive
 25 compensation, director selection, and other important actions that
 26 significantly affect corporate performance; under specific conditions,
 27 such committees members have to serve on board committees with
 28 primary responsibility for these functions.

29 Moreover, committees are important mechanisms to monitor
 30 corporate activities and play a valuable role in the protection of
 31 shareholders' wealth (Kesner, 1988). From an agency perspective,
 32 committees can allow directors to better perform their control role.
 33 The specialization of committees and the large amount of informa-
 34 tion that directors can share during meetings increase the potential
 35 to monitor executives and protect shareholders' wealth. Further-
 36 more, from a resource-based-perspective, committees can enhance

1 the involvement of directors in innovation activities (Harrison, 1987).
 2 They can better inform the whole board about the resources they can
 3 provide for firm growth (Gabrielsson and Winlund, 2000). They can
 4 also provide advice on how to use the resources required for innova-
 5 tion opportunities, which could lead to an increase in shareholders'
 6 wealth.

7 Board committees offer knowledge specialization, task-division
 8 efficiency, and accountability. The nature of the monitoring and
 9 advising tasks of boards are complex and require significant firm-
 10 specific knowledge; its accumulation requires personal investment
 11 from directors. In fact, committee members could provide large and
 12 diverse resources to the firm, such as strategic advice and networking,
 13 which could be value-enhancing for innovation (Talke *et al.*, 2010).
 14 Accordingly, in order to perform their role effectively, board com-
 15 mittees should have adequate resources and authority to discharge
 16 their increasing responsibilities and stimulate innovative' activities
 17 (see among others FRC, 2008; Mangena and Pike, 2005).

18 **14.3.2 *Committee composition and innovation***

19 Board committees have become more regulated and formal compo-
 20 nents of the board of directors over time. Beginning in 1940, the Secu-
 21 rities and Exchange Commission (SEC) recommended that outside
 22 directors should be appointed to audit committees. In the 1970s, SEC
 23 adopted rules requiring firms to disclose audit committee composi-
 24 tion (Reeb and Upadhyay, 2010). In 2002, the major stock exchanges
 25 NYSE and NASDAQ mandated that firms have compensation and
 26 governance committees. In fact, the last accounting and executive
 27 pay scandals had shed light on the role and effects of committees
 28 on financial performance (Klein, 2002; Kelton and Yang, 2008; Sun
 29 *et al.*, 2009). Governance literature has, first, focused on audit com-
 30 mittee and how its composition could influence governance quality.
 31 For instance, Deli and Gillan (2000), Klein (2002), Krishnan (2005),
 32 and Zhang *et al.* (2007) have examined the impact of audit commit-
 33 tee characteristics such as the audit committee independence, the
 34 financial expertise of audit committee members, and the commit-
 35 tee's size (Deli and Gillan, 2000; Klein, 2002, Zhang *et al.*, 2007;
 36 Krishnan, 2005). Some studies have also examined how the com-
 37 position of audit committee could influence the quality of financial

1 disclosure (Karamanou and Vafeas, 2005; Mangena and Pike, 2005),
 2 internet reporting (Kelton and Yang, 2008), earnings management
 3 (Bédard *et al.*, 2004; Klein, 2002), and financial performance (Zhou
 4 *et al.*, 2018).

5 Moreover, turning to the composition of board committees shows
 6 that most studies have covered the effect of appointing independ-
 7 ent members (Deli and Gillan, 2000; Klein, 2002; Zhang *et al.*,
 8 2007; Krishnan 2005; Choi *et al.*, 2007). In fact, independent com-
 9 mittees help to improve managerial monitoring (Xie *et al.*, 2003).
 10 They could also improve financial performance (Choi *et al.*, 2007).
 11 Ruigroki *et al.* (2006) find that firms with nomination committees are
 12 more likely to have a higher number of independent and foreign direc-
 13 tors and a lower number of female members. When the CEO is on
 14 the nomination committee, firms appoint fewer independent directors
 15 (Shivdasani and Yermack, 1999). Moreover, Guo and Masulis (2015)
 16 conclude that greater board independence and full independence of
 17 nominating committees lead to more rigorous CEO monitoring and
 18 discipline. However, the literature neglects several forms of directors’
 19 attributes in committees and their influence on the firm’s activities.
 20 Despite this booming number of studies on committees, to the best
 21 of our knowledge, the effects of diversity on board committees have
 22 not been considered, yet.

23 14.3.2.1 *What do women bring to committees?*

24 Prior research has pointed out several reasons to hire more women
 25 on corporate boards as well as on board committees. For instance,
 26 Daily and Dalton (2003) state that boards are increasingly appoint-
 27 ing female members. In fact, the absence of gender diversity on board
 28 may result in a negative market image. Moreover, Kesner (1988)
 29 argued that firms are prone to elect the most powerful and influ-
 30 ential women in their committees. Most often, they are concerned
 31 about the firm image, without consideration of the women’s potential
 32 contributions (Tokenism, Kanter, 1977).

33 However, Elstad and Ladegard (2012) show that the presence
 34 of female directors changes the decision-making dynamics inside
 35 the board. In fact, in line with the dependence resource theory,
 36 women have different experiences and qualifications from their male
 37 counterparts; they could, therefore, have different values and analysis

1 perspectives. This leads to more interactive dynamics in boardrooms
 2 (Peterson and Philpot, 2007). They have, most often, more connec-
 3 tions to external sources, which make them highly sought after in
 4 boards and on specific board committees, such as audit, governance,
 5 ethics, and environment committees (Singh and Vinnicombe, 2004;
 6 Adams and Ferreira, 2009).

7 Despite the introduction of gender quota law, female directors are
 8 not appointed to strategic committees on the board, such as develop-
 9 ment and remuneration committees. In fact, very few women are in
 10 committee board positions, particularly in male-dominated compa-
 11 nies. Female directors are still prevented from moving up into man-
 12 agement and leadership positions and are facing significant barriers
 13 (glass ceiling theory, ILO, 2001).⁷ Moreover, the complexity of the
 14 board selection process (Peterson and Philpot, 2007), in addition to
 15 many gender stereotypes, still makes it more difficult for a woman
 16 to be nominated on boards as well as on committees (Singh and
 17 Terjesen, 2008; Brière and Rinfret, 2010).

18 Besides, female directors display greater diligence in monitoring
 19 and are most often appointed to corporate governance committees
 20 (Adams and Ferreira, 2009). Gender-diverse committees can provide
 21 better advice, legitimacy, effective communication, and resources
 22 (Hillman *et al.*, 2007) than male-dominated committees. Female
 23 directors exhibit more independent thinking (Adams *et al.*, 2010),
 24 which facilitates decision-making and increases transparency (Adams
 25 *et al.*, 2010; Srinidhi *et al.*, 2011). Thus, the appointment of female
 26 directors to committees can be a source of competitive advantage.

27 Moreover, many studies have strongly supported that their pres-
 28 ence on board can contribute to broadening the range of new prod-
 29 ucts and services (Østergaard *et al.*, 2011; Teruel *et al.*, 2015)
 30 as women have specific knowledge of consumer markets, consumer
 31 behavior, and customer needs (see among others Kang *et al.*, 2007;
 32 Torchia *et al.*, 2011; Díaz-García *et al.*, 2013; Teruel *et al.*, 2015);
 33 thus, they are likely to identify the most successful innovations.

⁷The glass ceiling was identified in the 1980s by the International Labor Orga-
 nization and Catalyst4. The glass ceiling theory is about “those artificial barriers
 based on an attitudinal or organisational bias that prevents qualified individuals
 from advancing upward into management level positions” (ILO, 2001).

1 For instance, when female directors are appointed to the strategic
 2 committees, they can contribute to broadening the range of new
 3 products and services.

4 However, turning to nomination committees, female members
 5 will be inclined to prefer and encourage the nomination of other
 6 female candidates. They may recommend more female candidates to
 7 increase their feelings of security, identity, and self-esteem (Singh and
 8 Vinnicombe, 2004). Therefore, by appointing more female directors,
 9 women seem to select members who share similar demographic char-
 10 acteristics and not necessarily skillful directors who have the neces-
 11 sary qualifications to fulfil their responsibilities. Furthermore, there
 12 is consensus in the literature arguing that women are risk-averse
 13 (Faccio *et al.*, 2016; Croson and Gneezy, 2009). Female directors are
 14 labelled as more risk-averse than men (Croson and Gneezy, 2009),
 15 which could drastically decrease long-term profitable and uncertain
 16 activities, such as innovation projects. Therefore, women in strate-
 17 gic committees avoid challenging situations, which could marginalize
 18 investments with unknown outcomes, such as R&D activities.

19 14.3.2.2 *Why should more independent directors be appointed* 20 *to committees?*

21 In the 1990s, the Cadbury Report (Cadbury Committee, 1992) and
 22 several studies recommended the appointment of more independent
 23 directors to corporate boards and to their key committees (i.e. audit,
 24 compensation, and nomination committees) to improve the boards'
 25 and the committees' effectiveness (Klein, 1998). In fact, board's inde-
 26 pendence could enhance board's effectiveness and improve, therefore,
 27 the firm's performance (Choi *et al.*, 2007), as well as innovation per-
 28 formance (Chen and Hsu, 2009; Choi and Lee, 2011; Lodh *et al.*,
 29 2014; Shapiro *et al.*, 2013; Balsmeier *et al.*, 2014; Sena *et al.*, 2018).

30 Most of the papers confirm that independent committees pro-
 31 vide more effective monitoring of managerial decisions and activities
 32 (Xie *et al.*, 2003; Guo and Masulis, 2015). Independent directors
 33 are prone to reduce agency conflicts and to ensure management. In
 34 fact, the high attendance rate among independent members can be
 35 explained by their essential role in complying with the good practices
 36 of governance (Adams and Ferreira, 2009). Furthermore, in line with
 37 resource-based theory, outsiders can be seen as providers of access to

1 scarce or strategic resources (Lynall *et al.*, 2003; Tuggle *et al.*, 2010).
2 Independent members can also increase the awareness of implement-
3 ing new projects and bring new opportunities from their industries
4 (Hillman and Dalziel, 2003; Tuggle *et al.*, 2010). They have out-
5 side contacts and typically bring a broader range of experience due
6 to their address book (Chen, 2013). They have a good knowledge of
7 many businesses, and they are more concerned about the firm's internal
8 development (Choi *et al.*, 2012). Therefore, independent directors
9 in strategic committees are likely to have enough knowledge and
10 skills to offer different perspectives on innovative investments and
11 growth opportunities. They could also mobilize new resources coming
12 from their networks. Also, independent directors in nomination
13 committees are likely to have enough knowledge and skills to appoint
14 new members, who have the required qualifications for innovative
15 activities.

16 Finally, we conclude that the positive outcomes of board diversity
17 help to relate board diversity to innovation (Miller and Triana
18 2009). Board diversity provides the firm with human and social capital
19 resources that help the board to generate ideas, allocate resources,
20 and find opportunities, thereby increasing innovation (Østergaard
21 *et al.*, 2011; Talke *et al.*, 2010; Carter *et al.*, 2010). In fact, in order to
22 push companies to renew the composition of their board of directors
23 and to select diverse profiles, several initiatives and recommendations
24 have been introduced as laws on gender quotas and the presence of
25 minorities in leadership positions.

26 **14.3.3** *Committees size*

27 Large committees could provide the necessary and diversity of views
28 to ensure effective monitoring (Bédard *et al.*, 2004). They could
29 lead to more successful innovations due to the members' multiple
30 resources (Zona *et al.*, 2013). However, they could suffer interest con-
31 flicts, leading to unnecessary debate and delay in making decisions.
32 Consequently, they slow down communication and decision-making
33 processes (Linck *et al.*, 2008); this environment can inhibit creativ-
34 ity and innovation opportunities (Jensen, 1993). In the same vein,
35 Linck *et al.* (2008) stress that large boards may have more resources
36 and knowledge, which positively contributes to firm performance and
37 agility; however, they could delay communication inside the board

1 (Jensen, 1993). Committee size could, therefore, inhibit creativity
2 and innovation. In addition, large committees are prone to suffer
3 from process losses and diffusion of responsibilities, specifically in
4 long-term and uncertain projects, such as R&D projects (Karamanou
5 and Vafeas, 2005; Yang and Krishnan, 2005; Cornett *et al.*, 2009).

6 **14.3.4 Committees functioning and innovation**

7 Committee meetings represent the place where directors can discuss
8 the firm's opportunities and management's operations in more detail
9 (Demb and Neubauer, 1992). Committee meetings are quite useful to
10 disclose information and to discuss views. They are also a proxy for
11 the members' involvement (Tuggle *et al.*, 2010). For instance, audit
12 committees that meet more often would have more time to perform
13 the role of monitoring (Karamanou and Vafeas, 2005) and are more
14 likely to be well informed, more diligent, and more knowledgeable
15 about the current problems (Raghunandan *et al.*, 2001). The fre-
16 quency of meetings has a positive influence on the strategic role of
17 board committees, specifically on how they perform their roles. It
18 improves, therefore, the quality of control (Demb and Neubauer,
19 1992). From a resource-based perspective, frequent meetings can
20 help outside directors interact with insiders and to be well informed
21 about firm activities. A large frequency of meetings can stimulate
22 entrepreneurial thinking; particularly, outside directors could sug-
23 gest innovative initiatives when they are given the opportunity in
24 committees meetings.

25 **14.4 Board Quota: Gender Quota Laws**

26 The literature on board members' selection is growing (Boulouta,
27 2013; Nekhili and Gatfaoui, 2013). The most visible illustration of
28 diversity pressure on board members' selection criteria is on gender
29 diversity. In fact, there are several reasons why increasing the quota
30 of women directors might be associated with better performance (see
31 among others: Carter *et al.*, 2003; Belghiti-Mahut *et al.*, 2010). First,
32 women have a positive impact on the board's ability to engage in cog-
33 nitive conflict counterparts (Nielsen and Huse, 2010). Second, they
34 tend to bring diverse viewpoints to the boardroom and encourage

1 greater discussions and arguments over board decisions (Daily *et al.*,
2 2003, Hillman *et al.*, 2002; Elstad and Ladegard, 2012). In addition,
3 they possess unique skill sets such as greater familiarity with con-
4 sumer products or a better understanding of stakeholder issues (Kang
5 *et al.*, 2007; Torchia *et al.*, 2011; Díaz-García *et al.*, 2013; Teruel
6 *et al.*, 2015). Finally, female directors can contribute to the creativ-
7 ity or innovativeness of board discussions and solutions considered
8 in the board meetings (Torchia *et al.*, 2018). Accordingly, increasing
9 the number of women on boards can improve board decision-making
10 through the unique contributions women can make to the board.

11 However, women’s talents are being underutilized at decision-
12 making levels, in particular at the top level. Very few women are in
13 leading positions, particularly in male-dominated companies. Women
14 have failed to attain equal representation on corporate boards of
15 directors (Torchia *et al.*, 2011; European Commission, 2012). Women
16 are still prevented from moving up into management and leadership
17 positions and are facing significant barriers. These barriers are dis-
18 cussed in the “glass ceiling” theory (ILO, 2001). Moreover, women
19 might be subject to discrimination before being appointed to boards;
20 board roles are different for men and women (Bilimoria and Piderit,
21 1994; Kesner, 1988; Peterson and Philpot, 2007), and the board selec-
22 tion process is often analyzed as a ‘male club’ or “old boy’s network”.
23 The complexity of the board selection process (Peterson and Philpot,
24 2007), in addition to many gender stereotypes, still makes it more
25 difficult for a woman to be nominated on boards (Brière and Rinfret,
26 2010).

27 Over the last few years, several initiatives and programs have been
28 introduced, to increase diversity in the board, such as gender quota
29 laws and the presence of minorities in top management positions.
30 In fact, gender quota legislation constrained companies to rethink
31 their board composition and select new profiles, which needed also
32 to be able to detect women profiles and make them visible. Moreover,
33 board-level mandatory gender quotas, as enacted over the last decade
34 by several countries, have, to a large extent, succeeded in breaking
35 the glass ceiling at the top of listed companies (ILO, 2001). They have
36 done so by forcing companies to open their board to a new population
37 of female directors, with no prior board experience. Hence, gender
38 quotas force firms to respond quickly to identify, develop, promote,

1 and retain suitable female talent for the corporate board leadership
2 structure.

3 Across countries, enacted legislation takes a variety of forms but
4 generally consists of setting gender quotas, usually 33–50%, (Euro-
5 pean Commission, 2012). In 2003, Norway became the first country to
6 implement a quota law. Following this, other countries, such as Spain,
7 Iceland, France, Italy, Belgium, the Netherlands, and Germany, have
8 implemented some kind of quota laws for board positions. However,
9 what is apparent is that, over time, each country has adopted and
10 introduced an individualized and distinct approach.

11 The different quota laws vary according to the country's prac-
12 tices, contexts, and realities. For instance: Some of the national
13 quota laws refer to supervisory boards only (Norway, Iceland, France,
14 and Germany), while others prescribe a quota for both supervisory
15 and executive boards (the Netherlands, Belgium, Italy, and Spain).
16 The first countries to implement these regulations aimed to achieve
17 more gender-balanced boards with at least of 40% women members
18 (Norway, Spain, Iceland, and France). Other countries have lower
19 gender percentages: in Italy and Belgium, the gender quota is spec-
20 ified at 33%, while in the Netherlands and Germany, quotas are set
21 to at least 30%. In fact, gender quotas have dealt with women under-
22 representation in board seats; however, they did not attempt to reg-
23 ulate the distribution of positions and fees across gender, (European
24 Commission, 2012).

25 Studies on the boards' committees show that women directors
26 most often serve on specific committees: they face a second ceiling
27 barrier in boardrooms while they are supposed to achieve high top
28 management positions: the glass cliff (Smith and Parrotta, 2018, and
29 Ryan and Haslam, 2005). For instance, they can easily join audit,
30 CSR, and corporate governance committees while they are unlikely
31 to be appointed to the strategic, nominating, and compensation com-
32 mittees (Adams and Ferreira, 2009). In a recent study, Bugeja *et al.*
33 (2016) highlight that when women sit on these committees, CEO
34 salaries, bonuses, and total compensation are decreased. Their pres-
35 ence on these committees could lead to an increase in transparency.

36 Another limit of gender quota laws is that they substantially
37 increased female multiple directorships. Hillman *et al.* (2007) provide
38 evidence that firms that have strong business relationships with other

1 firms that have already appointed women to their boards are likely
2 to increase women representation on their boards. In France, the
3 gender quota law, specifically the urgent need to achieve the quota
4 of 40% by 2017, the limited pool of talent, and the strong connec-
5 tion between family-controlled/owned firms in France, has increased
6 female multiple directorships.

7 In family-controlled firms, most often, women directors are
8 recruited within families, without carrying out an external and neu-
9 tral selection process (Campbell and Minguez-Vera, 2008). In fact,
10 being a member of the founding family helps women to overcome bar-
11 riers they usually face to achieve higher positions. In that sense, fam-
12 ily firms could offer better career opportunities (Curimbaba, 2002).
13 Consequently, highly qualified women who are able to sit on boards
14 suffer from a lack of visibility because of weak networking and social
15 circles. Indeed, firms make-believe that they have a limited pool of
16 talents (Sheridan and Milgate, 2005). Hence, social ties and con-
17 tacts, specifically family connections, are critical to the appointment
18 of women to the director’s positions. This could increase the risk of
19 recruiting unqualified female directors (Claessens *et al.*, 2000).

20 Finally, we notice that only gender diversity has been fostered
21 through quota law. To the best of our knowledge, there are only
22 some recommendations to promote other forms of diversity, such as
23 ethnic and minority diversity. The Securities and Exchange Com-
24 mission (SEC), and New York Stock Exchange (NYSE)⁸ recom-
25 mend the appointment of independent directors on corporate boards
26 and key corporate committees [e.g. audit, compensation, and nom-
27 ination committees]. Moreover, the German Corporate Governance
28 Code (DCGK)⁹ recommends appointing an adequate number of out-
29 side board members, taking into account the specific requirements
30 of the firm. It recommends that supervisory boards should “pos-
31 sess the knowledge, ability and expert experience required to prop-
32 erly complete its tasks”. The importance of sufficient professional

⁸NYSE requires an independent nominating committee. NASDAQ requires director nominees selected or recommended for board’s selection by an independent nominating committee or by a majority of the independent directors.

⁹the German Corporate Governance Code as amended on May 13, 2013, Articles 5.4.1, 5.4.2.

1 qualifications and leadership experience of non-executive board mem-
 2 bers, emphasized by the European Commission,¹⁰ point to a similar
 3 direction.

4 **14.5 Discussion and Conclusion**

5 The influence of board structure on the performance of a company
 6 is one of the most active research areas in corporate finance (Black
 7 and Khanna, 2007). In fact, beyond its role of ensuring the alignment
 8 of interests between shareholders and managers, and monitoring and
 9 controlling (Daily *et al.*, 2003), the board could provide valuable
 10 resources to the firm, dole out strategic advice, and help the firm
 11 to develop knowledge and networks (Goodstein *et al.*, 1994; Ruigrok
 12 *et al.*, 2007; Kang *et al.*, 2007; Miller and Triana, 2009).

13 As R&D and innovation activities are typically associated with
 14 new technology or new products, we highlight that better-educated
 15 directors tend to have better cognitive ability to absorb new ideas,
 16 which therefore could increase the probability of introducing inno-
 17 vations (Barker and Mueller, 2002, Dalziel *et al.*, 2011; Lin *et al.*,
 18 2011; Kuo *et al.*, 2018), while the education level of diversity caused
 19 by exposure to different knowledge may lead to different ways of
 20 thinking, resulting in a negative impact on innovation. In addition,
 21 we underline in this contribution that the type of academic degree
 22 can have a different influence on innovation activities. For instance,
 23 business-educated directors are more conservative and risk-averse,
 24 and they seem to marginalize innovation investments as they are
 25 more likely to focus on activities with short-term financial returns;
 26 however, directors with science and engineering degrees have better
 27 skills when they have to take risky decisions. They could increase the
 28 probability of accepting and introducing new changes.

29 On the other hand, we notice that outside directors on board
 30 have good knowledge of the business and valuable social network and
 31 resources in innovation activities. They are more prone to encourage
 32 innovative projects that could lead to the implementation of new

¹⁰European Commission, Green Paper: The EU corporate governance frame-
 work, COM [2011] 164 final, April 5, 2011, Article 1.1.7.

1 products and processes. However, directors who have different cul-
2 tural backgrounds could provide diverse perspectives, though not
3 automatically valuable for innovation and solving problems. Even
4 though ethnically diverse directors know global markets and cus-
5 tomers' tastes, they may not lead the firm to develop new products
6 that are sold abroad as they. Furthermore, we show that the pres-
7 ence of independent directors in decision-making committees could
8 have a positive contribution on innovation: They could provide more
9 effective monitoring of managerial decisions and activities in com-
10 mittees, and they are likely to have enough knowledge and skills
11 to offer different perspectives on innovative investments and growth
12 opportunities.

13 Turning to committee functioning, we show that when committees
14 meet often, board committees seem to have more information about
15 the current problems and are more concerned about R&D invest-
16 ments. Frequent meetings can help outside directors interacting with
17 insiders. Therefore, they could be better informed about firm activ-
18 ities. When it comes to committee structures, we notice that large
19 committees are prone to have a valuable diversity of views, which
20 increases innovation investments. However, large committees could
21 suffer interest conflicts and lead to unnecessary debate and delay in
22 making decisions. We notice also that large committees are prone
23 to suffer from process losses and diffusion of responsibilities, specifi-
24 cally in long-term and uncertain projects, such as R&D projects
25 (Karamanou and Vafeas, 2005; Yang and Krishnan, 2005; and Cor-
26 netts *et al.*, 2009). Consequently, it could influence negatively the
27 communication and decision-making processes.

28 The complexity of the board selection process (Peterson and
29 Philpot, 2007), in addition to many gender stereotypes, still makes
30 it more difficult for a woman to be nominated on boards (Brière
31 and Rinfret, 2010). The absence of females in corporate boards
32 has become the focus of legislators and regulators in many coun-
33 tries, especially with women being more risk-averse and adopting
34 a trust-building approach than men, as proven in prior research
35 (Daily and Dalton, 2003). Women's talents are still being under-
36 utilized at decision-making levels. However, through this chapter, we
37 try to show how the presence of females could change the dynamics
38 of the board as well as the various board committees, which could
39 influence innovative activities. We notice that gender diversity in
40 board seems to help firms to diversify knowledge and to improve

1 discussion, which generates new ideas. They can contribute to broad-
2 ening the range of new products (Østergaard *et al.*, 2011; Torchia
3 *et al.*, 2011; Díaz-García *et al.*, 2013; Teruel *et al.*, 2013), and intro-
4 duce more organizational innovation. However, due to the feature
5 of risk-aversion, women on board as well as on committees tend
6 to avoid challenging situations, which could marginalize investments
7 with unknown outcomes, such as innovation projects.

8 By looking at the impact of various types of directors' charac-
9 teristics on innovation and by taking into account various types of
10 innovation, this chapter brings practical insights on board structure
11 issues. We highlight the urgent need to increase the firms' capacity
12 to appoint, on the board as well as on board committees, individuals
13 displaying diverse types of knowledge, abilities, skills, and network-
14 ing that could drive more innovations. This chapter contributes to
15 the current debate on how boards should be organized. It shows that
16 boards should pay attention to the committee features as they could
17 undermine innovation projects, specifically in innovation-sensitive
18 industries.

19 The state of art provided by the current chapter has investi-
20 gated how boards' characteristics could influence innovation project.
21 It shows, however, that many areas in boardrooms and how they
22 could influence innovation have not yet been explored. For instance,
23 to the best of our knowledge, most of studies have focused on
24 CEO remuneration and how it could influence CEO's incentives
25 to get involved in innovative project, but there are no stud-
26 ies on board members' remuneration. Moreover, in our analysis,
27 we have neglected the market characteristics such as competi-
28 tiveness or sector affiliation, which provide significant incentive
29 to serve as innovation projects. These issues are left for future
30 papers.

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