

Family Ownership and Directors' Attributes as Determinants of Innovation in SMES During the Covid-19 Pandemic

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Abstract: This research shows specific determinants of innovation in SMEs in La Rioja (Spain) during the COVID-19 pandemic. Our results demonstrate that gender and university studies tend to have a positive influence on SMEs' innovation. Female managers and managers with university studies have a positive relationship with innovation. Additionally, family SMEs tend to be less innovative than non-family SMEs. Finally, female managers with a university degree show less innovative activity. We provide clarity on sometimes contradictory findings in the related literature. Finally, we highlight the importance of developing appropriate policies to improve resilience through innovation process in SMEs.

Keywords: COVID-19; academic background; SMEs; innovation; gender; family firm

La propiedad familiar y los atributos de los directores como determinantes de la innovación en las pymes durante la pandemia covid-19

Resumen: Esta investigación muestra los determinantes específicos de la innovación en las PYME de La Rioja (España) durante la pandemia de COVID-19. Nuestros resultados demuestran que el género y los estudios universitarios tienden a influir positivamente en la innovación de las PYMEs. Las mujeres directivas y los directivos con estudios universitarios tienen una relación positiva con la innovación. Además, las PYME familiares tienden a ser menos innovadoras que las no familiares. Por último, las mujeres directivas con estudios universitarios muestran una menor actividad innovadora. Aportamos claridad sobre conclusiones a veces contradictorias en la literatura relacionada. Por último, destacamos la importancia de desarrollar políticas adecuadas para mejorar la capacidad de recuperación a través del proceso de innovación en las PYME.

Palabras clave: COVID-19; formación académica; PYME; innovación; género; empresa familiar

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1. Introduction

The global pandemic has brought about a new environment of great uncertainty (VUCA, or volatility, uncertainty, complexity, and ambiguity) in geopolitical, environmental and health terms. Along with the digital transformation, the current business, social and cultural environment has had a significant impact on firms' business models. In this uncertain scenario, decisions that were valid before the pandemic are no longer so.

In this context, the study of SMEs is crucial since they are the backbone of the economy and the largest employers in the world, generating between 60% and 70% of all employment and producing 50% of world Gross Domestic Product (GDP) according to data from the United Nations (2021). In the European Union, SMEs make up 99% of industry and represent more than 70% of employment, while in Spain they account for 99.9% of industry, 65% of GDP and 75% of employment (National Statistics Institute, 2022). In the Spanish region of La Rioja, the data are similar, but it is a particularly interesting case to study as this region makes the second largest contribution to Spanish industrial GDP; in addition, employment during the

pandemic remained at 90% compared to 62.5% at the national level (Clemente et al., 2021).

SMEs are engines of job creation and economic growth; however, faced with the new cultural, political, and socioeconomic situation, they are seeking to survive and improve their performance. The pandemic has given rise to a complex scenario for SMEs and, as a result, their strategic orientations are aimed at generating behaviors that ensure their sustainable performance (Clemente et al., 2021). After the COVID-19 pandemic, innovation activities have become more critical than ever as drivers of competitiveness. In fact, according to the Kantar COVID-19 Barometer (2021), 86% of SMEs and 80% of large companies expect to overcome the crisis by relying on innovation.

Furthermore, in the volatile circumstances created by the COVID-19 pandemic, innovation is particularly important for SMEs. Many of them fail to launch successful innovations or adjust their portfolios to changing customer demands under these conditions. In this respect, investments, market orientation, and planning are considered crucial for successful innovation. Therefore, we need to better understand the factors that lead to innovation in SMEs.

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Our study adds to recent research on innovation and external crises. According to the Kantar report (2021), 86% of SMEs consider innovation to be key to overcoming the effects of the pandemic, although the report does not break down this percentage into family and non-family businesses. We address the gap in the literature on different innovation responses in times of crisis by considering the internal characteristics of SMEs (Runyan, 2006), since the contextual environment is important when analyzing innovation in business (Hu and Hughes, 2020).

Innovation offers SMEs a means of transformation, increasing their resilience to external crises such as COVID-19. For this reason, innovation represents a way for SMEs to address the current crisis and build up their business resilience (Díaz-Moriana et al., 2020). This will be particularly relevant for SMEs' post-pandemic recovery, where they will need to absorb and adapt the financial and strategic choices they were forced to make during the pandemic.

In this context, there is strategic value in analyzing the determinants of the innovation that SMEs undertake in order to overcome the crisis and grow; accordingly, our aim is to analyze this issue for SMEs in the autonomous region of La Rioja, Spain. Additionally, the Spanish case is particularly interesting since the rate of female entrepreneurship in Spain is higher than in the rest of Europe (Jimenez-Zarco et al., 2021).

On the other hand, research on family businesses is relevant since, as Aranda et al. (2021) point out, they make an enormous contribution to economic growth and wealth, being engines of job creation. It should be noted that, according to the INE, the majority of Spanish companies are SMEs (95%), of which a high percentage are family businesses (71.5%). Likewise, in the region of La Rioja, 79.9% of SMEs are family businesses, with these economic units being the main source of wealth and employment generation (Clemente et al., 2021). The COVID-19 pandemic has forced these companies to engage in quick and flexible decision-making to guarantee their survival.

Given the importance of family SMEs in La Rioja, understanding how the innovative process has occurred in the family businesses of the Community of La Rioja is of great interest. Moreover, although in the last 30 years there has been a significant increase in the research dedicated to the analysis of the family business (Yan and Yu, 2021; Molina, 2020; Gómez-Mejía et al., 2003), we aim to understand how distinctive features of family firms, such as the influence of the family legacy and non-economic factors in their decision-making process, may lead them to avoid risky decisions and pay more attention to protecting the family legacy), there are still far fewer studies on this type of company than on non-family companies (García et al., 2021), and they report controversial results regarding innovation (Gómez et al., 2019).

Gender is an important aspect of this research, as male and female SME managers may differ in their approaches to innovation. In addition, in recent years in Spain (and the Community of La Rioja), there have been high rates of female entrepreneurship, even higher than in

the rest of Europe, according to data provided by the Global Entrepreneurship Monitor (GEM) 2020 World Report. This translates into a high percentage of family businesses run by a woman. Among the reasons for female entrepreneurship is the need to break the "glass ceiling" or the importance of achieving a work-life balance (Jiménez-Zarco et al., 2021).

Despite the extensive literature that analyzes the effect of gender on business performance (Scott and Barnes, 2011; Milliken and Martins, 1996), there is limited empirical evidence on the effect of gender in the field of business innovation. This has led various authors to argue that innovation has been considered a gender-neutral phenomenon (Kvidal and Ljunggren, 2012), while authors such as Blake and Hanson (2005) and Alsos et al. (2013) have highlighted the need to take into account the gender dimension when studying this phenomenon. In light of these opposite opinions, gender must be considered as a relevant factor when analyzing innovative activity in times of crisis (Oertelt-Prigione, 2020).

. However, innovation is a knowledge-creating process, and the ability to be innovative is closely related to a manager's education and intellectual capital. For this reason, another aspect to take into account in this research is how the education, qualifications, and training of SME managers influence the innovation processes being carried out in their business. In this sense, it has been shown that highly-qualified managers have a positive impact on innovation activities (Le Blanc, Nash, et al., 1997;

Hoffman, Parejo, et al., 1998). In fact, having the specific knowledge that higher education provides allows them to launch innovation processes more effectively. In this paper, we will argue that heterogeneity among SMEs in terms of their levels of family ownership and the managers' individual characteristics (gender, education, and so on), alters their response to the new economic, political, and cultural situation in the post-COVID era. We contribute to the literature by showing the role of specific determinants of innovation in SMEs, and we shed light on the sometimes puzzling findings regarding the influence of family ownership status and gender on innovation processes in SMEs. We confirm the role played by the manager's academic background in improving SMEs' resilience through innovation in a crisis context. Our findings provide empirical evidence that can be used to improve the competitiveness of SMEs, which is critical given the vulnerability of this type of business in times of crisis.

To that end, in the following section, we review the related literature and present the hypotheses to be tested. The section "Data" describes the databases used in our study and the variables included in our model. The section "Methodology and Results" explains the empirical methods employed and the results obtained, as well as additional robustness tests carried out. Finally, the section "Discussion and Conclusion" discusses the main findings, their implications and the main limitations of the study.

2. Literature and hypotheses

The resource-based view (RBV) is a theoretical framework in which researchers seek to understand the forces that drive business performance in general, including strategic orientations in SMEs (Yan and Yu, 2021). This theoretical framework emphasizes the importance of firms' internal resource endowments (Hoffman et al., 1998) and the relevance of external forces. The RBV claims that the limited availability of resources in family firms (such as financial, social capital, and knowledge resources) discourages innovation. This effect is particularly important in the economic turmoil resulting from the pandemic.

According to the RBV, companies generate resources from which they can achieve a competitive advantage and hence superior long-term economic performance (Terrón et al., 2019). Many family firms develop their own resources and capabilities, reflecting their specific governance structure and leadership (Chrisman et al., 2005). In this sense, the interplay between the family, the ownership and the management of the family business creates a setting for improving its performance (Azizi et al., 2021). Basing their study on the RBV, Habbershon and Williams (1999) described family businesses as “complex, dynamic, and rich in intangible resources”, and introduced the concept of “familiness”, which they defined as “the unique bundle of resources a particular firm has because of the systems interaction between the family, its individual members, and the business”, to explain how the family connection contributes to business success. These authors therefore consider “familiness” to be a source of competitive advantage for family businesses.

Similarly, taking an RBV approach, it is interesting to explore the influence of gender of firm performance; for instance, by analyzing the differences in performance of female-owned and male-owned firms. Any disparities found may reflect structural characteristics of the businesses women tend to own (e.g., low growth prospects), which reduce the likelihood of gaining access to capital (Runyan et al., 2006; Strawser et al., 2021; Bullough et al., 2022; Nguyen et al., 2022).

We complement this approach with a focus on innovation in SMEs; specifically, the idea that SMEs need to establish innovative networks with suppliers, universities, clients, and higher education institutions to become more competitive (Zeb and Ihsan, 2020). In terms of external market forces, some authors have found that an increase in innovation is due to the complementary competencies shared with clients and suppliers, and this is particularly influential for the survival of SMEs (Bartik et al., 2020). Based on these fundamentals, SMEs' boundary choices often stem from the tension between the need for external resources and the importance of coordinating organizations and maintaining external relations. However, discussions among scholars have largely overlooked the concept of innovation in SMEs as it is more easily examined in larger firms; that is, SMEs have less access to external resources and fewer technological assets that they can exchange in a more uncertain context (García et al., 2021). For this reason, in this paper we will assume that SMEs work in a systemic manner, and they are integrated in a network of internal and external relations in a post-crisis era.

2.1. Innovation in family SMEs vs non-family SMEs

Family businesses are a type of organization that are playing an increasingly important role as a pillar of progress and well-being due to their substantial contribution to the generation of employment and wealth (Navarro et al., 2020). In fact, the critical role of the family business in the economy has led to its growing influence in the institutional environment in recent decades (Aranda et al., 2021).

In order to better understand the subject under study, it is important to define what a family business is. In this sense, there is no single, universally-accepted definition of the family business. König et al. (2013) define family businesses as organizations that are characterized by the presence of people united by family ties, who exert substantial influence in the business; for example, through ownership interests and/or important managerial positions held by family members. Meanwhile, Duran et al. (2016) describe the family business as an important but conservative organizational form that is reluctant to invest in innovation. Hamilton et al. (2017) indicate that the family business is an entity with idiosyncratic features that, depending on the individuals that comprise it, can act in different ways.

There is no doubt that, precisely because of these differentiating features, this type of company deploys different strategies that set them apart from non-family businesses. Family businesses thus tend to display a long-term orientation, risk avoidance, preference for capital financing and commitment to frugal innovation (Le Breton-Miller and Miller, 2006; Sirmon and Hitt, 2003).

Throughout history, the family business has shown its ability to adapt, and the pandemic has undoubtedly been the definitive test of resilience. In this sense, one of the key pillars for overcoming the crisis and lasting over time is the innovative nature of the company. But innovation in the family business remains an understudied area (Lorenzo and Núñez, 2012). A better understanding is thus needed of the how family status influences innovation in SMEs aimed at improving their resilience, given the vulnerability they showed in COVID-19 crisis.

Regarding the concept of innovation, according to Açıkgöz et al. (2016) innovation is the adoption of new ideas or behaviors. The adoption of new ideas requires that the groups responsible for innovation remain alert and open to new information or knowledge, work continuously and seek to discover new creative solutions to their problems.

The evidence shows that family and non-family businesses differ in terms of innovation. Massis et al. (2015) point out that family businesses are characterized by being less willing to participate in innovation activities than non-family businesses. This is because the family business has a strong link with its human capital (Díaz-Mariana et al., 2020), a feature that has been aggravated by the pandemic. Moreover, family businesses pursue long-term survival even at the expense of short-term profits (Minichilli et al., 2016).

Several different authors argue that the family business innovates less than the non-family business since the family business has certain difficulties in innovating (König et al., 2013), due to its aversion to

risk (Gomez-Mejia et al., 2007) In addition, the family business has a dual motivation: serving economic interests and family interests. All this hinders its innovative process.

However, various authors claim that family businesses are more innovative than non-family ones because they make more efficient use of investments (Duran et al., 2016), and pursue long-term survival even at the expense of profits in the short term (Minichilli et al., 2016). Furthermore, even if they innovate less, they are better able to do so than non-family businesses. Family businesses have a superior ability to identify opportunities and gain knowledge outside their boundaries due to their non-economic goals.

From this point of view, and taking into account the situation caused by COVID-19, evidence shows that a crisis (that is, a decline in organizational performance) can act as either a catalyst or an inhibitor of innovation in a family business (Wenzel et al., 2020; McKinley et al., 2014). Therefore, the crisis context raises important and interesting questions in relation to family businesses and their innovative process. COVID-19 could provide a research opportunity to gain a better understanding of the relationship between family SMEs and the innovation that can transform them.

In addition, it should be noted that family SMEs are the predominant type of SME (Sánchez-Marín et al., 2016), which motivates us to seek a better understanding of the family business in regard to the issue under study here. In line with the literature, the following hypothesis is proposed:

H1: Family SMEs innovate less than non-family SMEs in the context of COVID-19.

2.2. Effect of gender on innovative activity in SMEs

One determinant to consider when analyzing innovative activity is gender. Although there is very little empirical evidence that sheds light on the relationship between gender and innovation, some studies show how gender impacts business development (Marvel et al., 2015; Alsos et al., 2013; Watson and Robinson, 2003). However, the latter tend to focus on the initial phase of entrepreneurship rather than innovation (Alsos et al., 2013). In fact, it has been shown that women have a series of qualities that can be vital for the survival and success of a family business (Salganicoff, 1990). Indeed, it should be borne in mind that men and women differ when facing the challenging effects of certain economic situations (Gálvez and Rodríguez, 2013), making gender a relevant aspect to study in times of crisis.

In addition, the few studies that address the possible effect of the manager's gender on innovative activity report contradictory results (Na and Shin, 2019; Dohse et al., 2019; Kvidal and Ljunggren, 2012; Blake and Hanson, 2005).

Other qualities that can affect innovation according to Croson and Gneezy (2009) are the ability to detect market opportunities and the propensity for risk-taking. On the one hand, Kang et al. (2007) point out that it is women who have the greatest ability to identify customer needs and market opportunities, while Weber and Geneste (2014)

state that male managers take more risks in their decisions than women, which is why they are attributed a more innovative profile. Along the same lines, Expósito et al. (2021) argue that male managers, due to the positive impact of self-confidence, tend to carry out more innovative activities than women.

However, Croson and Gneezy (2009) do not agree with this point of view and point out that women managers in SMEs may opt for more conservative management to safeguard the survival of the business; therefore, risk aversion is tied to a number of unobservable qualities. In addition, in a more recent study, Abril et al. (2021) report that female empowerment leads to women showing superior innovative activity to men. This is confirmed by Zeb and Ihsan (2020), who support the direct relationship between female empowerment and innovation. In fact, in recent decades, women have been found to have advanced in the dynamics of fostering gender equality through innovation, as shown by Paredes, Castillo and Saavedra (2019). These authors state that women have capacities that make them more enterprising, such as less fear of failure, and that their motivations are supporting the family income or improving their standard of living, among others. Their empowerment is related to society, and involves seizing opportunities by drawing on acquired knowledge, culture and customs, which they combine with creativity to give rise to innovation.

Along the same lines, Dezsö and Ross (2012) and Dohse et al. (2019) state that female participation in management and ownership can be constructive when it comes to business innovation, arguing that female managers may not follow the traditional gender order. This may open up possibilities for changes in organizational structures that support innovation at the company level, underlining the positive role of women's representation at the managerial level in innovation outcomes.

In addition, women are likely to establish new businesses or launch new products in existing businesses, especially in the retail sector, where renewal is a strategic factor (Blake, 2005; Runyan, 2006). This explains why women are not averse to innovation, but they seek to work in sectors that guarantee them the necessary flexibility to respond to the needs of their company and their family life, even when the ability to innovate is not a strategic factor for the development of their business (Lim, 2011). Therefore, women have high potential for innovation and considerable entrepreneurial talent (Marlow et al., 2008; Tagg, 2011).

On the other hand, authors such as Kvidal and Ljunggren (2012) hold that gender does not affect innovation and, therefore, innovation should be considered a gender-neutral or gender-independent phenomenon. Meanwhile, other authors such as Blake and Hanson (2005) and Alsos et al. (2013) highlight the need to delve into the effects of gender on innovation.

Thus, the empirical evidence on the effect of gender in the field of business innovation is limited (Chen et al., 2018; Scott and Barnes, 2011; Milliken and Martins, 1996), and it is even more scarce and controversial in the context of COVID-19.

Nevertheless, numerous studies have shown that women's capacity for innovation is greater than that of men—or at least that women show a greater propensity for innovation (Brush and Hisrich, 2000; Runyan, 2006; Torchia, 2011). This idea is reinforced by studies such as the one carried out by Lorenzo et al. (2018), in which it was determined that companies with more women in management positions are more innovative, regardless of the environmental conditions they face.

Given the scarce existing literature on the subject of the influence of gender on SME managers' capacity for innovation in a crisis situation such as COVID-19, and the evidence that points to women's capacity for innovation and greater tendency to occupy leadership positions in companies that are in crisis situations (Ryan and Haslam, 2005), the following hypothesis is formulated:

H2: Female SME managers innovate more than male SME managers

2.3. Education and innovative performance in SMEs

The concept of innovation can be understood from different angles. For example, according to the Oslo Manual (2005), there are four types of innovation relating to the activities of a company: product innovation, process innovation, organizational innovation, and marketing innovation.

Innovation in SMEs is conditioned by both external factors and internal factors. Notable among the latter are the human resources available to the company, where the manager of the SME plays an important role, since he or she must encourage the generation and development of new ideas. Indeed, many authors point to a positive effect of human resources on innovation (Chandler, Keller and Lyon, 2000) or on company performance (Gadene, 1998), with some considering it vital (Hornsby and Kuratko, 2003). This idea is also supported by numerous studies that provide data on how the personal characteristics of SME managers influence the capacity for innovation (Renko et al., 2012; Romero and Martínez-Román, 2012), finding a relationship between the capacity for innovation in SMEs and aspects such as the level of training. In fact, the level of training is considered a key resource in innovation and in the assimilation of new technologies, since the knowledge acquired through training contributes to the generation of new ideas within the company (Massa and Testa, 2008). According to Lawson and Samson (2001), for innovation to occur in companies, they must have a highly qualified workforce that proactively cooperates and innovates. That is, investment in talent or human capital determines the differences in the levels of innovation. As a result, innovation capabilities, which are built through resources, enhance the firm's innovative performance.

Innovative activity may be higher within individuals who have a subset of well-defined entrepreneurial characteristics; this could result in higher levels of creativity and vision, enabling them to take advantage of opportunities, which in turn could aid the longevity and sustainability of both projects and businesses. Some authors (Navarro et al., 2021; Tanner and Su, 2019) suggest that organizational success relies to an extent on its human resource capabilities because education and training are considered two pillars for such success. Moreover, in the

present global economy, organizations are faced with increasing levels of competition and a dynamic environment. Consequently, SMEs must keep abreast of these changing patterns through training. Intense competition and rapidly changing market environments cause companies to create knowledge that can be used to improve or develop their products to satisfy customers in order to gain a competitive advantage in the industry. Therefore, a high level of education or training will help the company to define and establish appropriate innovation strategies in each situation and to identify those that best suit their needs and restrictions (Ripoll and Hervás-Oliver, 2011).

Certainly, the relevance of managers' characteristics for innovative performance and innovation capabilities is well established in the entrepreneurship literature (Abril et al., 2021). This may be particularly the case in SMEs, which are often managed by the owner, who thus plays a more prominent role in decision-making. Education is perceived to be a viable channel to new knowledge generation and transfer that will help the business develop the required innovations (Açkgöz et al., 2016). Consequently, education and training will facilitate access to knowledge and increase the SME's tendency to innovate (Palmer et al., 2019). In line with the literature, this hypothesis is formulated as follows:

H3. Knowledge acquired through education enhances innovative performance in SMEs.

2.4. Effect of education and gender on innovative performance in SMEs

Irrespective of the relationship between women's higher education and the increase in the rate of women entrepreneurs (Wilson et al., 2007), several studies in the management literature observe that women remain underrepresented in top leadership positions, a reality that reflects a variety of barriers creating a glass ceiling effect. Ryan and Haslam (2005) reveal that during a period of overall stock-market decline, those companies that appointed women to their boards were more likely to have experienced consistently bad performance in the preceding five months than those who appointed men.

In terms of education and gender, the related literature theorizes that the context influences the female positive attitude to innovate (Dezsö and Ross, 2012) reversing the traditional negative attitude. In this specific environment the female traits are suitable to identify new opportunities which result in an inclined attitude to adopt new opportunities. The theory showed in the literature claims that, in addition to the context, the type of risk also affects the attitude of gender to innovate. In time of crisis, the so-called venturing risk is crucial, since it involves the adoption of new opportunities when the firm's status quo is in danger, thus, leading to the search of new products, services, or technologies (Calabrò et al., 2021). This type of risk fits with specific female traits (prone to identify new opportunities, manage with companies in difficulties, changes in the organization).

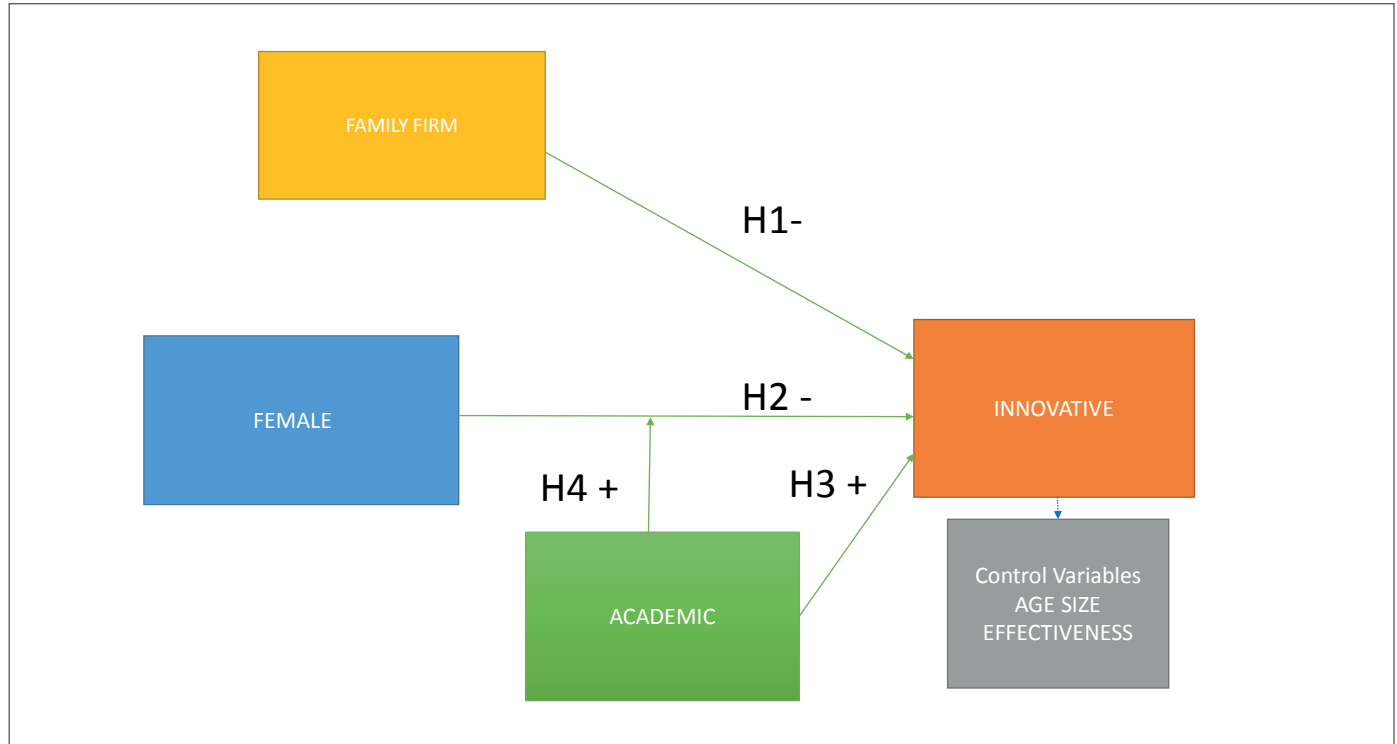
Certainly, highly-educated managers could better understand complex decisions and facilitate innovation. However, due to the COVID-19 crisis, demand has been reduced and this context has highlighted the need for research into the conditions under which women are promoted, despite well-documented barriers in SMEs.

According to several authors (Adomako and Ahsan, 2022; Attia et al., 2020; Ryan and Haslam, 2005), females with a business education seem to marginalize innovation as they are more likely to focus on activities with short-term financial returns. In line with the literature, the following hypothesis is proposed,

H4: In a highly uncertain context, knowledge acquired through education negatively influences the innovative performance of female SME managers.

As a summary of our hypotheses, Figure 1 shows the model we aim to test.

Figure 1. Model



3. Method

3.1. Source

The data used in our sample were collected using a questionnaire conducted through telephone interviews with 329 SME managers in La Rioja (Spain). The process forms part of two studies: *Informe de la PYME 2021. Impacto económico de la crisis COVID-19 sobre la Pequeña y Mediana Empresa en la Comunidad Autónoma de La Rioja* (SME Report 2021. Economic impact of the COVID-19 crisis on Small and Medium-Sized Enterprises in the Autonomous Community of La Rioja) and *Impacto económico de la COVID-19 sobre la Pyme en España* (Economic impact of COVID-19 on SMEs in Spain), both of which are headed up by *Fundación para el Análisis Estratégico y Desarrollo de la Pequeña y Mediana Empresa* (FAEDPYME).

The collection of the data reflected the business structure of La Rioja through stratified sampling of a finite population. The total number of companies in La Rioja (22,679) extracted from the *Instituto Nacional de Estadística* (Spanish National Statistics Institute, INE) were segmented by size and industry. Since our analysis is exclusively focused on companies with more than 5 employees and fewer than 250, the final sample consisted of 2,104 companies. Those companies that refused to answer the questionnaire were replaced with similar compa-

nies that belong to the same sector. The SMEs' general managers were the target of our questionnaire, since they represent the most relevant decision-makers and have the largest influence on the business strategy (O'Regan and Sims, 2008; Van Gils, 2005).

A total of 329 valid questionnaires were collected, representing a margin of error of 5% at a confidence level of 95% (p=0.5) (Adam, 2020; Kim et al., 2020).

To test for potential common method bias, we use Harman's one factor test (Podsakoff et al., 2003; Podsakoff and Ogran, 1986). Our results confirm the absence of common method bias, since the principal component analysis of all the variables included in our model indicates that there is no dominant factor. Next, to test for potential non-response bias, we compare early and late respondents in our sample by means of a t-test (Armstrong and Overton, 1977). The results show that there are no significant differences in the dependent (p-value 0.947) and independent variables (Family firm p-value 0.308; Female p-value 0.607; Academic p-value 0.165). Our sample exhibits similar traits in terms of industry (Industry p-value 0.097; Construction p-value 0.177; Commerce p-value 0.116; Services p-value 0.499), impact of COVID-19 (p-value 0.903), and sales expectations (p-value 0.684) (Jiménez-Zarco et al., 2021).

3.2. Variables

In this section, we explain the variables used in our model.

3.2.1. Dependent Variable

Company's Degree of Innovation (INNOVATIVE)

The variable we aim to explain is a construct built from specific questions in the survey related to different innovations applied by the SMEs in our sample. By means of five-point Likert scale questions, the SME managers were asked about a wide range of innovations such as improvements or changes in their products and services; new product launches; improvement in organizational and operational processes; and capital expenditure decisions.

This construct was built based on the first factor derived from a factor analysis of the aforementioned Likert questions (Acock, 2013 by Alan Acock, successfully introduces both the statistical principles involved in structural equation modeling (SEM; Breton-Miller *et al.*, 2011). A Cronbach's Alpha of 0.878 and correlations among the items ranging between 0.49 and 0.73—all above 0.30—(Raykov and Marcoulides, 2008; Waltz *et al.*, 2010) confirmed the reliability of the construct. The validity of the construct was confirmed by the factor analysis. The Kaiser-Meyer-Olkin (KMO) test gave a value of 0.86 and Bartlett's test a p-value of 0.00. The analysis of the Total Variance Explained (TVE) showed that the presence of a single construct explains 58.10% of the variance, while the factor loadings of the items in the construct were higher than 0.5. Tables X shows the factor loadings and variance of this construct.

Table 1: INNOVATIVE variance and factor loadings.

Variable	Items	Factor Loading	Percentage of Variance Explained
INNOVATIVE	1. Changes or improvements in existing products/services	0.809	58.10%
	2. Market launch of new products/services	0.753	
	3. Changes or improvements in production processes	0.792	
	4. Acquisition of new capital goods	0.589	
	5. New changes or improvements in organization and/or management	0.790	
	6. New changes or improvements in purchases and/or supplies	0.775	
	7. New changes or improvements in commercial and/or sales	0.804	

3.2.2. Independent Variables

Female Manager (FEMALE)

Taken from information provided in the questionnaire, *FEMALE* is a dichotomous variable which takes the value 1 if the company's general manager is man and 0 if it is a woman.

Manager's University Education (ACADEMIC)

From information provided in the questionnaire, *ACADEMIC* is a dichotomous variable which takes the value 1 if the company's general manager has a university degree, and 0 otherwise.

Family Firm Status (FAMILY FIRM)

In line with the literature, an SME in our sample is defined as a family firm if more than the 50% of the firm is owned and controlled by a family (Chua *et al.*, 2003; Sharma *et al.*, 1997; Westhead and Cowling, 1998). Thus, *FAMILY FIRM* is a dichotomous variable that takes the value 1 if the company satisfies this criterion and can thus be defined as a family firm, and 0 otherwise.

3.2.3. Control Variables

Following the literature about innovation (Camisón-Haba *et al.*, 2019; Brinckmann and Hoegl, 2011; Saemundsson and Dahlstrand, 2005; Colombo *et al.*, 2004), we use the following control variables: firm size measured as the number of employees (SIZE), firm age (AGE), and effectiveness (EFFECTIVENESS). The latter is a construct whose reliability is confirmed by a Cronbach's Alpha of 0.819 and correlations higher than 0.3 (ranging from 0.48 to 0.68). The validity of this construct is also verified. The KMO measure is 0.84 and the significance level for the Bartlett's test is 0.00. The TVE analysis confirms the existence of one component that explains 52.79% of the variance, and the components matrix shows coefficients between 0.62 and 0.81. Table x shows the variance explained and factor loadings of this construct.

Table 2: EFECTIVENESS variance and factor loadings.

Variable	Items	Factor Loading	Percentage of Variance Explained
EFECTIVENESS	1. Quality of its products	0.755	52.79%
	2. Efficiency of production processes	0.749	
	3. Customer satisfaction	0.808	
	4. Speed of adaptation to market changes.	0.720	
	5. Employee satisfaction	0.689	
	6. Level of absenteeism	0.624	

3.3. Statistical technique

By means of Ordinary Least Squares (OLS) linear regression we tested our model in Figure 1. The estimated coefficients (unstandardized and standardized) are statistically robust, in compliance with the OLS assumptions. The mean of the residuals is zero. Moreover, the Durbin-Watson statistics is 2.280, which is in between 1.5 and 2.5, indicating the independence of the residuals. The Cameron and Trivedi test (Cameron et al., 1990) and the Breusch-Pagan test (Breusch and Pagan, 1979) confirm the homoscedasticity of the variance. The normality assumption was tested according to the test proposed by Jarque and Bera (Jarque and Bera, 1987). Correlation and collinearity are not a problem in our sample.

4. Results and Discussion.

Table 3: Regression coefficients.

Explanatory Variables	Model I	Model II	Model III	Model IV
<i>FAMILY FIRM</i> (H1)	-0.338**(0.138)	-0.330**(0.138)	-0.135**(0.055)	-0.132**(0.055)
<i>FEMALE</i> (H2)	-0.288*(0.163)	-0.654**(0.273)	-0.097*(0.055)	-0.132**(0.059)
<i>ACADEMIC</i> (H3)	0.215*(0.114)	0.285***(0.122)	0.107*(0.057)	0.105*(0.057)
<i>FEMALE x ACADEMIC</i> (H4)		0.566*(0.340)		0.096*(0.057)
<i>SIZE</i>	0.007***(0.002)	0.007***(0.002)	0.170***(0.058)	0.168***(0.057)
<i>AGE</i>	0.003(0.002)	0.004*(0.002)	0.093(0.058)	0.104*(0.059)
<i>EFFECTIVENESS</i>	0.216***(0.056)	0.211***(0.056)	0.216***(0.056)	0.211***(0.056)
Constant	-0.149(0.154)	-0.199(0.156)	0.012(0.053)	0.028(0.054)
Observations	309	309	309	309
R-Squared	0.126	0.134	0.126	0.134

Notes: Robust regression coefficients. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. Model I and II: unstandardized coefficients. Model III and IV: standardized coefficients.

Table 3 shows the unstandardized and standardized regression coefficients of our different estimations, which provide similar results. Non-Family firms (unstandardized coefficient of -0.338 and standardized coefficient of -0.135 for the variable *FAMILY FIRM*) tend to be more innovative than family firms, confirming our first hypothesis. Despite the puzzling literature on this topic, our result shows that the adverse external environment stemming from the pandemic exerted a negative influence on family firms' innovation. The claim of the RBV that family firm decisions tend to prioritize the preservation of the family's financial is especially relevant in the context of COVID-19, since family members usually lend financial support to the family firm (Chrisman et al., 2016). Moreover, according to the Socio-Emotional Wealth (SEW) perspective, family firms tend to try to preserve their SEW in turbulent and uncertain contexts (Clemente-Almendros and González-Cruz, 2023). From this point of view, innovation is perceived as a potential risk to the non-financial wealth of the family firm when it is straggling with a scarcity of resources, since innovation involves the use of resources (De Massis et al., 2015). There are significant differences between family and non-family firms in terms of changes made to their products, production processes and organizational approach, as well as the launch of a new product (p-values of 0.053, 0.037, 0.044, and 0.055, respectively). These types of innovation require risk-taking and the use of resources.

To test our moderation hypothesis, we use a two-way interaction approach in addition to bootstrapping (Hayes, 2013). This technique is not conditioned by the normality assumptions of parametric approaches and is particularly recommended when the hypotheses include moderations (Pérez-Luño et al., 2018; Palmer et al., 2019; Jiménez-Zarco et al., 2021). For this purpose, we used the PROCESS macro for SPSS (Hayes, 2018a; Wei et al., 2019). This software creates 5,000 bias-corrected bootstrap samples with which to test the moderation effect (Hayes, 2018b; Tanner and Su, 2019).

Female general managers (coefficients of 0.288 and 0.097 for the variable *FEMALE*) tend to be more innovative than male general managers, as stated in Hypothesis 2. Our results are in line with the literature claiming that female managers, particularly in times of crisis, are predisposed to changes in the organization that allow the business to adapt and survive. (Clemente-Almendros et al., 2023; Dohse et al., 2019; Dezsö and Ross, 2012). Odehmalova and Pirozek (2018) showed that female managers have an influence on SMEs' strategic adaptation in adverse circumstances. In the same vein, our results confirm statistically significant differences between female and male managers in changes or improvements in the organization and in production processes (p-values of 0.042 and 0.016, respectively). Female managers are inclined to make organizational changes (Adams and Funk, 2012).

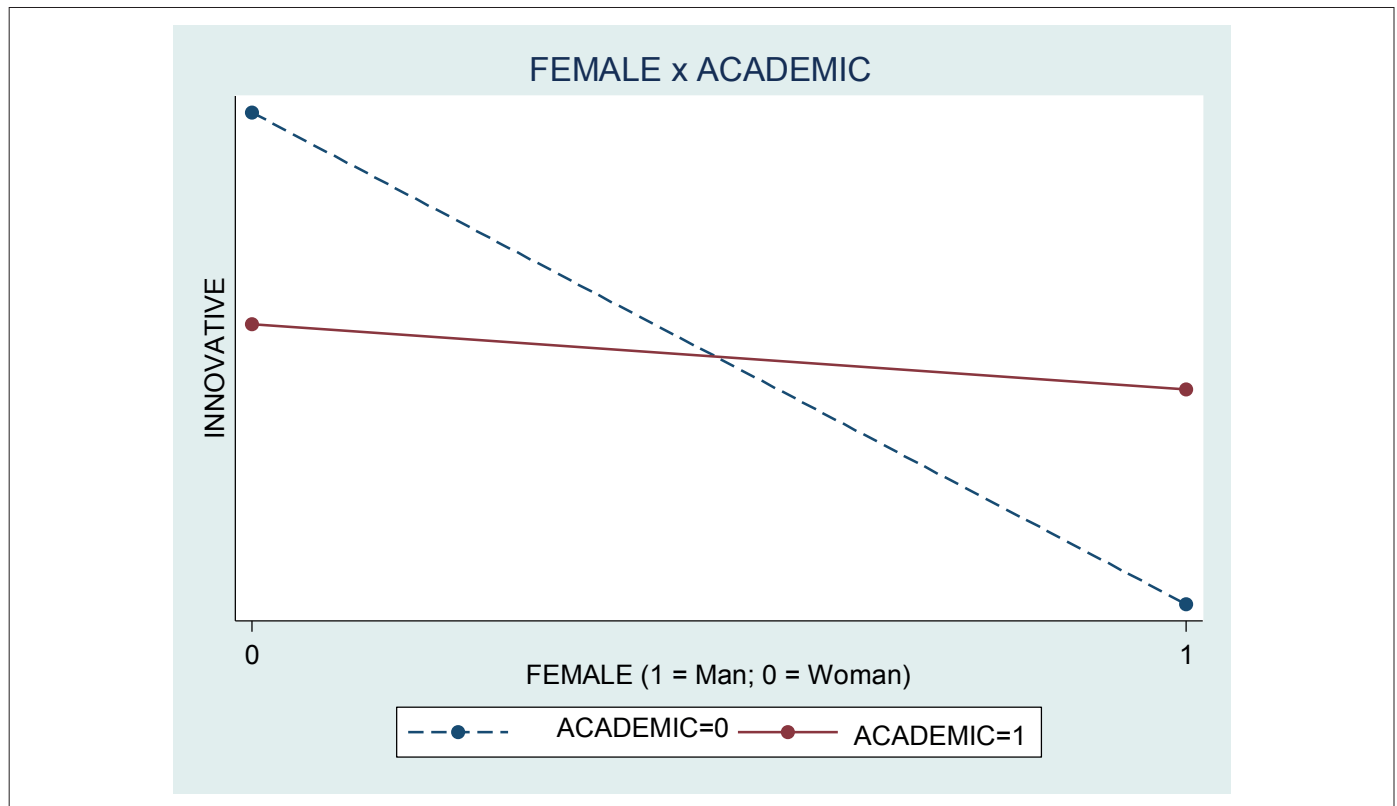
When the general manager of the SME has a university degree, this has a positive effect on SMEs' innovation process (coefficients of 0.215 and 0.107 for the variable *ACADEMIC*), confirming Hypothesis 3. In the context of the crisis generated by COVID-19, general managers' higher education contributed to the generation of new ideas (Massa and Testa, 2008). This educational background facilitates creativity and business vision, enabling managers to identify market opportunities (Navarro et al., 2021; Tanner and Su, 2019). In times of crises,

having a higher educational level may help managers to develop new products or improve the existing products, adapting the innovation strategy of the company to the new context (Ripoll and Hervás-Oliver, 2011). We found statistically significant differences in all the innovations shown in Table 3, which confirms our ideas about the importance of higher education for innovation in times of crisis.

The moderation coefficients (-0.566 and -0.096 for the interaction FEMALE x ACADEMIC) are significant. To get a better understanding of this relationship of moderation, we need to plot the two-way interaction (Pérez-Luño et al., 2018; Lauf et al., 2016). Figure 2 shows the negative effect on SMEs' innovation of female managers having a university degree, in line with Hypothesis 4. The level of innovation is lower for female managers (position 0) on the horizontal axis when

they hold a university degree (solid line) compared to when they do not have one (dashed line). Having university studies adversely affects the innovative performance of female managers. When facing a financial downturn, listed companies that appointed female managers experienced an improvement in their financial performance, and this appointment could be seen as a strategy to signal that an important change to improve the financial situation can be expected (Ryan and Haslam, 2005). In this vein, our results show that female managers with higher education show a higher level of innovation than male with high education, but a relatively lower level when compared to female managers without academic studies. They may also focus on activities with short-term financial effects, in order to avoid losses (Attia et al., 2020).

Figure 2. Two-way Interaction FEMALE x ACADEMIC



5. Conclusion

The pandemic has underscored the fact that in order for businesses to survive and endure over time, they must adopt an innovation and digitization strategy. Bearing in mind that family businesses are fundamental to the reactivation of the economy and to employment, this study has examined, among other aspects, how SMEs in La Rioja have innovated in the COVID era. To that end, the analysis has been carried out using the macro PROCESS with a sample of SMEs in La Rioja.

. Due to family businesses' aversion to risk, sense of belonging to the community and desire for long-term continuity, along with the combination of economic and non-economic objectives linked to family interests, they have innovated less than non-family businesses in times of crisis. Although there are authors who show that family businesses do innovate, the most relevant takeaway is that in times of crisis they do so to a lesser extent than non-family businesses. In this respect, family businesses, being the most predominant type of SME, must adopt technological advances, setting aside their risk aversion and committing to innovation and training as a way of adapting to a changing new reality full of uncertainty.

Moreover, gender is found to be relevant in innovative activity; thus, in times of crisis—and bearing in mind the situation of women entrepreneurs, who tend to prioritize work-life balance over results—women who are at the head of an SME innovate more than their male counterparts.

This research shows the influence of gender on innovation activity during the COVID-19 pandemic. In this regard, the results are in line with the theory that gender exerts an important influence on management style and business orientation towards innovation (Muñoz and Graña, 2016). In this context, Dezső and Ross (2012) point out that female representation in senior management positions improves innovation. The specific style of management and female leadership, relating to motivation, creativity and knowledge sharing, fits with the generation of new ideas. The female management style tends to be more cooperative and collaborative, which stimulates innovation (Dohse et al. 2019). In the same vein, Han et al. (2019) point out that female CEOs drive corporate innovations due to the socialization and self-selection of women, and because existing evaluation mechanisms do not favor women. On top of that, decision-making is a relatively complex process and female CEOs increase corporate value through innovation, thereby boosting their own value.

On the other hand, the university education that managers have is shown to positively affect innovation processes in SMEs, in part due to the specific knowledge that innovation entails, especially in contexts related to R&D. (Lopez and Robledo, 2014). Along these lines, Navarro et al. (2021) point out that education plays a fundamental role in developing innovative solutions to environmental problems, and it has positive effects on innovation, improving it at an organizational level as well as in the creation of products and services within SMEs (Aceituno, Casero and Escudero, 2018). In turn, the existence of scientists and engineers and strong leadership provided by a highly educated director or founder have been shown to have a strong influence on innovative activity (Le Blanc et al., 1997; Hoffman et al., 1998). This reinforces the idea that innovation is closely related to the innovative performance of the company, and the latter will largely depend on the specific training that managers have (López and Robledo, 2014).

The results of the study confirm that the gender of the general manager does affect the innovation that takes place in SMEs, with more innovative activity found for women. Turning to the effect of university studies on innovation, it is concluded that in the case of men the effect of having a degree is positive, that is, men with university education have more capacity for innovation. However, the opposite is the case for women, with more innovation found for women who do not have higher education, a result related to the effect of female empowerment on innovative activity (Ordoñez-Abril et al., 2021; Zeb et al., 2020).

Our paper supports decision-makers in SMEs by exploring which determinants influence innovation in SMEs and then showing how to improve their resilience. Our paper contributes to the sometimes ambiguous literature about family firms and innovation, by showing

the importance of the external context when determining the priority for the use of resources and the appropriateness of risky decisions in family firms. Our study also contributes evidence on how gender and professional and academic backgrounds could provide new perspectives on the management of SMEs in a crisis context. We highlight the importance of the context when analyzing the effect of gender on innovation. This study can aid policy-makers by highlighting the importance of developing specific policies aimed at enhancing resilience in the most vulnerable companies, SMEs. Moreover, our findings may point to specific policies to promote innovation in family firms in times of crisis and to develop tailored programs that account for the overlap of interests in this type of organization. Policies that promote gender equality in business organizations, particularly in SMEs, would lead to more innovative organizations. Furthermore, policies aimed at encouraging the professionalization of SMEs would help foster innovation in these companies and thus prepare them for future crises.

However, our study is not free from limitations. Our study is focused on a snapshot of the effect of Covid-19, and it would be interesting to analyze whether our findings hold over time. Similarly, it would be worth extending our research to the national level. These two limitations can be viewed as future lines of research.

References

- Abril, D. Y. O., López, A. M. C., and Bravo, I. M. R. (2021), “Empoderamiento de la mujer en el emprendimiento y la innovación”, *Población y Desarrollo*, Vol. 27 No. 52, pp. 69-91.
- Aceituno-Aceituno, P., Bousño-Calzón, C., Escudero-Garzà, J.J., and Herrera-Gálvez, F.J. (2014), “Formación en emprendimiento para periodistas”, *El Profesional de la Información*, Vol. 23 No. 4, pp. 409-414. <https://doi.org/10.3145/epi.2014.jul.09>
- Aceituno-Aceituno, P., Bousño-Calzón, C., and Herrera-Gálvez, F.J. (2015), “Una propuesta para impulsar el espíritu emprendedor y la capacitación en el futuro de la profesión periodística”, *Estudios sobre el Mensaje Periodístico*, Vol. 21 No. 2, pp. 929-942.
- Aceituno, P., Casero, A., and Escudero, J. J. (2018), “Formación universitaria sobre el emprendimiento en proyectos empresariales de comunicación y periodismo”, pp. 91-100.
- Açkgöz, A., Günsel, A., Kuzey, C., and Zaim, H. (2016), “Team foresight in new product development projects”, *Group Decision and Negotiation*, Vol. 25 No. 2, pp. 289-323.
- Acock, A. C. (2013), “Discovering Structural Equation Modeling Using Stata”, *Stata Press books*. StataCorp LP. Available at: <https://ideas.repec.org/b/tsj/spbook/dsemus.html> (Accessed: 12 December 2021).
- Adam, A. M. (2020), “Sample Size Determination in Survey Research”, *Journal of Scientific Research and Reports*. Sciencedomain International, pp.90–97. doi: 10.9734/JSRR/2020/V26I530263.

- Adams, R., and Funk, P. (2012). "Beyond the glass ceiling: does gender matter?", *Managerial Science*, Vol. 58, pp.219-235.
- Adomako, S., Ahsan, M. (2022), "Entrepreneurial passion and SMEs' performance: Moderating effects of financial resource availability and resource flexibility", *Journal of Business Research*, Volume 144, pp. 122-135,
- Agnete Alsos, G., Ljunggren, E. and Hytti, U. (2013), "Gender and innovation: State of the art and a research agenda", *International Journal of Gender and Entrepreneurship*, *Emerald Group Publishing Limited*, Vol. 5 No. 3, pp. 236–256. doi: 10.1108/IJGE-06-2013- 0049/FULL/XML.
- Alsos, G. A., Ljunggren, E., and Hytti, U. (2013), "Gender and innovation: state of the art and a research agenda", *International Journal of Gender and Entrepreneurship*, Vol. 5 No. 3, pp. 236-256.
- Aranda, E., Martín, V.J., and Santos, J. (2021). *Analysis of Family Business from a gender perspective*, en Ho-Don Y. and Fu-Lai T.Y., *The Routledge Companion to Asian Family Business Governance, Succession, and Challenges in the Age of Digital Disruption*, Routledge.
- Armstrong, J. and Overton, T. S. (1977), "Estimating Nonresponse Bias in Mail Surveys", *Journal of Marketing Research*, Vol. 14 No. 3, pp.396–402.
- Attia, M., Yousfi, O., Loukil, N., and Abdelwahed Omri. A. (2020). Do directors' attributes influence innovation? Empirical evidence from France. *International Journal of Innovation Management*, World Scientific Publishing, pp.2150010-1-37.
- Azizi, M., Bidgoli, M. S., and Taheri, A. (2021). "The effect of ownership and management structure on family businesses performance", *Cogent Business & Management*, Vol. 8, No. 1, pp. 1-15.
- Barnes, R., and de-Villiers-Scheepers, M.J. (2017), "Tackling uncertainty for journalism graduates: A model for teaching experiential entrepreneurship", *Journalism Practice*, pp. 1-21. <https://doi.org/10.1080/17512786.2016.1266277>
- Bartik, A. W., Bertrand, M., Cullen, Z. B., Glaeser, E. L., Luca, M., and Stanton, C. T. (2020), "How are small businesses adjusting to COVID-19? Early evidence from a survey", (No. w26989). National Bureau of Economic Research.
- Beltrán, G.J., and Miguel, P. (2014). Doing culture, doing business: A new entrepreneurial spirit in the Argentine creative industries. *International Journal*
- Blake, M. K., and Hanson, S. (2005), "Rethinking Innovation: Context and Gender", *Environment and Planning A: Economy and Space*, Vol. 37 No. 4, pp. 681–701. <https://doi.org/10.1068/a3710>
- Brush, C., and Hisrich, R. (2000). *Women-owned businesses: An exploratory study comparing factors affecting performance*. Washington: Research Institute for Small and Emerging Business.
- Breusch, T. S., and Pagan, A.R. (1979), "A simple test for heteroscedasticity and random coefficient variation", *Econometrica*, Vol. 47, pp.1287–1294.
- Brinckmann, J. and Hoegl, M. (2011), "Effects of initial teamwork capability and initial relational capability on the development of new technology-based firms", *Strategic Entrepreneurship Journal*, Vol. 5, pp.37–57. doi: 10.1002/sej.106.
- Bullough, A., Guelich, U., Manolova, T.S., and Schjoedt, L. (2022). "Women's entrepreneurship and culture: gender role expectations and identities, societal culture, and the entrepreneurial environment". *Small Business Economics*, Vol. 58, No. 1, pp. 985–996.
- Calabrò, A., Vecchiarini, M., Gast, J., Campopiano, G., De Massis, A., & Kraus, S. (2019). Innovation in family firms: A systematic literature review and guidance for future research. *International journal of management reviews*, 21(3), 317-355.
- Calabrò, A., Frank, H., Minichilli, A., & Suess-Reyes, J. (2021). Business families in times of crises: The backbone of family firm resilience and continuity. *Journal of Family Business Strategy*, 12(2), 100442.
- Cameron, A., and Trivedi, P.K. (1990), "The Information Matrix Test and Its Implied Alternative Hypotheses", California Davis - Institute of Governmental Affairs. Available at: <https://econpapers.repec.org/RePEc:fth:caldav:372> (Accessed: 12 December 2021).
- Camisón-Haba, S., Clemente-Almendros, J. A. and Gonzalez-Cruz, T. (2019), "How technology-based firms become also highly innovative firms? The role of knowledge, technological and managerial capabilities, and entrepreneurs' background", *Journal of Innovation and Knowledge*, Vol. 4 No. 3, pp.162–170. doi: 10.1016/J.JIK.2018.12.001.
- Campopiano, G., De Massis, A., Rinaldi, F.R., and Sciascia, S., (2017). Women's involvement in family firms: Progress and challenges for future research. *Journal of Family Business Strategy*, 8(4), 200-212.
- Chen, J., Leung, W. S., and Evans, K. P. (2018), "Female board representation, corporate innovation, and firm performance", *Journal of Empirical Finance*, Vol. 48, pp. 236–254. <https://doi.org/10.1016/j.jempfin.2018.07.003>
- Chandler, G. N., Keller, C., and Lyon, D. W. (2000), "Unraveling the Determinants and Consequences of an Innovation-Supportive Organizational Culture", *Entrepreneurship Theory and Practice*, Vol. 25 No. 1, pp. 59–76. <https://doi.org/10.1177/104225870002500106>
- Chrisman, J., Chua, J., De Massis, A., Minola, T. and Vismara, S. (2016). "Management processes and strategy execution in family firms: from 'what' to 'how'". *Small Business Economics*, Vol. 47 No. 3, pp. 719-734.
- Chrisman, J.J., Chua, J.H., and Steier, L. (2005). Sources and consequences of distinctive familiness: an introduction. *Entrepreneurship Theory and Practice*, Vol. 29, No. 3, pp. 237–247.

- Chua, J. H., Chrisman, J. J. and Steier, L. P. (2003), "Extending the Theoretical Horizons of Family Business Research", *Entrepreneurship Theory and Practice*, Vol. 27 No. 4, pp.331–338. doi: 10.1111/1540-8520.00012.
- Clemente-Almendros, J.A., González-González, I., Cerdá-Suárez, L.M., Seguí-Amórtégui, L.A., Perán-López, J. And Blanco-Hernández, M. (2021). Estudio de la PYME 2021. La pequeña y mediana empresa en La Rioja ante la crisis de la COVID-19: Análisis comparativo con España. Editorial ESIC.
- Clemente-Almendros, J.A., González-González, I., Cerdá-Suárez, L.M. and Seguí-Amórtégui, L.A. (2023), «Understanding the relevance of family business, gender and value chains for SMEs» innovation in the context of COVID-19», *International Journal of Entrepreneurial Behavior & Research*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/IJEBR-12-2021-1028>.
- Clemente-Almendros, J.A. and González-Cruz, T. (2023), «Family involvement and proactive tax management behaviour in private family SMEs», *International Journal of Entrepreneurial Behavior & Research*, Vol. 29 No. 1, pp. 218-244. <https://doi.org/10.1108/IJE-BR-01-2022-0021>
- Colombo, M. G., Delmastro, M. and Grilli, L. (2004), "Entrepreneurs' human capital and the start-up size of new technology-based firms", *International Journal of Industrial Organization*, Vol. 22 No. 8, pp.1183–1211. doi: 10.1016/J.IJINDORG.2004.06.006.
- Croson, R., and Gneezy, U. (2009), "Gender differences in preferences", *Journal of Economic Literature*, Vol. 47 No. 2, pp. 448-74.
- Dawson, C., and Henley, A. (2015), "Gender, risk, and venture creation intentions", *Journal of Small Business Management*, Vol. 53 No. 2, pp. 501-515.
- De Massis, A., Frattini, F. and Lichtenthaler, U. (2015), "Research on Technological Innovation in Family Firms: Present Debates and Future Directions", *Family Business Review*, Vol. 26 No. 1, pp. 10-31.
- De Massis, A., Kotlar, J., Campopiano, G. and Cassia, L. (2015). "The impact of family involvement on SMEs' performance: theory and evidence", *Journal of Small Business Management*, Vol. 53 No. 4, pp. 924-948.
- Deshpande, S.P.; Golhard, D. (1994): "HRM Practice in Large and Small Manufacturing Firms: A Comparative Study", *Journal of Small Business Management*, Vol. 32 No. 2, pp. 49-56.
- Dezsö, C. L., and Ross, D. G. (2012), "Does female representation in top management improve firm performance? A panel data investigation", *Strategic Management Journal*, Vol. 33 No. 9, pp. 1072–1089. <https://doi.org/10.1002/smj.1955>
- Diaz-Moriana, V., Clinton, E., Kammerlander, N., Lumpkin, G. T., and Craig, J. B. (2020), "Innovation motives in family firms: A trans-generational view", *Entrepreneurship theory and practice*, Vol. 44 No. 2, pp. 256-287.
- Dohse, D., Goel, R. K., and Nelson, M. A. (2019), "Female owners versus female managers: Who is better at introducing innovations?", *The Journal of Technology Transfer*, Vol. 44 No. 2, pp. 520–539. <https://doi.org/10.1007/s10961-018-9679-z>
- Duran, P., Kammerlander, N., Van Essen, M., and Zellweger, T. (2016), "Doing more with less: Innovation input and output in family firms", *Academy of Management Journal*, Vol. 59 No. 4, pp. 1224-1264.
- Expósito, A., Sanchis-Llopis, A., and Sanchis-Llopis, J. A. (2021), "CEO gender and SMEs innovativeness: evidence for Spanish businesses", *International Entrepreneurship and Management Journal*, 1-38.
- Freel, M. S. (2003), "Paper and Book Reviews", *International Small Business Journal*, Vol. 21 No. 4, pp. 487–489. <https://doi.org/10.1177/02662426030214009>
- Fries, A., Kammerlander, N., & Leitterstorf, M. (2021). Leadership styles and leadership behaviors in family firms: A systematic literature review. *Journal of Family Business Strategy*, 12(1), 100374.
- Gálvez Muñoz, L., and Rodríguez Modroño, P. (2013), "La desigualdad de género en las crisis económicas", *Investigaciones Feministas*, Vol. 2, pp. 113-132.
- Gadanne, D. (1998). Critical Success Factors for Small Business: An Inter-industry Comparison. *International Small Business Journal*, 17(1), 36–56. <https://doi.org/10.1177/0266242698171002>
- García, E. A., Cerdeño, V. J. M., and del Cerro, J. S. (2021), "Importancia económica de la empresa familiar. Una aproximación desde la política económica", *International Review of Economic Policy-Revista Internacional de Política Económica*, Vol. 3 No. 1, pp. 99-118.
- Gómez, J. D. L., Utrilla, P. N. C., De Massis, A., and Kotlar, J. (2019), "Innovation in family firms: bridging the theory-practice gap", *European Journal of Family Business*, Vol. 9 No. 2, pp. 65-69.
- Gómez, J. D. L., and Utrilla, P. N. C. (2012), "Inercia e innovación en la empresa familiar: una primera aproximación", *European Journal of Family Business*, Vol. 2 No. 2, pp. 23-40
- Gómez-Mejia, L. R., Larraza-Kintana, M., and Makri, M. (2003), "The determinants of executive compensation in family-controlled public corporations", *Academy of Management Journal*, Vol. 46 No. 2, pp. 226-237.
- Gómez, J. D. L., Utrilla, P. N. C., De Massis, A., and Kotlar, J. (2019), "Innovation in family firms: bridging the theory-practice gap", *European Journal of Family Business*, Vol. 9 No. 2, pp. 65-69.
- Habbershon, T. and Williams, M. (1999). "A resource-based framework for assessing the strategic advantage of family firms". *Family Business Review*, Vol. 12, No. 1, pp. 1–25.
- Hayes, A.F. (2013). *Introduction to Mediation, Moderation and Conditional Process Analysis*. The Guilford Press, New York, NY.

- Hayes, A. F. (2018a), *Introduction to mediation, moderation, and conditional process analysis: A regression-based perspective* (2nd ed.). New York, NY: The Guilford Press.
- Hayes, A. F. (2018b), “Partial, conditional, and moderated mediation: Quantification, inference, and interpretation”, *Communication Monographs*, Vol. 85 No. 1, pp.4-40.
- Hoffman, K., Parejo, M., Bessant, J., and Perren, L. (1998), “Small firms, R&D, technology and innovation in the UK: a literature review”, *Technovation*, Vol. 18 No. 1, pp. 39-55.
- Hornsby, J.S. and Kuratko, D.F. (2003), “Human resource management in US small businesses: A replication and extension”, *Journal of developmental entrepreneurship*, Vol. 8 No. 1, pp.73-92.
- Instituto Nacional de Estadística (INE: 2020, January, 1), Notas de prensa: Estructura y dinamismo del tejido empresarial en España - Directorio Central de Empresas (DIRCE) a 1 de enero de 2020. [press release]. Retrieved from: https://www.ine.es/prensa/dirce_2020.pdf
- Instituto Nacional de Estadística (INE: 2022, March, 22), Notas de prensa: Estructura y dinamismo del tejido empresarial en España - Directorio Central de Empresas (DIRCE) a 1 de enero de 2022. [press release]. Retrieved from: https://www.ine.es/prensa/dirce_2022.pdf
- Jarque, C. M. and Bera, A. K. (1987), “A Test for Normality of Observations and Regression Residuals”, *International Statistical Review*, Vol. 55 No. 2, p.p.163. doi: 10.2307/1403192.
- Ripoll, F. S., and Hervás-Oliver, J. L. (2011), “¿Qué explica la innovación en PyMEs?”, *Dirección y Organización*, Vol. 43, 5-15.
- Jiménez-Zarco, A. I., Clemente-Almendros, J.A., González-González, I., and Aracil-Jordá, J. (2021), “Female Micro-Entrepreneurs and Social Networks: Diagnostic Analysis of the Influence of Social-Media Marketing Strategies on Brand Financial Performance”, *Frontiers in Psychology*, Vol. 12. doi: 10.3389/FPSYG.2021.630058/BIBTEX.
- Kang, H., Cheng, M., and Gray, S. J. (2007), “Corporate governance and board composition: Diversity and independence of Australian boards”, *Corporate Governance*, Vol. 15 No. 2, pp. 194–207. <http://doi.org/10.1111/j.1467-8683.2007.00554.x>
- Kantar (2021). COVID-19 Barometer. Available at <https://www.kantar.com/campaigns/Covid-19-Barometer>
- Kim, J. (2020), “Decision-Theoretic Hypothesis Testing: A Primer With R Package OptSig”, *The American Statistician*, Vol. 74 No. 4, pp.370–379. doi: 10.1080/00031305.2020.1750484.
- König, A., Kammerlander, N., and Enders, A. (2013), “The family innovator’s dilemma: How family influence affects the adoption of discontinuous technologies by incumbent firms”, *Academy of Management Review*, Vol. 38 No. 3, pp. 418-441.
- Kvidall, T. and Ljunggren, E. (2012), “Implementing a gender perspective in an innovation programme: More innovation or ambivalence an uncertainty?”, in S. Andersson, K. Berglund, E. Gunnarsson and E. Sundin (eds). *Promoting Innovation Policies, Practices and Procedures*, Stockholm: Vinnova, pp. 111-130.
- Laufs, K., Bembom, M., and Schwens, C. (2016), “CEO characteristics and SME foreign market entry mode choice: The moderating effect of firm’s geographic experience and host-country political risk”, *International Marketing Review*, Vol. 33 No. 2, pp.246-275.
- LeBlanc, L. J., Nash, R., Gallagher, D., Gonda, K., and Kakizaki, F. (1997), “A comparison of US and Japanese technology management and innovation”, *International Journal of Technology Management*, Vol 13 No. 5, pp. 601-614.
- Le Breton-Miller, I., Miller, D., Lester, R.H. (2011), “Stewardship or Agency? A Social Embeddedness Reconciliation of Conduct and Performance in Public Family Businesses”, *Organization Science*, Vol. 22 No. 3, pp.704–721. doi: 10.1287/ORSC.1100.0541.
- Marvel, M. R., Lee, I. H. I. and Wolfe, M. T. (2015), “Entrepreneur Gender and Firm Innovation Activity: A Multilevel Perspective”, *Business, Computer Science*. Institute of Electrical and Electronics Engineers Inc., Vol. 62 No. 4, pp. 558–567. doi:10.1109/TEM.2015.2454993.
- Lawson, B. and Samson, D. (2001) “Developing innovation capability in organizations: a dynamic capabilities approach”. *International Journal of Innovation Management*, Vol. 5, No. 63, pp. 377–400.
- Le Breton-Miller, I., Miller, D., and Lester, H. (2011), “Stewardship or Agency? A social embeddedness reconciliation of conduct and performance in public family businesses”, *Organization Science*, Vol. 22 No. 3, pp. 704-721.
- Lim, S., and Enrick, B. R. (2011), “Gender and entrepreneurial orientation: A multi-country study”, *International Entrepreneurship and Management Journal*, Vol. 7, pp. 1-18.
- Lorenzo, R., Voigt, N., Tsusaka, M., Krentz, M., and Abouzahr, K. (2018), “How diverse leadership teams boost innovation”, *Boston Consulting Group*, 23.
- McKinley, W., Latham, S., and Braun, M. (2014), “Organizational decline and innovation: Turnarounds and downward spirals”, *Academy of Management Review*, Vol. 39 No. 1, pp. 88-110.
- Marlow, S., Carter, S., and Shaw, E. (2008), “Constructing female entrepreneurship policy in the UK: Is the US a relevant benchmark?”, *Environment and Planning: Government and Policy*, Vol. 26 No. 2, pp. 335-351.
- Maseda, A., Iturralde, T., Coopers, S., and Aparicio, G. (2022). Mapping women’s involvement in family firms: a review based on bibliographic coupling analysis. *International Journal of Management Review*, 24(2), 279-305.

- Massa, S., and Testa, S. (2008), "Innovation and SMEs: Misaligned perspectives and goals among entrepreneurs, academics, and policy makers", *Technovation*, Vol. 28, pp. 393–407.
- Milliken, F. J., and Martins, L. L. (1996), "Searching for common threads: Understanding the multiple effects of diversity in organizational groups", *Academy of management review*, Vol. 21 No. 2, pp. 402-433.
- Minichilli, A., Brogi, M. and Calabro, A. (2016), "Weathering the storm: family ownership, governance, and performance through the financial and economic crisis", *Corporate Governance: An International Review*, Vol. 24 No. 6, pp. 552-568.
- Mitchell, M. N. (2012). *Interpreting and visualizing regression models using Stata*. Stata Press
- Molina, J.A. (2020), "Family and Entrepreneurship: New Empirical and Theoretical Results", *Journal of Family and Economic Issues*, Vol. 41, pp. 1–3. <https://doi.org/10.1007/s10834-020-09667-y>
- Muñoz, R. T., and Graña, C. P. (2016), "The effects of gender on the quality of university patents and public research centres in Andalusia: Is it better with a female presence?", *Economics and Sociology*, Vol. 9 No. 1, pp. 220–236. <https://doi.org/10.14254/2071-789X.2016/9-1/15>.
- Na, K., and Shin, K. (2019), "The gender effect on a firm's innovative activities in the emerging economies", *Sustainability*, Vol. 11 No. 7, 1992
- Navarro Garay, A. E. L., Paredes Romero, K., Romero, M. C., and Vázquez Noguera, S. (2021), "Contribución de la formación universitaria para desarrollo del emprendimiento", *Revista Tecnológica - ES-POL*, Vol. 33 No. 3, pp. 12–22. <https://doi.org/10.37815/rte.v33n3.887>
- Navarro-Caballero, M., Hernández-Fernández, L., Navarro-Manotas, E., and Hernández Chacín, J. (2020), "Innovación en las micro, pequeñas y medianas empresa familiares del sector manufacturero del Atlántico-Colombia", *Revista de Ciencias Sociales*, Vol. 26 No. 4.
- Nguyen, M.-H., Nguyen, H.T.T., Le, T.-T., Luong, A.-P., and Vuong, Q.-H. (2022), "Gender issues in family business research: A bibliometric scoping review", *Journal of Asian Business and Economic Studies*, Vol. 29 No. 3, pp. 166-188.
- OECD, and Eurostat. (2005). *Oslo manual: Guidelines for collecting and interpreting innovation data (3rd ed.)*. Paris: Organisation for Economic Cooperation and Development, Statistical Office of the European Communities.
- Oerlemans, L. A., Meeus, M. T., and Boekema, F. W. (1998), "Do networks matter for innovation? The usefulness of the economic network approach in analysing innovation", *Tijdschrift voor economische en sociale geografie*, Vol. 89 No. 3, pp. 298-309.
- Oertelt-Prigione, S. (2020). *The impact of sex and gender in the COVID-19 pandemic*. European Union.
- Odehnalova, P. and Pirozek, P. (2018). "Corporate board composition in family businesses: Evidence from the Czech Republic". *Management – Journal of Contemporary Management Issues*, Vol. 23, pp.155–173.
- O'Regan, N. and Sims, M. A. (2008), "Identifying high technology small firms: A sectoral analysis", *Technovation*, Vol 28, pp.408–423. doi: 10.1016/j.technovation.2008.02.010.
- Palmer, A., Koenig-Lewis, N., and Asaad, Y. (2019), "Brand identification in higher education: A conditional process analysis", *Journal of Business Research*, Vol. 69, pp.3033–3040.
- Paniagua-Rojano, F.J., Gomez-Aguilar, M., and Gonzalez-Cortés, M.E. (2014), "Incentivar el emprendimiento periodístico desde la Universidad", *Revista Latina de Comunicación Social*, Vol. 69, pp. 548-570. <https://doi.org/10.4185/RLCS-2014-1024>
- Paredes Hernández, S. P., Leal, M. C., and Saavedra García, M. L. (2019), "Factores que influyen en el emprendimiento femenino en México", *Suma de Negocios*, Vol. 10 No. 23, pp. 158-167.
- Pérez-Luño, A., Bojica, A. and Golapakrishnan, S. (2018), "The role of cross-functional integration, knowledge complexity and product innovation in firm performance", *International Journal of Operations and Production Management*, Vol. 39 No. 1, pp.94-115.
- Podsakoff, P.M., MacKenzie, S.B. and Lee, J.Y. (2003), "Common method biases in behavioral research: a critical review of the literature and recommended remedies", *Journal of Applied Psychology*, Vol. 88 No. 5, pp.879-903.
- Podsakoff, P. M., and Organ, D. W. (1986), "Self-Reports in Organizational Research: Problems and Prospects", *Journal of Management*, Vol. 12 No.4, pp. 531-544.
- Raykov T., and Marcoulides G. (2008), *An Introduction to Applied Multivariate Analysis*. New York: Routledge. pp. 265.
- Renko, M., Shrader, R.C., Simon, M. (2012), "Perception of entrepreneurial opportunity: a general framework", *Management Decision*, Vol. 50 No. 7, pp. 1233-1251
- Ryan, M., and Haslam, S. (2005), "The Glass Cliff: Evidence that Women are Over-Represented in Precarious Leadership Positions", *British Journal of Management*, 16. 81 - 90. [10.1111/j.1467-8551.2005.00433.x](https://doi.org/10.1111/j.1467-8551.2005.00433.x)
- Robledo, S., Osorio, G., and Lopez, C. (2014), "Networking en pequeña empresa: una revisión bibliográfica utilizando la teoría de grafos", *Revista vínculos*, Vol. 11, No. 2, pp. 6-16.
- Romero, I., and Martínez-Román, J. A. (2012), "Self-employment and innovation. Exploring the determinants of innovative behavior in small businesses", *Research Policy*, Vol. No. 1, pp. 178-189.

- Runyan, R. C., Huddleston, P., and Swinney, J. (2006), "Entrepreneurial Orientation and social capital as small firm strategies: A study of gender differences from a resource-based view", *International Entrepreneurship and Management Journal*, Vol. 2 No. 4, pp. 455-477.
- Saemundsson, R. and Dahlstrand, Å. L. (2005), "How Business Opportunities Constrain Young Technology-Based Firms from Growing into Medium-Sized Firms", *Small Business Economics*, Vol. 24 No. 2, pp.113-129. doi: 10.1007/S11187-003-3803-6.
- Salganicoff, M. (1990), "Women in Family Businesses: Challenges and Opportunities", *Family Business Review*, Vol. 3 No. 2, pp. 125-137. doi: 10.1111/J.1741-6248.1990.00125.X.
- Salvato, C., Sargiacomo, M., Amore, M. D., & Minichilli, A. (2020). Natural disasters as a source of entrepreneurial opportunity: Family business resilience after an earthquake. *Strategic Entrepreneurship Journal*, 14(4), 594-615.
- Sánchez-Marín, G., Portillo-Navarro, M. J., and Clavel, J. G. (2016), "The influence of family involvement on tax aggressiveness of family firms", *Journal of Family Business Management*, Vol. 6 No. 2, pp. 143-168.
- Scott, B. A., and Barnes, C. M. (2011), "A multilevel field investigation of emotional labor, affect, work withdrawal, and gender", *Academy of management journal*, Vol. 54 No. 1, pp. 116-136.
- Sharma, P., Chrisman, J. J. and Chua, J. H. (1997), "Strategic Management of the Family Business: Past Research and Future Challenges", *Family Business Review*, Vol. 10 No. 1, pp.1-35.
- Sirmon, D. And Hitt, M. A.(2003), "Managing resources: Linking unique resources, management, and wealth creation in family firms", *Entrepreneurship Theory and Practice*, Vol. 27 No. 4, pp. 339-358.
- Strawser, J. A., Hechavarría, D. M., and Passerini, K. (2021), "Gender and entrepreneurship: Research frameworks, barriers and opportunities for women entrepreneurship worldwide", *Journal of Small Business Management*, Vol. 59, No. 1, pp. S1-S15.
- Tanner, E.C. and Su, L. (2019), "Reducing perceived vulnerability to increase utilization of nonprofit services", *Journal of Services Marketing*, Vol. 33 No.3, pp. 344-355.
- Tagg, S., and Wilson, F. (2011), "Construing business owners: Are men and women really different?", *International Journal of Gender and Entrepreneurship*, Vol. 2 No. 1.
- Terrón Ibáñez, S., Gómez-Miranda, M. E., Miras Rodríguez, M. del M., and Rodríguez Ariza, L. (2019). "Economic and Financial Snapshot of small spanish family firms". *Revista de Contabilidad - Spanish Accounting Review*, Vol. 22, No. 1, pp. 21-31.
- Torchia, M. T., Calabro, A., and Huse, M. (2011), "Women directors on corporate boards: From tokenism to critical mass", *Journal of Business Ethics*, Vol. 102 No. 2, pp. 299-317.
- Van Gils, A. (2005), "Management and governance in Dutch SMEs", *European Management Journal*, Vol. 23 No. 5, pp. 583-589.
- Waltz C., Strikland O., and Lenz E. (2010), *Measurement in Nursing and Health Research*. 4th Ed. New York: Springer Publishing Company.
- Watson, J., and Robinson, S. (2003), "Adjusting for risk in comparing the performances of male-and female-controlled SMEs", *Journal of Business Venturing*, Vol. 18 No. 6, pp. 773-788.
- Weber, P. C., and Geneste, L. (2014). *Exploring gender-related perceptions of SMEsuccess*. International Journal of Gender and Entrepreneurship.
- Wei, W., Qi, R., and Zhang, L. (2019), "Effects of virtual reality on theme park visitors' experience and behaviors: A presence perspective", *Tourism Management*, Vol. 71, pp.282-293.
- Wenzel, M., Stanske, S., and Lieberman, M. B. (2020), "Strategic responses to crisis", *Strategic Management Journal*, Vol. 41, pp. 7-18.
- Westhead, P. and Cowling, M. (1998), "Family Firm Research: The Need for a Methodological Rethink", *Entrepreneurship Theory and Practice*, Vol. 23 No. (1), pp. 31-56. doi: 10.1177/104225879802300102.
- Wilson, F., Kickul, J., and Marlino, D. (2007), "Gender, entrepreneurial self-efficacy, and entrepreneurial career intentions: Implications for entrepreneurship education", *Entrepreneurship: Theory and Practice*, Vol. 31 No. 3, pp. 387-406. <https://doi.org/10.1111/j.1540-6520.2007.00179.x>
- Yan, H. D., and Yu, F. L. T. (2021). *Comparative Studies*. In The Routledge Companion to Asian Family Business (pp. 151-233). Routledge.
- Zeb, A., and Ihsan, A. (2020, March). *Innovation and the entrepreneurial performance in women-owned small and medium-sized enterprises in Pakistan*. In Women's Studies International Forum (Vol. 79, p. 102342). Pergamon.

