Family firms, women, and innovation

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Abstract

Frame of the research: *We aim to inform family business literature and family business managers on the effect to include women as managers by providing empirical evidence on their impact on innovation.*

Purpose of the paper: *The paper investigates the impact of female directors on innovation in Family Businesses (FBs). We assume that the presence of women, due to recent generations with the presence of daughters or due to marriages involving third parties, could be more common than in non-FBs.*

Methodology*: We tested our hypotheses on a sample of 755 Italian FBs through a count data model.*

Findings*: Our findings show how and when the invisible women became visible and their effect on innovation performance. Prejudice against women in FBs is detrimental to innovation; however, both the presence of female family members in control positions and the presence of a critical mass helps to mitigate the effect of prejudice on innovation.*

Research limits: *The sample is limited to Italian firms only. The social dynamics and the role of women in the entrepreneurial arena are strongly influenced by the institutional system in which the firm operates.*

Practical implications: *Our findings will be relevant to family business owners and managers with regard to their innovation strategy. A greater understanding of the relationship between female directors and innovation may contribute to increasing the number of women in these important roles.*

Originality of the paper: *We extend our understanding of the effects on innovation of the involvement of female family members on the board of directors. We discuss the invisibility of female family members. We enhance our growing knowledge on female directors in family businesses by studying women's roles as president or vice president, in relation to innovation.*

Key words: gender; invisible women; family business; innovation

1. Introduction

The study of women as managers and/or owners is not new to management literature (Terjesen *et al.*, 2009). Some studies investigated the relationship between the presence of women in management roles and firms' strategic choices (Post and Byron, 2015; Sila *et al.*, 2016; Smith *et al.*, 2006; Fagenson, 1993; Vinnicombe and Colwill, 1995). Others focused on the differences in the firms' performance as the female presence in top roles increases. These studies originate from the Upper Echelons Theory (Hambrick and Mason, 1984), according to which the observable

demographic variables constitute important factors influencing the decisions taken by the upper echelons and, consequently, on the behaviors and results of the firms.

This issue has always attracted researchers' interest in both FB and non-FB domains, but there remains a need to improve our understanding due to the main change that is occurring at the institutional level related to the inclusion of women in the boardroom. For example, in Italy in 2011, the Golfo-Mosca law obliged listed companies to reserve one third of the seats on boards to women. From this date forward, the presence of women in listed companies was no longer spontaneous, but legally required. However, as the presence of women increases, so does the need for new research surfaces. As a result, management scholars have called for major research on the topic. We aim to contribute to the FB literature by considering how the FB potential supports the presence of women in management and on the board (Bannò and D'Allura, 2018). Our interest is to improve our understanding both in quantitative terms (if women are formally present in key roles or are still invisible) and qualitative terms (what is their influence on firm innovation). In this paper, we aim to extend this literature by providing an empirical investigation into women's presence on the boards of family firms and their role in firm innovation.

The presence of women in managerial roles is a topic relevant to the case of FBs started in the 80s (Campopiano *et al.*, 2017), and FB scholars call for further investigation (Cesaroni and Sentuti, 2014; Gallucci, 2010; Gallucci *et al.*, 2015). We contribute to this mainstream research in many ways. First, we extend our understanding of the effects on innovation of female family involvement in the board of directors. In particular, we discuss the invisibility of female family members. Second, we add to the growing literature on FB (e.g., Dibrell and Memili, 2019) by addressing how innovation output of FBs varies depending on the composition of the board of directors, specifically with regard to the presence of female directors. Third, we enhance our knowledge of women's roles in FBs relative to innovation (e.g., Campopiano *et al.*, 2017; Chadwick and Dawson, 2018), by studying cases in which women act as president or vice president. Fourth, from an empirical point of view, our paper investigates the impact on innovation of the presence of women in a sample of 755 Italian FBs. Finally, our research is also relevant to practitioners (e.g., FB owners and managers) with regard to their innovation strategy, specifically in connection to the composition of the board of directors. Finally, a greater understanding of the relationship between women's presence on the board and innovation may contribute to the increase of the number of women in the upper echelon.

2. Theoretical framework

2.1 Women's presence in family firms

In their recent review, Campopiano *et al.* (2017) emphasize that contributions analyzing the role of women within FBs are still limited.

Available research suggests that FBs offer a relatively favorable environment for women to cover upper echelon positions (Bianco *et al.*, 2015; Chadwick and Dawson, 2018). For example, small- and medium-sized FBs offer a more advantageous context for women to join the board of directors (Songini and Gnan, 2009). Family connections with the controlling shareholder are conducive to joining the board, especially in small firms with concentrated ownership (Bianco *et al.*, 2015). Indeed, in developed countries, FBs generally have more women on their boards than non-FBs; this is often because female directors are part of the owning family (Bettinelli *et al.*, 2019).

Even if women are more present in FBs, they usually play informal roles (Dumas, 1992). It is not clear from the literature whether the family environment supports or opposes the female presence in leadership positions. Some studies suggest that FBs represent the most suitable place to offer opportunities to women. Other studies suggest that traditional family roles are perceived as inconsistent with corporate hierarchies and, consequently, the spaces available for women are marginal or invisible (Montemerlo and Profeta, 2009). The female presence could be inhibited by the work-family conflict (Vera and Dean, 2005): women can have problems looking after the family if they work too many hours a day (Cadieux *et al.*, 2002). Therefore, the family tends to protect the primary role of caring for the woman's family at the expense of her presence in the firm.

This also affects how daughters and sons are prepared for succession (Haberman and Danes, 2007); usually daughters spend less time in FBs than sons. Consequently, the daughters inevitably develop less firm-specific knowledge, and this will be a hindrance to the later identification processes of the successor. According to what emerges from the FB literature, as well as historical and current anecdotal evidence, it is clear that the preferred route in family succession is to identify the heir in the male child. In fact, even if there is an increase in women-led enterprises, there has always been a greater propensity to ignore daughters as possible successors (Dumas, 1998). Keating and Little (1997) identified the gender factor of the successor, explaining the rule according to which daughters could not become chosen heirs to lead the companies following generational change, except in the absence of other possible heirs.

The manifold reasons why women are rarely chosen as successors are linked to a set of stereotypes attributable to their supposed lower working capacity and to their reluctance to sacrifice the family in which the female role is central. In this regard, investigating the challenges and opportunities that women must face and seize respectively, and considering that the contribution of women in FBs is recognized but not evident, Dumas (1998) identifies the barriers to participation and hiring leadership in (a) the social structure, in (b) the family expectations about the woman's role, in (c) the relationship with parents, siblings, and unfamiliar members, and in (d) problems related to the assumption of power and authority. Furthermore, female leaders tend to favor the family over the company's performance (Gherardi and Perotta, 2016), which could lead to a negative assessment of women's presence in key roles by relatives and other stakeholders. It is often the case that women are considered by their families to be less

legitimate than males to manage the FB, and thus they do not plan a real career within the firm, participating only when needed or during a crisis (Dumas, 1998). The need to ensure the dynastic continuity of the firm is one of these cases and can contribute to the encouragement of female entrepreneurship (Cassia *et al.*, 2011).

2.2 Women and firm innovation output

While, in the domain of FB, few papers investigate the effects on innovation of women's presence in upper echelons (Campopiano *et al.*, 2017), this issue has long been investigated in management literature. This literature is often quantitative, comparing the tendencies of women and men to contribute to innovation. Whittington (2011) suggests that "academic mothers" are less likely to patent because "family responsibilities" impede women's ability to innovate. As a consequence, the intersection of gender and innovation appears to favor men. Other studies show that male researchers are more likely than female researchers to be involved in industry cooperation (Bozeman and Gaughan, 2007). Further, public support for innovation or R&D is mainly given to science and engineering, and there is a strong association between masculinity, science and engineering, and innovation since these processes are intertwined (Dautzenberg, 2012; Marlow and McAdam, 2012). As a consequence, it is not surprising to find in the literature that the concept of innovation is highly gendered, with a strong male connotation (Marlow and McAdam, 2012).

2.3 Hypotheses development

FBs are unique institutions. They represent a context in which two superficially different social units (i.e., families and businesses) are substantially integrated (D'Allura, 2019). There is an "intimate connection between family and business" that is "natural and compatible" (Davis, 1968). This connection covers succession across generations. As a result of this connection, FBs generally have more women on their boards than non-FBs, because female directors are part of the owning family. The main consequence is that they are often selected because of their family ties rather than for their competencies (Bettinelli *et al.*, 2019). However, even if directly involved in the daily operations of the FB, women do not receive recognition for their contribution, neither with a formal position in the company nor for a salary and, in short, they do not receive the same consideration as their male relatives within the enterprise due to the motivation for their selection (Hollander and Bukowitz, 1990). This phenomenon has been recognized in the literature as the "invisibility of women" (Cole, 1997). We argue that there is a further kind of invisibility such that, even if female family members are recognized by the Board, they cannot exercise their role because they are tokens for the family and because their presence is seen as a product of an inferior succession process. Indeed, family firms formally include female family members, but continue to treat them more as family members than professionals (Campopiano *et*

al., 2017). This reveals how the presence of these women is not related to their effective role in the decision-making process, particularly in terms of innovation.

For these reasons, we expect that:

HP1: The relationship between female family presence and level of innovation is negative

Further, women in the boardroom face family and social barriers that create the condition of often being the minority on the board. Often, women prefer to leave their business roles to maintain their family roles, preferring the caring of the family to their professional lives (Cesaroni and Sentuti, 2014; Bianco *et al.*, 2015). Moreover, innovation literature states that women's orientations also influence their propensity to innovate (Dautzenberg, 2012); as a result, compared to males, they patent less. However, previous contributions have suggested that women need to have other qualities to be influential directors, such as having specific prior board experience and network ties, interlinks with other boards, and individual power as president or vice president (Westphal and Milton, 2000; Cook and Glass, 2015). Another way for women to be influential is to reach a critical mass (Kanter, 1977; Konrad *et al.*, 2008), which the literature identifies as three seats on the board (e.g., Torchia *et al.*, 2011). Consequently, what is expected here is a change in the relationship between women's presence and innovation; in this case, the conditions should change in terms of power or critical mass, and, consequently, women should exercise their roles by making their impact on innovation.

Following previous contributions on women in power positions and critical mass, we expect that:

HP2: The relationship between female family presence and level of innovation become positive when female family members are on the board with other females and/or they are president or vice president.

3. Methodology

3.1 Data and sample

FBs play a primary role within the global context both in terms of social impact and with respect to the importance assumed within the economic dynamics (Tapies and Ward, 2008). According to estimates by the Family Firm Institute[1], two out of three companies are FBs. They produce an annual gross domestic product share of approximately 70% to 90% and, in most countries, create more than half of the jobs available (between 50% and 80%). The predominant role of FBs is also confirmed in the European context and, in particular, in Italy (Cesaroni and Sentuti, 2010; Corbetta, 2010; Gallucci and Gentile; 2009), where 82% of firms are FBs. In the Italian context, a further peculiarity is that even the largest companies are

[1] https://www.ffi.org/

FBs (Corbetta, 2010). These characteristics of the industrial ecosystem justify and support the use of a sample of Italian firms to conduct empirical analyses.

The sample for this study comprised 755 Italian family firms. The dataset, updated to 2018, was randomly gathered by merging data from the following datasets: Espacenet, Aida (Bureau Van Dijk), Borsa Italiana, and Reprint. We operationalized FB through the key dimensions of ownership. Firms were selected randomly; therefore, each firm had the same probability of being selected. We controlled for the representativeness of the sample according to relevant dimensions. Further tests were conducted by comparing the representativeness of family dimension and firm dimension.

We selected Family Business as a binary variable equal to 1, if either a non-listed firm was majority-owned by the family or no less than 20% of a listed firm was owned by the family, and 0, if otherwise (Anderson and Reeb, 2003). The variable describing the family nature of the firm was constructed by crossing data from the Aida database and the Borsa Italiana databases.

3.2 The variables and the models

Given the count nature of the dependent variable, for the main effect we adopted Poisson models to estimate the influence of the independent variables on the dependent variables (Greene, 2018; Wooldridge, 2013; Kennedy, 2003).

Table 1 reports the definitions and sources of both the dependent and independent variables.

Dependent variable. The dependent variable is the number of patents (Innovation).

Independent variable. We measure the female presence as the number of women on the BoD (variable Female Board). We measure the variable Female Family as a dummy variable indicating whether they are part of the family or not. We measure the variable Female Power, as a dummy variable with value 1 if the female is a president or vice president, and 0, if otherwise.

Control variable. According to previous research on the factors affecting a firm's degree of innovation, we controlled for several firm-specific characteristics: firm size and age, profitability, firms' internationalization, geographical localization, financial constraints, productivity, listed, and industry (e.g., Chabchoub and Niosi, 2005; Arundel and Kabla, 1998; Mansfield, 1986; Horstmann *et al.*, 1985).

Firm size and firm age are proxies for accumulated knowledge and managerial experience (Brouwer and Kleinknecht, 1999). Thus, we measured Size as the logarithm of total sales and Age as the logarithm of the number of years since the firm's foundation.

We controlled for Profitability, measured as the return on equity (Hanel and St-Pierre, 2002).

We further controlled for Internationalization, which is measured by the logarithm of the number of total Foreign Direct Investments (FDIs)

made by the parent company in foreign markets. Past literature suggests that by acting in international markets, firms can better capitalize the exclusive rents of innovation. Multinational firms offer products to a larger number of potential buyers, thereby enhancing profits from innovation efforts and distributing innovation costs. Internationalization lowers the risk of R&D by avoiding fluctuations and business cycles specific to a single market (Kafouros *et al.*, 2008). Furthermore, international investments enhance a firm's knowledge about the environment and the competition in different countries. This knowledge drives the firm's efforts into the most promising innovative objectives. We proxy international presence through the variable Internationalisation, here measured as the logarithm of the number of the firm's foreign subsidiaries.

The binary variable Localisation takes the value 1 when the firm is located in the North of Italy, and 0, if otherwise; regional location of the headquarters in Southern Italy vs. other regions entails differing services and resource availability.

To take into account whether the firm is exposed to financial restrictions (a firm needs adequate capital to develop its innovative ideas), we control for Financial Constraints (ratio of current assets net of inventory to current liabilities).

We also controlled for Productivity, which is measured as the value added per employee (Hanel and St-Pierre, 2002).

Tab. 1: Definition and source of the variables used in the empirical analyses

	Definition	Source
Dependent variable		
Innovation	Number of patent	Espacenet
Independent variables		
Gender variable		
Female Board	Number of women on the board of directors.	Aida
Female Family	Dummy variable taking value 1 when a family woman is on the board of directors, 0 otherwise.	Aida
Female Power	Dummy variable taking value 1 when a family woman that is on the board of directors or is the president or vice president, 0 otherwise.	Aida
Control variable		
Size	Logarithm of total sales (euro).	Aida
Age	Logarithm of firm age (years).	Aida
Profitability	Return on equity (%).	Aida
Internationalization	Logarithm of the number of the past FDIs.	Reprint
Localization	Dummy variable taking the value 1 if the firm is located in the north of Italy, 0 otherwise.	Aida
Financial Constraints	Ratio between bank debt and total assets.	Aida
Productivity	Logarithm of the value added per employee (euros).	Aida
Listed	Dummy variable if the firm is listed, 0 otherwise.	Borsa Italiana

Source: author elaboration

The variables Listed is a dummy; in this case, it is equal to 1 if the firm is listed, and 0 if otherwise.

Finally, we include industry dummies as further controls, not only because of the significant impact of the industry on innovation capacity (Scherer, 1983), but also because patenting is more extensively used as an intellectual-property protection tool in science-based industries. The analysis monitored the industry by using the Pavitt taxonomy (1984). Four binary variables identify whether the firm belongs to a traditional sector, a scale-intensive sector, a specialized supplier sector, a science-based sector, or any other sector; the variables are Pavitt traditional, Pavitt scale intensive, Pavitt specialised supplier, Pavitt science based, and Pavitt other, respectively.

To test our hypothesis, we developed five econometric models that relate the innovation output of the firm with the different roles of women in the boardroom. In Model 1, we consider the presence of women in the board of directors.

Model 1: Innovation = ƒ (Female Board; Control Variables)

We then estimated four other conceptual models to further elaborate on the idea of female presence in family firms. With Model 2 we consider the simple presence of a female family member on the board.

Model 2: Innovation = ƒ (Female Board; Female Family; Control Variables)

Then, we consider the presence of a female family member on the board using three different scenarios. The first scenario (Model 3) concerns the case where female family directors are on the board with other non-family females. The second scenario (Model 4) concerns the case where female family directors are on the board with a powerful role (i.e., president or vice president women). The last scenario (Model 5) concerns the synthesis of the previous two.

Model 3: Innovation = ƒ (as.factor Female Board X Female Family; Control Variables)

Model 4: Innovation = ƒ (Female Board; Female Family; Female Power; Control Variables)

Model 5: Innovation = ƒ (as.factor Female Board X Female Family; Female Power; Control Variables)

3.3 Descriptive analysis

The overall descriptive statistics reported in Table 2 show that the average Innovation is equal to 36 patents.

As for the female variables, if we consider the whole sample, there is an average female presence in important decision-making roles of just 11% (on average one female director for every board), a percentage that rises to 31% if we refer to the subgroup where at least one family woman takes part in the board. The percentage of family members holding the

president or vice president position is very high, while the percentage of female president or vice president is very low, for an average of just 11%. Companies with a female presence in decision-making roles are larger and more structured. The average size is equal to 3.26 logarithm of total sales. Almost nine out of ten firms are located in the North of Italy. The average age is 3.6 years and profitability is more than 8%, revealing a good sample of profitable family firms. Correlation is acceptable among all variables (Table 3) (Greene, 2018; Wooldridge, 2013).

Tab. 2: Descriptive statistics

Statistic	Mean/ Percentage	St. Dev.	Min	Max
Innovation	36.764	312.622	0	7,710
Female Board	0.544	1.005	0	5
Female Family	31.1%	0.463	0	1
Female Power	11.2%	0.316	0	1
Size	3.265	1.917	-5.116	8.079
Age	3.615	0.538	2.079	5.231
Profitability	8.2%	0.174	-1.430	0.790
Internationalization	1.477	1.143	0	4.898
Localization	90.0%	0.300	0	1
Financial Constraints	0.412	0.227	-0.396	1.000
Productivity	7.822	8.042	0.080	98.740
Listed	5.5%	0.228	0	1

Source: author elaboration

Tab. 3: Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12
1. Innovation	1											
2. Female Board	0.031	1										
3. Female Family	-0.003	0.803	1									
4. Female Power	-0.001	0.391	0.524	1								
5. Size	0.143	0.169	0.113	0.067	1							
6. Age	0.070	0.128	0.039	0.071	0.234	1						
7. Profitability	0.020	-0.002	-0.010	-0.001	0.111	0.012	1					
8. Internationalization	0.131	0.185	0.097	0.046	0.545	0.236	-0.043	1				
9. Localization	0.023	-0.125	-0.096	0.008	-0.001	0.004	0.035	-0.082	1			
10. Fin. Constraints	0.033	0.062	0.066	0.030	0.012	0.099	0.096	0.007	0.026	1		
11. Productivity	-0.044	-0.019	-0.006	-0.044	0.063	-0.080	0.092	-0.052	-0.027	-0.018	1	
12. Listed	0.048	0.572	0.266	0.089	0.167	0.150	0.012	0.203	-0.125	0.024	-0.016	1

Source: author elaboration

4. Results

4.1 Empirical findings

Table 4 reports the regression results from Model 1 to Model 5. The econometric results highlight that not all female-related variables considered exert the same impact, and that only some of the traditional variables included as determinants of innovation had the expected impact.

Results show that a female presence on the board has a negative impact on innovation (Female Board is negative and significant at p<.01 in Model 1), but when controlling for the presence of female family members (introducing the variable Female Family), the variable of Female Board became positive and significant at p<.01 in Model 2. This reveals that the presence of female family members has a negative impact on innovation (Female Family is negative and significant at p<.01 in Model 2). Female Family shows the same negative coefficient in Models 2 and 4.

When looking at the interaction of Female Family and Female Board as factors in Model 3, results demonstrate that the influence of female family members became positive only when at least three women were on the board, suggesting that the critical mass must be reached in order to make their contribution effective (as.factor Female Board = 1 Female Family and as.factor Female Board = 2 Female Family are both negative and significant at p<.01; as.factor Female Board = 3 Female Family, as.factor Female Board = 4 Female Family, as.factor Female Board = 5 Female Family are all positive and significant at p<.01 in Model 3; similar results hold also for Model 5). When considering the role of president or vice president, the impact of female family members became positive and significant (Female Power is positive and significant at p<.01 in Models 4 and 5).

The control variables also yielded interesting results. Both Size and Age, reflecting managerial capability, had a positive impact and their coefficients are significantly different from zero at p<.01 in all models. International presence is positive and significant in all Models, except Model 3. Concerning the remaining variables, firms localised in North of Italy and less financially constrained, show a greater innovation (Localization and Financial Constraints are positive and significant at p<0.01 in all Models). Also, Productivity, surprisingly negative and significant at p<.01 in all Models, directly affects innovation; on the contrary, the profitability does not seem to crucially influence innovation, at least in the full Model (Profitability is not a significant factor in Models 3 and 5). Variable Listed shows mixed results in different models. Not surprisingly, there are always significant differences among sectors.

4.2 Robustness check

We produced various robustness checks and we tried additional models. First, we included alternative measures of the presence of women on the board of directors, attaining outcomes consistent with previous ones. Second, other specifications for the dependent variable Innovation have been considered in the analysis and, again, have yielded the same results (i.e., a dummy variable and a log variable). Third, to check for possible selection bias due to the presence of only innovative firms, we made a Heckman selection model, which included the sample of non-innovative firms as a control, again finding the same results. All the alternative models produced the same results proposed in this paper. Finally, we believe that endogeneity might not represent a major issue in our analysis, because our hypotheses included interaction terms. Bun and Harrison (2019) report that endogeneity is minimized when the findings of interest include

interactions. Our regressions are thus safeguarded in terms of endogeneity, because our results involve a 2-way interaction (Hypotheses 1 and 2). All the results of the robustness checks performed are available upon request.

Tab. 4: Empirical results

	Dependent variable:				
	Innovation				
	(1)	(2)	(3)	(4)	(5)
Female Board	-0.124***	0.223***		0.254***	
	(0.007)	(0.012)		(0.013)	
as.factor Female Board=1			-0.598***		-0.721***
*Female Family			(0.020)		(0.024)
as.factor Female Board=2			-1.006***		-1.085***
*Female Family			(0.032)		(0.033)
as.factor Female Board=3			0.072**		-0.084**
*Female Family			(0.033)		(0.036)
as.factor Female Board=4			0.720***		0.766***
*Female Family			(0.045)		(0.044)
as.factor Female Board=5			0.198***		0.196***
*Female Family			(0.048)		(0.048)
Female Family		-0.928***		-1.065***	
		(0.026)		(0.030)	
Female Power				0.232***	0.293***
				(0.025)	(0.027)
Size	1.207***	1.185***	1.197***	1.184***	1.197***
	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
Age	0.383***	0.341***	0.332***	0.334***	0.324***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Profitability	0.110**	-0.374***	-0.076	-0.301***	-0.004
	(0.051)	(0.051)	(0.056)	(0.052)	(0.056)
Internationalization	0.023***	0.015*	0.014	0.019**	0.021**
	(0.008)	(0.008)	(0.009)	(0.008)	(0.009)
Localization	0.345***	0.247***	0.276***	0.197***	0.207***
	(0.031)	(0.031)	(0.031)	(0.032)	(0.032)
Financial Constraints	1.709***	1.886***	1.848***	1.897***	1.856***
	(0.035)	(0.036)	(0.037)	(0.036)	(0.037)
Productivity	-0.453***	-0.448***	-0.456***	-0.449***	-0.457***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Listed	0.538***	0.142***	-0.148***	0.065**	-0.214***
	(0.027)	(0.032)	(0.035)	(0.033)	(0.035)
Sector	YES	YES	YES	YES	YES
Constant	-1.818***	-1.423***	-1.545***	-1.340***	-1.481***
	(0.078)	(0.078)	(0.080)	(0.079)	(0.080)
Observations	755	755	755	755	755
Log Likelihood	-32,483.910	-31,811.770	-31,404.710	-31,768.090	-31,344.77
Akaike Inf. Crit.	65,005.82	63,663.54	62,855.43	63,578.17	62,737.53

Note: *p<0.1; **p<0.05; ***p<0.01

Source: author elaboration

4.3 Discussion

The empirical relationship between the female directors and firm performance has received much more attention in the literature than the female presence measured as we propose here.

Our results suggest the existence of the phenomenon of family tokenism for female members. Tokenism, polarization, and assimilation phenomena derive from the low proportionate representation of minority group members. Tokenism is defined as "a tendency for minority members to be viewed as representatives of their culture group rather than as individuals, as well as a tendency for their performance, good or bad, to be magnified because of the extra attention that their distinctiveness creates" (Cox, 1994). We demonstrated that even if female family members are recognized by the board, they cannot exercise their roles because they are tokens for the family. This explains the negative role of female family members on innovation.

However, if at least three women are on the board, the effect of female family members on innovation becomes positive. This result confirms those explained in previous literature that argue that females should reach a critical mass in order to be effective (Kanter, 1977; Konrad *et al.*, 2008, Torchia *et al.*, 2011).

Furthermore, the aforementioned effect is emphasized when considering female family members of the board holding power positions.

Overall these results confirm the idea that, given the social barriers female family members face in the boardroom, female minorities need to have either critical mass or powerful positions to be influential.

5. Conclusion, limits, and future developments

In this paper we investigated the effect of female directors on innovation with a focus on FBs. From a theoretical point of view, we build on the invisibility of female family members to outline our hypotheses. From an empirical point of view, we tested our hypotheses on a sample of 755 Italian FBs. Our results support the idea that the relationship between female family members on the board and the level of innovation is negative due to their invisible condition. Specifically, given the social barriers family females face in the boardrooms, they need to reach a critical mass and/or to hold powerful positions in order to be influential. In that case, the relationship between family women on the board and the level of innovation becomes positive, because they lose their invisible condition.

The women-invisibility is a well-known phenomenon in the literature: women are rarely considered as candidates for the management team or for succession to the helm of the business. Still, in family firms, female presence on boards and in control positions (president or vice president of the BoD) is higher than in non-family firms; however, this choice is forced by the lack of male successors or by a crisis looming over the company (Curimbaba, 2002; Dumas, 1992, 1998; Haberman and Danes, 2007). Our findings confirm the idea that to consider women as members of the family (formal inclusion to the board) instead of professionals (consider their skill and listen to their voice) is detrimental to innovation. However, both the presence of family women in control positions (i.e., as president or vice president) and the presence of a critical mass (i.e., three or more women on the BoD) helps in mitigating the effect of prejudice on innovation.

Our findings are relevant also to practitioners. Owners and managers can observe how female directors positively impact firms' innovation strategies. The concept of innovation is often regarded as a highly gendered phenomena with a strong male connotation. However, our results suggest that women's presence on the board may be either beneficial or detrimental to innovation. Beneficial effects are obtained with critical mass and may be enhanced by women in power positions. However, power position alone is not sufficient to induce such positive effects. This is particularly relevant for family firms where family women are more likely to be involved in the board of directors, but where women-invisibility and tokenism phenomena are still present (potentially triggering the aforementioned detrimental effects). In order to leverage the positive effects of female presence on the board, family firms should place particular attention on overcoming tokenism (with family or non-family female members).

We hope that these results can inspire a new path for women inside FBs, increasing the number of women in important roles. Further research is still needed in order to improve our understanding of the relationship between female directors on the board and innovation, with the goal to support owners' and managers' practices.

Our paper presents some limitations. First the sample is limited to Italian firms only. The same study could be replicated in countries characterized by different institutional and socio-cultural contexts, which could provide different results. The social dynamics and the role of women in the entrepreneurial arena are strongly influenced by the institutional system in which the firm operates. Specifically, a culture more inclined towards the female figure in leadership roles can influence the contribution made by women to those processes.

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