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Addressing singularities of Family Business performance under the lenses of Innovation and Internationalization

Singularidades do desempenho de Empresas Familiares sob a perspectiva de Inovação e Internacionalização

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palavras-chave   Empresas-Familiares, Inovação, Internacionalização

resumo   A presente dissertação tem como objetivo fulcral a análise da relação entre inovação e internacionalização em empresas-familiares. Devido à natureza singular deste tipo de negócios, os seus processos de inovação e internacionalização caracterizam-se como sendo distintos dos restantes. Devido a uma escassez de literatura relativamente à relação biunívoca destes conceitos é pertinente a realização de um estudo empírico tendo como referência a indústria da manufatura em Portugal.

Obteve-se uma amostra em painel que se reparte em 41347 empresas familiares e 23720 empresas não familiares, observadas no período entre 2014 e 2017 e utilizando uma estimação em painel Pooled.

Os resultados obtidos evidenciam uma evolução positiva na componente inovativa e internacional presente em empresas-familiares; embora exista uma maior restrição de orçamento, estas têm uma grande rentabilidade e eficácia nos seus desenvolvimentos e procedimentos validando a literatura existente no contexto Português.

keywords   Family-Firms, Innovation, Internationalization.

abstract   The main purpose of this dissertation is to explore and analyse the relationship between innovation and internationalization in family firms. Due to the individual character of this type of business, the processes of innovation and internationalization are depicted as being unique to the rest.
To appraise the research, question the analysis was broken down into four parts: first of all, understanding the role of capital ownership in firms towards innovative and internationalisation attitudes. Secondly, understanding singularities of determinants to innovate in either family and non-family businesses, the same procedure was implemented for internationalisation and finally, appraising the self-reinforcement of the two vectors.
As a result of shortage of literature regarding the biunivocal relation of these concepts it is pertinent to carry out an empirical study taking into account the Portuguese manufacturing industry. based on a panel sample of 41347 family-firms and 23720 non family-firms, in the period between 2014 and 2017.
The results provided evidence on positive connection between innovation and internationalization efforts in family owned businesses, although having a greater budget constraint they have a great profitability and effectiveness in their developments and procedures validating the existing literature, and shedding some light to the Portuguese context.

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List of Acronyms

CAE Classificação de Atividade Económica

D/E RATIO Debt to equity ratio

EU European Union

FF Family Firm

INE Instituto Nacional de Estatítica

NFF Non-Family-Firm

ROA Return on Assets

ROE Return on Equity

R&D Research and Development

SABI Analysis System of Iberian Balance Sheets

SEW Socio-emotional Wealth

SME Small and Medium Sized Enterprises

Introduction

Family Businesses are of a vital nature in the contribution to the economy stability they offer in the long run, making them a valuable asset for the economic development of a region and country (European Commission, 2009).

Most of the studies in this field presented tend to focus on noticeable firms, eventually case studies that have great commercial power, oddly enough, or not, these companies only represent a small percentage in the economic markets.

Family-Firm´s, hence forth FF`s, are the most abundant form of business and they are considered crucial for the economic progress and sustainability (Anderson & Reeb, 2003). According to the European Commission, (2009) FF`s account for 60% of all companies in Europe. This fact establishes family businesses as an excellent source of regional and national employability and economic sustainability, smoothing adverse faces of the business cycle.

The influence of family ownership over firm performance has been a controversial topic among economists during the decade (Anderson & Reeb, 2003). These firms are singular in the way they operate, which is replicated in their internationalization and innovation attitude.

Different author´s tend to have different views concerning FF`s in their operations, for some, this type of organizations is unwilling to invest in new missions due to sceptical views towards new challenges (Eddleston et al., 2001); others consider family ownership may lead to a more innovative and aggressive business strategy (Gómez-Mejía et al., 2007)

The internationalization process is in general beneficial for firms in the long run specially for due to their long-term survival strategy FF`s (Gallo & Sveen, 1991). This practise provides competitive advantages such as the expansion to new markets, economies of scale and a greater diversification of inputs to production (Gallo & Sveen, 1991). The internationalization process demands flexibility from the firms an adaptation, in the instance of FF`s there is a greater need to change their hierarchical structure in order to be competitive in the new markets (Gallo & Sveen, 1991).

Another element that consolidates the process of internationalization in FF`s is their long-term commitment; FF lean to have continuity in their business strategies instead of perishable profits and interests (Gallo & Sveen, 1991).

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The economic performance of a company is improved in the presence of a higher participation in international markets (Johanson & Vahlne, 1977). International presence promotes business operations and opens up new possibilities such as economies of scale, nonetheless when deciding to internationalize they are exposed to greater and tougher competition than local agents, so they have to create new solutions in order to counter this effect (Kafourus, 2008).

The ability to innovate depends on the skills and absorptive capacity of the firm, technological gains, innovation efficiency, and recognition of external opportunities fuels and empowers commercial application of products and services (Cohen et al, 1990; Dosi, 1988).

Innovation performance, inside the firm hinges on many components; according to Kafourus (2008), one of the most important is the external source of information, which leads to the redesign in of innovation and internationalization of the firm structure.

This dissertation aims to analyse the influence that family ownership has on the internationalization and innovation processes, there's a gap in the literature regarding the interrelation of these processes, in the sense that they are distinct in non-family businesses. Thus, through the accomplishment of the present work we aim to analyse if the innovation and internationalization performances are different among family-businesses and non-family businesses.

The work is divided into six chapters: literature review, innovation in FF`s, internationalization in FF`s, relationship between innovation and internationalization in FF`s, data and methodology and results and conclusions.

So, the document is organized as follows: the first chapter is the literature review, in this section it's made an introduction to the concept of FF`s and all the inherent characteristics such as their capital structures, economic perspectives, value creation and economic competitiveness. The second chapter focuses on the innovation in FF`s according to theories present in the literature such as Agency Theory, Stewardship Theory, Resource-Based Theory and Behavioural Agency Model it is possible to obtain an overview on the innovation characteristics in FF`s. The third chapter focuses on the internationalization in FF`s, through an overview of the theories present in the internationalization process as well as an overview regarding the heterogeneity present in FF`s. The fourth chapter reports the relationship between innovation and internationalization. In the fifth chapter "Data and Methodology", there

is a description of the data present in the study as well as the presentation of the methodology used in the research, there is a description of all the variables.

Finally, chapter 6 reports the results discovered in the study as well as a discussion regarding the findings. Summarization of conclusions and limitations of the study along with policy mixes are proposed.

Synopsis

Purpose

The objective of this work is to identify the elements that differentiate the family firms from the others. The central theme focuses on their innovation and internationalization methods however it is also relevant to analyse and study all the business nuances that distinguish them. The present work tries to explore the innovation and internationalization performances in Family-Businesses.

Thus, having a direct comparison with non-family firms , we can obtain evidences of the differences between these types of companies in Portugal regarding their innovation and internationalization performance.

Methodology

For the creation of the present study we made a database for family and non-family businesses inserted in the Portuguese manufacturing industry according to the CAE REV sec.C for the period of 2014, 2015, 2016 and 2017. The results were obtained by the creation of a random panel data allowing to observe the correlations and relationships between the variables.

Research Limitations

There is a lack of available data regarding innovation and internationalization in Portuguese firms making it challenging to study more deeply about family businesses. However, the results obtained in the present study are in line with the current literature.

Originality/ Value

Although there are many studies focused on the topic of family businesses the theme of the relationship between innovation and internationalization becomes an important element of empirical study. Thus, taking into account the context of Portugal, we created a study that tries to highlight the particularities of family businesses and how they develop their processes of internationalization and innovation with a different approach regarding non-family businesses.

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1. Literature Review

1.1. Management in family businesses

There is a general acceptance that in order to define a company as an FF it must combine three elements: family, business and ownership. This model (Figure 1) named "three-Circle model of family businesses" was proposed by Davis & Tagiuri, (1982).

Figure 1. *The "3 Circle Model" in Family Businesses*
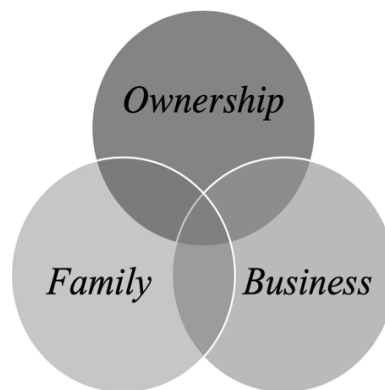
Source: *Adapted from Davis & Tagiuri (1982)*

These three components explain how family members make decisions and improve strategies to meet the goals of each subsystem, the entire family or organization (Davis & Tagiuri 1991). The long-term success of FF`s rests on the mutual effectiveness's capacity of interaction among each of these groups.

The diversity of FF`s and the innumerable perspectives associated with its definition remains in a vague and unclear FF concept  (Eddleston et al., 2012). Generally, the concept of FF`s reflects the type of research being carried out, for example a financial researcher is going to adjust his concept to the elements of management (Perri & Peruffo, 2017).

However, there are two divergent theoretical definitions accepted in the academic community. The first is according to the components-of-involvement approach (Siebels & Knyphausen-aufseß, 2012).This approach defines FF`s s by the percentage of shares held by family members, depending on the geographical criteria differs in their identification, for example in the European Union for a company to be considered Family Businesse 25% of its shareholders must belong to family-members

and one or more members must be in the administration of the firm (European Commission, 2009).

The second relates to the essence approach model (Eddleston et al., 2012): This characterization is more restrictive, and a business can be considered as family business in the presence of family involvement in specific orientations of the company, such as the authority in business strategy, family involvement and emotional attachment (Chua et al., 1999). In terms of comparison, this definition specifies in a better way the divergent characteristics present in FF`s. Both definitions are vague and incomplete, so the best option is to accept the best elements of both.

FF`s are companies oriented towards the creation of income and profits in the same vein as non-family businesses, however due to their singularities of property the family-owned businesses have other goals such as the reinforcement of their family assets and legacy.

The family involvement inside an organization can establish its business trajectory. The presence of one or a few family members in the administration of the firm there may be management failures, and poor quality in the decision-making method (Kellermanns et al., 2004). Contrariwise, in the presence of a large number of family members in the firm's management leads to agency conflicts and disagreements among the family members (Dyer, 2006). One of the peculiar characteristics of FF`s is that there is a restriction in the amount of people within the family inside the management and decision making committee, following stewardship theory (Davis, 1997) including family members in the firm's management can lead to a healthier understanding for the family of the future of the company and what elements can be corrected in order to enhance the business's performance (Kellermanns et al., 2004). Thus, FF`s that inspirits family members to take part in business management have benefits such as the growth of psychological/emotional ownership amongst family members, thus increasing the corporate responsibility and commitment of family members with the company (Kellermanns et al, 2012) .

1.2. Capital Structure and Family Ownership

The company ownership structure has a strong impact on its strategies, decisions and business direction. Thus, one of the fundamental roles of a manager is

to fit governance decisions to the nature of the company in which they are inserted, in order to maximize the firm performance and profit.

Much of the literature is based on two theories: the pecking order theory and the trade-off theory. The pecking order theory (Myers, 1984) designates that firms can fulfil their finance through internal financing.

In the first phase of financing, companies use first internal finance and followed by external financing if they wish. The most profitable companies resort less frequently to external financing since they have greater self-financing capacity.

The trade-off theory (Brennan & Schwartz, 1978) predicts that firms choose the best capital structure in order to balance the fiscal benefits of debt and the costs of financial hardship.

In the FF`s context the pecking order approach presents a better (Gottardo & Moisello, 2014) due to costs generated by information asymmetries which more severe for this type of business (Bacci et al., 2017).

Property ownership is directly linked to the capital structure (Croci et al., 2011) since it is essential in the development of the activities that differentiate the company. FF`s try to avoid debt financing, generally having an aversion to their debt, which outcomes in a less leveraged capital structure (Mishra & Mcconaughy, 1999), there is a direct threat to FF`s when they are in the presence of a highly leveraged capital structure since this affects family control, shifting decision making judgement to external investors, which may increase the risk of bankruptcy (Anderson & Reeb, 2003). If internal financing simplifies the process of maintaining power within families, dismissing external elements may have a negative influence on the business (Bacci et al., 2017). Thus, debt to equity is lower when there is a greater concentration of property within limited members of the family.

The capital structure has a direct impact not only on the management strategies but also on the innovation and internationalization strategies. Thus, according to Schumpeter (1942), innovation emerges as a competitive factor and a source of value creation, it can be described as the ability of a company to generate value by taking into account its accumulation and development of resource (Barney, 1991).

A company is nothing more than a set of resources and capabilities (Penrose, 1959), combining these resources and capabilities can lead the business to have a higher and more forceful competitive advantage over its market opposition.

Family businesses can be seen as an interaction between different individual elements and business (Sirmon & Hitt, 2003). One of the methods in which FF`s foster competitive skills is by means of the FF specific knowledge (Eddleston et al., 2012).

The most important feature that differentiates a FF as a distinctive entity with an singular behaviour is the theory of Socioemotional Wealth (SEW) (Gómez-Mejía et al., 2007). According to this theory family-owned firms make businesses evaluations according to the benchmarks of the company's dominant principles that determine and preserve the entity and accumulated value of the firm (Gómez-Mejía et al., 2007). In the case of family agents within the firm there is a great need to preserve the socioemotional wealth, so they foresee solutions to previously evaluate how the actions can affect the company. In case of a threat against these values, the family members are willing to make decisions, not always in an economic mindset, even if it means putting the firm at risk so that this endowment can be preserved. In sum, SEW magnetizes the values of affection that a family holds over the control of a company.

Nevertheless, SEW can decline and diminish the ability to gather entrepreneurial expectations. However, it can increase unique attributes for the company such as value creation. Contra, FF`s tend to amplify their investment in Research & Development in troubled times, in order to protect their wealth (Chrisman & Patel, 2012). Family influence and control are fundamental for a guiding line of goals and objectives within the company. The emotional side of the family can help the company to overcome the asymmetries of knowledge, making integration of new knowledge. However studies conducted by Martínez-Alonso et al., (2018) point to a negative relationship between R&D and SEW in the sense that in a presence of higher SEW the R&D processes are lower which leads us to consider that emotional constraints can have a negative impact on innovation processes.

1.3. Economic Competitiveness in Family Businesses

Family businesses are embedded in all industrial and economic sectors. Their existence in the economy is fundamental for its sustainability and growth, making them a wealth-enhancing engine. FF`s are the oldest and consequently the most enduring type of business this suggests their efficiency since it makes no sense to invest in an unprofitable form of business.

One of several ways of quantifying the economic value of a company is through their sales turnover, revenue, number of employees and capital structure. However, in the case of family-owned enterprises, there is another element that quantifies them differently in relation to NFF`s, the impact they have on a local socio-economic scenario. The true importance of a FF is highlighted through the social and economic contributions that these manage to make in the geographic area that are inserted. Each FF has a unique management model based on its own family values. In order to have a sustainable regional development, it is vital to have a constant maintenance of local family organizations

One issue that has been posed by the academic community regarding FF`s is the competitive skills they have in the development of their internationalization process.

A number of factors are present in the literature that are at a disadvantage for FF`s in their internationalization activities (Van Essen et al., 2017) : Failure to professionalize management (Chandler, 1990), failure to adopt new efficient management procedures (Bloom et al., 2006) and the persistence idea that this process affects SEW (Gomez-Mejia et al., 2011).

However, there is a unanimous consent that the relationships within FF`s strengthens the firm's position within its domestic market, that can result in a stagnation of the firms in their markets, rejecting the opportunity to export (Greve, 2005).

Nonetheless, there is other empirical research's that provide the opposite principle, FF`s have characteristics that can make them successful in non-domestic markets and support for their innovation projects which leads to a more competitive business model (Kammerlander et al., 2010).

Other empirical studies suggest that family ownership doesn´t affect the internationalization process, in the condition of the involvement of other external agents in the management process that can be an asset in the process (Kammerlander et al., 2010).

There is a propensity in family business to focus their competitive strategies in local market. Nevertheless, if a FF is heavily dependent on a single competitive strategy, it develops a source of inflexibility in relation to new strategies (Gallo & Sveen, 1991), which obstructs the internationalization process because of the

requirements to a new business model to become international and sell abroad (Abell, 1980).

The access to a new market requires the firm to relocate resources in order to achieve competitive advantage in international market (Gallo & Sveen, 1991).

2. Innovation in Family Firms

Entrepreneurial strategies are strongly connected to innovation and the adoption of singular original ideas.

The existing literature shows the existence of a positive connection between FF`s and innovation. Innovative companies are those who have strategic capabilities to assimilate new knowledge and ground-breaking practices that offer a competitive advantage in the face of the competition. These capacities are influenced by the organizational techniques put in place by the company (Werner et al., 2018).

Innovation appears in family businesses as being a vital feature in their economic growth and development. Innovation not only has a positive long-term aspect but is a differentiating element with respect to other businesses (Werner et al., 2018). The ability to innovate results in the inception of new goods, services and processes, which can become a mean to generate economic sustainability for the company. Even though, there is no opinion regarding the degree of innovation in FF`s as opposed to NFF`s (De Massis et al., 2013).

One characteristic that defines family-owned businesses in innovation is that they develop innovation projects incrementally and are less prone to acquire external ones (Werner et al., 2018).

Studies have shown that more competitive innovation firms are able to outperform their competitors in the market (Machin & Reenen, 1993). Perhaps this is the underlying reason behind the great investment by companies in new innovation projects.

Family involvement within an organization directly influences the awareness of innovation activities (Eddleston et al., 2012). There is evidence that in the search for SEW, companies can develop potential losses of control, which fosters collaborations with external partners (Gómez-Mejía et al., 2007). This can lead to acquiring marketing knowledge outside the company which can fluctuate when it comes to an FF versus NFF (De Massas et al., 2012).

The source of heterogeneity in family-firms arises from family governance that derives from the unification of ownership (Fama & Jensen, 1983). Family ownership has a straight impact on the company's direction and its strategic decisions (Gómez-Mejía et al., 2007). Family involvement within the company allows strategies and goals to be family -related being the role of the family role dominant coalition (Li & Daspit,

2016). The dominant coalition the group inside the firm that has influence and decision power allows the family to create competitive advantages through family involvement in the innovation strategy (Li & Daspit, 2016). However, when the company restricts its socio-emotional wealth internally, there is a restriction of funds in order to protect its internal wealth (Li & Daspit, 2016). This restriction becomes more serious when the dominant coalition is centred solely on members of the family which leads to a restriction of information and knowledge that confines resources and competences inside of the organization (Li & Daspit, 2016). This strategy has a positive impact on innovation of smaller magnitude, investment levels are lower due to risk-aversion which limits the various knowledge resources (Li & Daspit, 2016).

In order to preserve their socio-emotional wealth, FF`s favour to assume a short-term strategy (D. Miller & Le Breton-Miller, 2014), which outcomes lower levels of investment in R&D (Li & Daspit, 2016). Companies with a long-term approach consider innovation as a strategy of wealth preservation and recognize that underinvestment will increase the organization's long-term risk (Gomez-Mejia et al., 2014).

In FF`s there is a strong relationship of trust and altruism among members (Penney & Combs, 2013), these specific features improve the integration of resources and capabilities (Patel & Fiet, 2011). Despite these benefits when the knowledge is embedded within the organization due to the high family connection in the dominant coalition, access to external funds is more likely to be restricted (Li & Daspit, 2016).

In the presence of less family involvement in the dominant coalition and more restricted SEW, companies can be classified as "Potential Innovators" (Li & Daspit, 2016) there is potential for the company to innovate, but factors such as lack of communication and personal interests can harm the company in its innovation process. The involvement of non-family members within the dominant coalition of the company, results in riskier projects and higher diversified knowledge (Li & Daspit, 2016).

In contrast, companies with family members and non-family members in their dominant coalition and their SEW are considered "Active Innovators" (Li & Daspit, 2016). Active Innovators have a long-term orientation which means they are willing to invest in riskier projects, which leads to a more aggressive innovation process as they have a greater leverage (D. Miller & Le Breton-Miller, 2014).

2.1. Innovation Frameworks in Family-Businesses

There is a broad definition of innovation according to Schumpeter (1942) "carrying out innovations is the only function which is fundamental in history".

There are numerous features in which innovation can be implemented, product innovation, service innovation, process innovation, organizational innovation and marketing innovation. This practice is vital in the performance and growth potential of a company. A great capacity to innovate means that the company can be more competitive in the market and that it has an advantage over the competition. However, despite the relevance that family businesses have in our economy there is no unanimous consensus that these companies innovate more relative to non-family-firms.

The process of innovation in family businesses has two features: The first connects to the sense that these companies have a traditionalist approach, which results in a lower level of innovation (Gómez-Mejía et al., 2007). The second is that these companies are leaning more towards long-term investment projects, which leads to longer R&D investment ventures (D. J. Miller, 2006).

Evidence shows, FF`s are those who create the most patents suggesting a higher level of innovation (Kammerlander et al., 2010). The main reason given for this to arise according to studies by Kammerlander et al., (2010) is that, in a family business there is a concentration of wealth, which causes a greater caution regarding the investments of the company minimizing the costs and avoiding waste of resources, so the company has the privileged position to select only safe and advantageous investments (Kammerlander , 2010).

2.2. Innovation in Family- Firms according to the Agency Theory

The agency theory is a model relying on the interaction among two subjects: the Agent and the Principal (Ross, 1973). The relationship where the Agent (owner) has more information than the Principal (manager) outcomes in a case of asymmetric information, in the sense that there is a greater knowledge of one part than the other. The Agency theory aims to interpret the economic behaviour that exists in the departure of ownership, control and management (Shleifer et al., 1997).

The reasoning of this is that both elements, Agent and Principal, are endowed with economic rationality (Landström, 1993). When a separation of ownership, control

and management exists, results in decisions by the Agent that are not beneficial to the Principal which provides an increase in costs (agency costs).

This separation results to in an increase of costs has other negative consequences such as performance decrease and company strategy breakdown. According to this theory, a company has better performance in the presence of harmony between management and ownership. At this point there is no additional cost to the company (Songini et al., 2013).

FF`s appear to have a great advantage in this vector, as in these companies' management is constituted by elements of the family itself, so there is no conflict between ownership and management (Villalonga & Amit, 2006) however, in FF`s other agency conflicts can arise different from the Agency theory dichotomy (Songini et al., 2013).

According to Gnan & Songini (2013) there are numerous types of conflicts that can arise in family businesses. The first focuses on asymmetric altruism which result in a divergence of interests by the manager, who follow his own interests. The managers are inclined to continue projects and investments in the short term, which exhibits a self-interest, instead of investing and supporting in the firm projects that can bring a long-term value added. The second conflict lies in the interests between the family itself, when family members are involved in the administration and others in the ownership, it may lead to a conflict of interests which reduces the efficiency of the firm and the exchange of information.

In family businesses the whole organization has direct or indirect link with the family, therefore it shouldn't exist any agency problems after all these businesses are characterized as having a great control in their management, therefore, it is expected that FF`s have smaller agency costs (Jensen & Meckling, 1976).

2.3. Innovation in Family- Firms according to the Stewardship Theory

Agency theory states that in the presence of a separation between the ownership and the management there is a divergence between Agent (managers) and Principal (owners) (Jensen & Meckling, 1976). In this vein, the Stewardship theory (Davis et al., 1997) presents a new perspective on the Agency Theory. In which the agent is the steward being motivated and having a long-term perspective (Le Breton-Miller & Miller, 2009).

Underlying on a supportive basis of psychology, sociology, and leadership theories (Davis et al., 1997) stewardship theory suggests that elements within an organization are motivated not only by their personal motivation but also moral behaviours and loyalty within the company. In order to correctly apply this methodology within an organization it is necessary to have a correct ground root of concepts between opportunists and stewards (Davis et al., 1997). Experience is the cornerstone to recognize trusted agents (Quinn & Jones, 1995), in order to achieve good results it is vital to have an environment of trust, long-term competitive strategies and full access to information.

The stewardship theory in FF`s considers the managers as being a motivated member due to the historical and cultural legacy of the family, thus feeling the sense of belonging to the heritage of the family business (Le Breton-Miller & Miller, 2009). Bearing all these factors, there is a sense of loyalty and trust of the ownership to his agents. The stewardship theory is a secret element of competitive advantage for FF (Le Breton-Miller et al., 2009).

The applicability of stewardship theory or agency theory essentially depends on the social degree to which managers are able to engage within the family (Le Breton-Miller et al., 2011). Considering the characteristics present in FF`s and the involvement of the family itself, it is central to state that there is a greater use of the stewardship model in relation to NFF`s that opt for Agency relationships.

Taking into account innovation in FF`s, stewardship theory encourages and promotes a larger number of long-term projects that results in a wider investment in R&D and subsequently a competitive advantage (Le Breton-Miller et al., 2011).

Stewardship theory emerges as a competitive advantage for FF`s in their innovation expansion, serving as an amplifier component for a greater investment in innovation and consequently the creation of new products and services.

2.4. Innovation in Family- Firms according to the Resource-Based Theory

Another theory that studies the difference between FF`s and NFF`s is the resource-based theory. The foundation of this model is that firms can succeed different stages of performance and competitiveness according to their resources (Barney, 1991). A resource to be advantageous for a company must meet several requirements

such as being valuable, rare, hardly replicable resource, thus complementarity and heterogeneity explain the performance of the firm (Barney, 1991).

Resource heterogeneity may explain performance differentiation among firms (Barney, 1991); according to this concept, companies should focus on internal factors to gain competitiveness rather than external factors.

The family environment within the company has a positive significance in terms of motivation and commitment of its employees which helps to accomplish the objectives of the company in the long term (Gómez-Mejía et al., 2007).

In order to guarantee their survival FF`s have to ensure a distinctive integration of their resources, which can be defined as survivability capital (Sirmon & Hitt, 2003). The use of unique resources in FF`s such as free labour, loaned labour or even equity investments (Kraiczy, 2013), helps the company in its innovation process since these resources are the foundation for long-term innovation projects (Kraiczy, 2013). The survivability capital emerges as being a safety anchor in unexpected situations for FF`s.

In terms of innovation FF`s have a wide variety of singularities that intensify and improve their performance. Their human capital and ownership structure, in particular, are incomes that bring knowledge and enable the creation of new products and new ideas takeover, the power they have in allocating their financial resources efficiently, which are used in a way that generates and guarantees competitive advantages (Kraiczy, 2013).

3. Internationalization in Family Firms

In recent years, there is been a trend in the world economy of growing international exchange between businesses. Local markets appear to be secondary, and there is an inevitability for companies to satisfy consumers in new international markets, leading to the inception of new business and marketing strategies. Internationalization is a multidimensional process of cross-border flows and activities (Chetty & Campbell-Hunt, 2003).

The decision to internationalize is considered to be as an economic booster for companies (Welford, R. & Prescott, 1994).The first evidence assessment of internationalization activity in FF`s was managed by Gallo and Sveen (1991), who established that the internationalization process is slower in FF compared to NFF. However, if the firm is mindful of the elements that are restraining the development of the family business they can take advantage of this by means organizational measures enabling the success rate of the company to become internationally prosperous (Gallo & Sveen, 1991).

Contrary to a common misconception, FF`s do not have to reject their family origins to become prosperous internationally, but a amendment of attitude and orientation is imperative to be fruitful in foreign markets (Gallo & Sveen, 1991). There are three determinant factors that hinder international involvement of FF the engagement of the internationalization process, availability of financial resources and the ability to commit and use those financial resources to foster the necessary capabilities (Graves & Thomas, 2008).

Family businesses are described as being intricate to analyse, this facet is present not only in the innovation process but also their internationalization methods. They have a distinct nature from NFF`s, being portrayed as having a unique ownership structure as previously mentioned. The capital structure is one of the internal dynamics of the company that affects the way it behaves and how it acts. However, there are other internal factors which do influence the internationalization process such as the financial structure, the age of the company among others (Gallo & Sveen, 1991). When the company has a inferior leverage level the results of the internationalization activity is not the most preferred (Peng, 2001).

There is a risk associated with the internationalization process, which requires a broad knowledge of the new markets, requiring a great organizational effectiveness

within the company. This means that for family businesses there is a need to change some of their core structures to be effective (Gallo & Sveen, 1991). According to Galo and Sveen (1991), there are five central factors in FF`s that determine the company's ability to adapt to the internationalization process: (1) strategy and general objectives, (2) organizational structure and systems, (3) company culture, (4) developmental surge of the company, and (5) the family´s international characteristics the author also states that all these factors are interlinked.

In order to avoid the loss of social-emotional wealth FF`s may bypass opportunities for international diversification (L. R. Gomez-Mejia et al., 2011). The ownership willingness not to internationalize may reflect the desire to accumulate control of ownership and management inside the firm itself (L. R. Gomez-Mejia et al., 2011).

FF`s do not monitor their international progress in a regular method and have a greater struggle in incorporating international developments into their domestic markets (Okoroafo, 1999). One distinguishing feature is that if there is no international involvement in the first or second generation of the family it is very unlikely to be present in the third generation (Okoroafo, 1999); however the influx of new generations of the family in the company has an encouraging impact on their international involvement (Fernández & Nieto, 2005).

3.1. Internationalization in Family-Firms according Agency's Theory

Throughout the literature one of the most outstanding aspects of FF`s is their ownership structure; according to Agency theory FF`s usually do not support investments in their internationalization processes, since they constitute a risk to the financial situation of the organization. This type of attitude represents a way for these companies to protect the mechanisms within the family (Marin, 2017). Some authors claim that FF`s do not have organizational skills to succeed in a successful internationalization process (Graves & Thomas, 2008).

According to a study conducted by D'Angelo et al., (2016), when FF`s have only one family manager within the organization they have a higher internationalization level. If the firm agrees to include external managers in their hierarchy, the level of internationalization will be superior because they complement the company's lack of skills and know-how. According to the theoretical framework, the recruitment of

external managers in the context of internationalization is favourable for FF`s (D'Angelo, Majocchi, & Buck, 2016).

The consequence, of the external managers' involvement in the internationalization process largely depends on the level of involvement of the family inside the organization. The process is more effective if family involvement is lower (D'Angelo et al., 2016).

3.2. Internationalization in Family-Firms according to the Stewardship Theory

The Stewardship Theory (Davis et al., 1997) is based on the relationship between stewards (managers) and principals (owners) in the sense that managers operate within the business for the best benefits of the ownership. This theory is reflected in FF`s through a greater care of their socioemotional-wealth, less conflict between family members and a better decision-making process (Davis et al., 2010).

This perspective can help in understanding the major differences between FF`s and non-family-firms in their internationalization process. According to Gómez-Mejía et al., (2007), the existence of a greater connection of business continuity in FF`s leads to a higher level of investment in order to preserve these conditions, which results in the choice of entering new international markets. Therefore, an organization that is oriented through a stewardship perspective is more likely to have a higher level of long-term investments (D'Angelo et al., 2016).

The internationalization process requires a long-term investment in which the results obtained are not visible in a short period, so family-firms may be willing to sacrifice their short-term goals so that their international expansion strategy is more successful through a long-term perspective (Zahra, 2003). The framework below (Figure 2) represents the interconnection that occurs in the process of innovation and internationalization in FF`s according to the presented theories.

Figure 2 - *Family-Ownership Framework*

Figure 2 - *Family-Ownership Framework*
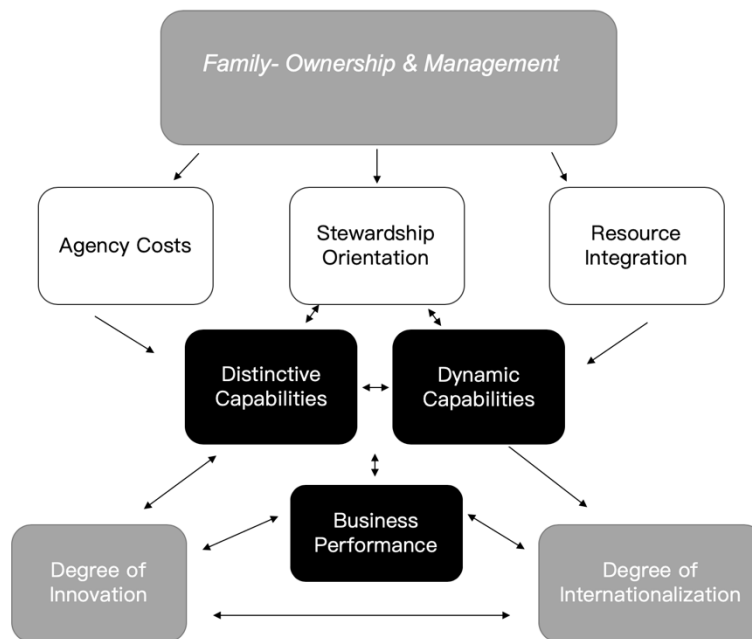
Source: *Own Elaboration*

3.3. The Uppsala Framework in Family Firms

The internationalization process is an integration and use of knowledge in international operations. Internationalization represents a growth plan for companies (Welford & Prescott, 1994) however this cannot be adopted as a universal solution to all firm's problems.

The Uppsala model (Johanson & Vahlne, 1977) contemplates the internationalization process as a gradual progress, in which the company rises its position in external markets by stages. Entering new markets poses a huge challenge for companies as there are several hinders such as barriers, psychic distance (Johanson & Vahlne, 1977). These obstacles can be the language, culture, politics or religion. Thus, there is a propensity for businesses to start their internationalization development in markets geographically close to their own. As the company gains experience and knowledge, it will gradually evolve into more complex stages such as the creation of new strategic partnerships and joint ventures.

Having an experiential market knowledge represents a competitive advantage because it generates business opportunities and consequently has a constructive influence on the development of internationalization and innovation (Johanson & Vahlne, 1990).

FF`s tend to acquire knowledge more gradually, their internationalization process becomes gentler compared to NNF´s (Gallo & Sveen, 1991). It is necessary to have a wide awareness for FF`s to overcome the fear of losing their SEW when developing their international strategies (Pukall & Calabrò, 2014).The preservation of SEW not only harms the internationalization process but also effects the business partnerships since there is unwillingness to develop new networks due to the fear of control loss (Gomez-Mejia et al., 2011).

Another outline from the Uppsala model concerning FF`s is the establishment of networks; FF`s prefer affiliations with other FF`s (Pukall and Calabrò, 2014). The creation of these relations potentiates the internationalization process through values of reliance and aversion to the loss of SEW (Pukall and Calabrò, 2014).

The Uppsala model was recently revised in the born-global framework (Rennie, 1993). Born-Global are businesses that advance with an internationalization project immediately after the time of their founding. This type of business model is closely related to the internationalization process of small and medium-sized enterprises, such as FF`s. There is a significant issue in the moment when family ownership at risk of losing their SEW, they tend to assume greater risks relative to NFF`s. Consequently, these companies tend to skip steps in the learning process of their internationalization process in order to have a faster response, which can have negative effects since the internationalization process must be carried out in the long run with a well-structured strategy in order to avoid financial and organizational complications which may arise (Pukall and Calabrò, 2014).

3.4. Family Firm Internationalization Heterogeneity

When a FF is entirety composed by family members, there is a negative impact on its internationalization process (Sciascia et al, 2012). However, in the presence of external managers, the effect is positive, with a different contribution of new partnerships and new markets, exports are strengthened when family ownership is at moderate levels (Sciascia et al., 2012).

In order to protect their SEW and preserve family legacies FF`s tend to be averse to the internationalization process as this is a practice that carries some risk to the organization in case of failure. Zahra, (2003) proposes the opposite, because FF`s are more entrepreneurial they are more motivated to proceed with internationalization,

since this embodies a competitive advantage. It is difficult to have a final conclusion on this topic as there is a lack of empirical data, but both perspectives are valid.

FF`s tend to have a long-term orientation which has an encouraging effect on the internationalization process (Claver et al., 2008) therefore external presence strengthens the organization in the future.

One of the most supported internationalization models at the theoretical level is the Uppsala stage model (Johanson & Vahlne, 1990). In this model, companies begin their internationalization process incrementally, in stages, the first being exports, which requires fewer resources. In the early stages, firms tend to concentrate their exports to geographically close markets, when there's an increase in resources and knowledge they move to more remote markets (Claver et al., 2007). It should be noted that FF`s tend to choose markets that do not jeopardize their independence (Pukall & Calabrò, 2014). The financial resources available in FF`s are lower than those present in NFF`s, the lack of financial power has a negative effect in the internationalization (Graves & Thomas, 2008). Another aspect that also negatively impacts the process is that FF`s wish to be independent of financial entities such as banks and external financiers (Graves & Thomas, 2006).

To ensure the success of the organization there is a necessity for FF`s to extend partnerships and alliances to create sustainable growth (Pukall & Calabrò, 2014).

Table 1. *Summary of main finding present in Innovation and Internationalization theories in relation to FF`s*

Theory	Major Findings	Strengths	Limitations	Influence on Innovation	Influence on Internationalization
FF`s Heterogeneity: *Graves&Thomas,2008* *Claver et al.,2008* *Patel & Fiet,2011* *Penney et al.,2013* *Miller et al., 2014* *Pukall & Calabrò,2014* *Bacci et al., 2017*	• Family Ownership has a direct impact on the company´s direction and its strategic decision • The involvement of non-Family members within the dominant coalition of the company results in riskier projects and higher diversified knowledge	• FF`s have an intimate relationship of high-trust and altruism between their members thus enhancing the integration of their resources and capabilities.	• Restriction in their SEW affects the wealth of the firm and the available financial resources. • FF`s in order to protect their SEW prefer to adopt short-term strategies resulting in lower levels of R&D investment.	• The Dominant coalition allows the family to create competitive advantages through family involvement in the innovation strategy • Lack of resources can confine the expansion into external markets.	• Long term orientation leads to more successful internationalization methods. • External managers have a positive impact in the process of entering new markets. • FF`s have a more passive internationalization process in relation to NFF`s.
Agency Theory: *Ross, 1973* *Jensen&Meckling,1976* *Landstrom,1993* *Shleifer et al., 1997.* *Villalonga et al., 2006.* *Gnan &Songini, 2013.*	• The separation of the Agent and the Principal leads to higher costs for the firm and the disruption of long-term projects	• There is less Agency Costs in FF`s. • Family businesses avoid short-term strategies instead they invest in long-term projects	• Rivalry inside the family can cause agency problems • Separation of the ownership and management might lead to a lower investment in innovation development	• FF`s have less agency costs than NFF`s therefore they have higher R&D investments and projects • Ownership concentration in FF`s lowers conflict between family member	• In the presence of conflict between the management and the ownership, the owners act in the best interest for the company which benefits the internationalization development.
Stewardship Theory: *Zahra, 2003* *Gómez-Mejía et al., 2010.* *Penney et al.,2013* *Bacci et al., 2017*	• People within the organization are motivated not only by their personal interest but also by the altruism towards the firm.	• Loyalty and trust of members towards the company becomes a competitive advantage for FF`s • Managers behave in the best interest of the ownership	• The Stewardship theory depends on the social interaction in which the managers are able to engage within the family members	• Less conflict between family members contributes to decision-making process that leads to higher investments in R&D an innovation	• FF`s have a long-term strategy that favours internationalization. • The affinity between family members strengthens the decision-making development that leads to the pursuit of new investments and projects.
Resource Based Theory: *Barney, 1991.* *Sirmon & Hitt, 2003.* *Gómez-Mejía et al., 2007.* *Kraiczy, 2013.*	• Businesses achieve different levels of performance and competitiveness according to their resources.	• Family Businesses have less structures hierarchy which can lead to lower overall costs.	• FF`s avoid big leverage capital structures meaning lowers investment levels. • Family Businesses are risk adverse meaning they might reduce their R&D investments in order to preserve their SEW.	• FF`s prefer to create strong partnerships with other businesses that leads to more successful innovation developments. • Lack of funds can impact the R&D investment.	• FF`s flexibility and firm-specific characteristics can lead to successful internationalization projects. • NFF`s have stronger resources in relation to FF`s.

Source: *Own Elaboration adapted from literature*

4. Relationship Between Innovation and Internationalization

4.1. Literature Overview

There is a biunivocal relationship between innovation and internationalization because both are related to the company's performance.

According to Aguilera et al., (2017), export activity increases the business propensity to actively participate in R&D investment and development, this will increase the chance for success in external markets.

Innovative firms have a propensity to be more prosperous in the internationalization activity (Filippetti et al., 2015), both elements are considered foundations for long-term sustainable growth. When a firm is present in an international market it may result in a higher level of innovation since it provides new knowledge that promotes the company to develop new innovation activities (Cassiman & Golovko, 2011).

There is an urge by businesses to achieve the best market position, innovation can help them to become leaders. In order to develop and capitalize their R&D investments (Kafouros et al., 2008) it is essential to have a market that corresponds to their needs, the decision to internationalization is to allow the company to have an economic expansion of their activity.

In order for the business to achieve paybacks from the innovation process there must be a given level of internationalization (Ruzzier, Hojnik, & Lipnik, 2013) businesses that have a higher degree of internationalization have a wider number of innovation projects compared to companies who do not internationalize.

There is a consensus opinion on the positive impact that innovation has on the internationalization process (Freixanet, 2014). Through innovation businesses are able to acquire competitive advantage, which is necessary to compete in international markets, through the creation of new products this process helps to create opportunities to expand into new markets, consequently fuelling internationalization. Love & Love (2002) proposed that innovation conveys market power which facilitates the internationalization process of the company.

According to a study by Becker & Egger (2013) regarding the effects of innovation in the process of internationalization, they conclude that innovation emerges as a factor of success in the entry of new markets. The authors also came to

the conclusion that innovation increases the trend to export in companies with a higher innovation level. Krugman (1979) through the creation of International trade models suggest that innovation emerges as a source of export.

According to the resource-based perspective, a company is a set of resources, human or physical, this theory shows why businesses perform differently (Barney, 1991). When the company has unique and different resources, it becomes more competitive in the local market as in external markets (Fahy, 2002). Innovation can be seen as a resource to gain competitive advantage (Yeoh & Roth, 1999) and has a constructive impact on internationalization (Kleinknecht & Oostendorp, 1994).

Hence, innovation leads to an increase in international competitiveness and facilitates the arrival into new markets. Innovation emerges as a unique competitive advantage that fosters the internationalization process.

Firms that find themselves actively in international markets generate higher levels of knowledge regarding their colleagues that only focus on local markets (Pastiglia et al., 2009). The internationalization process heightens the company's capacity to innovate allowing a greater access to technology and resources (Cheng and Bolon, 1993)

Firms have a propensity to decrease the costs associated with innovation (Kotabe, Srinivasan, & Aulakh, 2002), internationalization may soften such expenses as there is a higher access to global markets, which allows the acquisition of new materials and R&D in a more cost-efficient way (Kafouros et al., 2008).

According to Kotabe et al., (2002), there are two categories of factors that can evidence how internationalization influences the return on innovation. The first category focuses on the company's ability to innovate, a greater efficiency in the R&D department result in a better, faster and lower cost product or service that represents a competitive advantage for the company. The second category refers to the capabilities that the company has in exploiting its technological developments and making its innovation process profitable.

The internationalization process fosters innovation through the conception of new alliances and new networks in external markets (Arregle, Hitt, Sirmon, & Very, 2007) it generates R&D development (Kobrin, 1991), which diversifies and amplifies their innovative capabilities.

Márzabal et al., (2013) developed a framework (figure 3) that displays the relationship between innovation and internationalization.

Figure 3. *Relationship between Innovation and Internationalization*
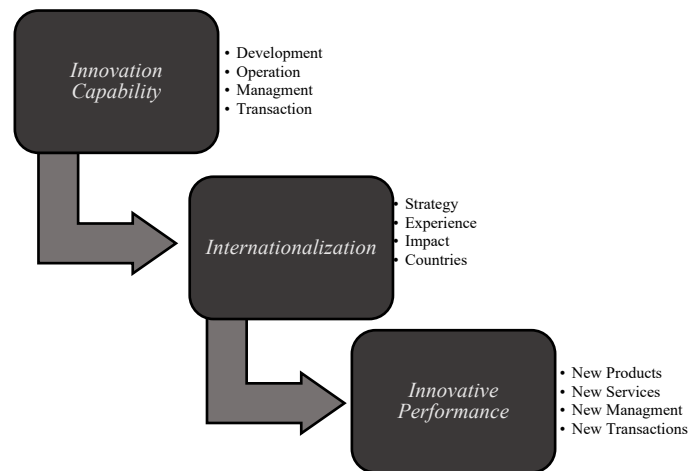
Source: *Adapted from Márzabal et al, (2013)*

This analytic framework evidences the positive relationship between internationalization and innovation, given the innovative performance (Márzabal et al., 2013) combining of capabilities, resources and performance through the internationalization process. There is a dynamic relation between these two elements since one reinforces.

4.2. Hypotheses in Test

The literature points towards interdependent relationship between innovation and internationalization being that these components are one of the most important for the competitive advantage of businesses (Kafouros et al., 2008; Cassiman & Golovko, 2011;Pérez and Rodríguez, 2013; Filippetti et al., 2015). On the other hand, FF`s appear being a vital element for economies creating employability and economic sustainability. Examining the elements that distinguish these companies from the rest is essential as theory point towards a relevant difference caused by capital ownership.

The focus of the present work is; firstly, we want to address the role of capital ownership on innovation and internationalization. Secondly, to identify potential difference of the impact internationalization has on innovation in either FF`s and NFF`s. Thirdly the converse effect and lastly the existence of self-reinforcing effect of the binomial and its generalisation among all capital structures

Based on the considerations obtained in the literature review we can form the hypotheses for our study that we will test through with the elaboration of a panel data model (Table 2).

Table 2 - *Hypotheses in test*

Number	Hypotheses Description	How to Measure	Expected Outcome
H1	*Family-Ownership influences managerial strategy on both vectors*		
H1a)	*Family-Ownership influences innovation propensity*	β_3 Model 2	*Positive*
H1b)	*Family-Ownership influences internationalization propensity*	β_3 Model 1	*Negative*
H2	*Internationalization influences differently innovation strategies among FF and NFF*		
H2a)	*Internationalization influences innovation among FF`s*	β_2 Model 3	*Positive*
H2b)	*Internationalization influences innovation among NFF`s*	β_2 Model 5	*Positive*
H3	*Innovation influences differently internationalization strategies among FF and NFF*		
H3a)	*Innovation influences internationalization among FF`s*	β_2 Model 4	*Positive*
H3b)	*Innovation influences internationalization among NFF`s*	β_2 Model 6	*Positive*
H4	*Innovation and Internationalization are self-reinforced*	$\beta_2 s$, *(3,4,5,6)*	*Positive*

Source: *Own Elaboration*

5. Data and Methodology

5.1. Initial Considerations

The data used in the present dissertation was collected regarding Portuguese FF`s and NFF`s inserted in the manufacturing industry according to CAE Rev3 Section C (INE, 2007), the dataset was built through the data provided by SABI platform. The information obtained in the dataset was followed according to the shareholders characteristics, additionally it was collected information for the number of employees, year of foundation of the company, and other financial data from the period of 2014 until 2017. Due to the high fluctuation of data in the SABI database, it is worth mentioning that all the data present in the study was collected on the 9 of January of 2019. Without an universal consent regarding the definition of FF, a firm management criterion was assumed according to González et al.(2013), in which firms are considered FF through the involvement in management, ownership and control. In the same vein, Ramalho et al. (2018) the segmentation criterion in data gathering was the following: (a) the company must have one or more family member in the administration (b) between 25% and 100% of the capital must belong to the

According to this criterion we were able to grasp a sample of 65067 Portuguese companies, of which 41347 (63,5%) are FF`s and the remaining 23720 (36,5%) are NFF`s. In Figure 4, we can observe the importance that FF`s have in the database since they are the majority of businesses in the National panorama.

Figure 4 *Classification of firms present in the data sample according to EU definition*
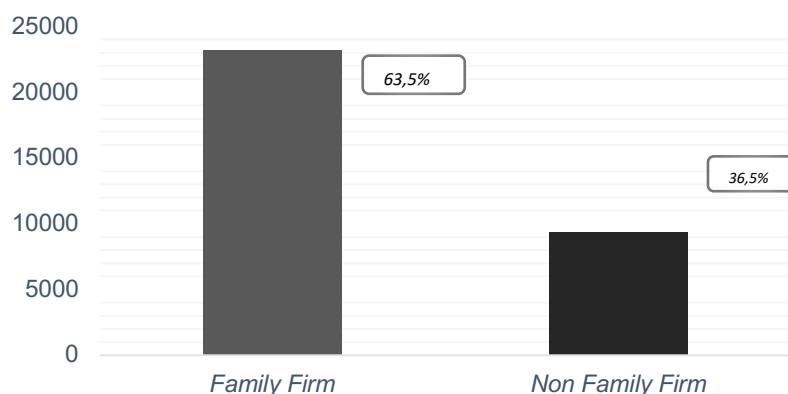
Source: *Own Elaboration according to data from SABI*

According to the European Union SME User Guide (European Commission, 2016) we can classify a firm in four categories: (1) Micro enterprise: annual work unit <10 (2) Small enterprise: annual work unit from11 to 49 (3) Medium-Size enterprise: annual work unit from 50 to 249 and Large-Size enterprise: annual work unit 250 or more. As can be seen in figure 4, the firms in our sample are mostly micro sized meaning that have less than 10 employees; however, in FF`s 70,5% are micro firms which leads to the conclusion that according to our sample F on average, have smaller size than NFF's. Concerning medium and large-sized companies the proportion of NFF is higher.

Figure 5. *Classification of firms present in the data sample according to UE definition*
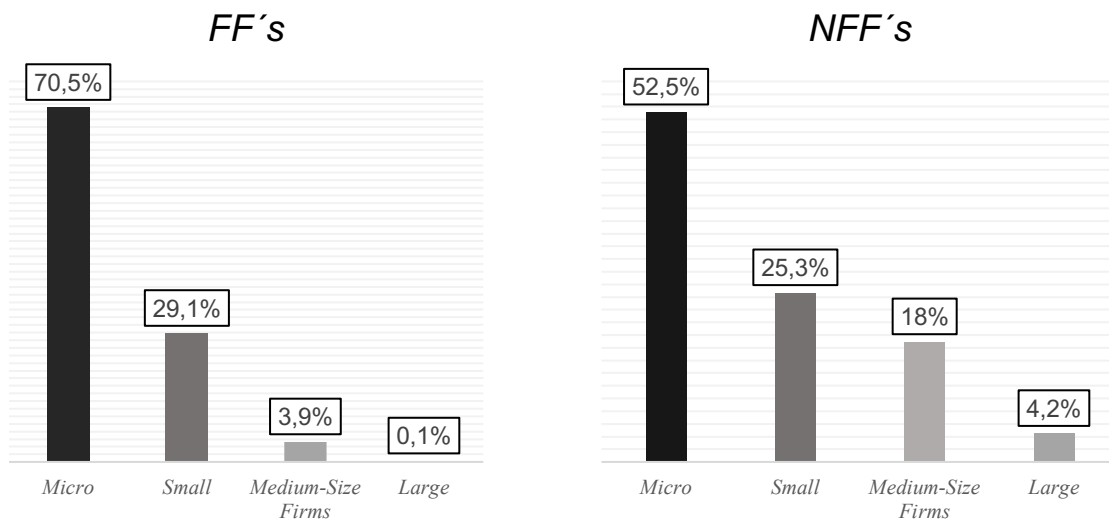
Source: *Own Elaboration according to data from SABI*

Manufacturing industry comprises every activity that transforms raw material into new goods. The present data concentrates all the firms inserted in the manufacturing industry according to the Portuguese economic activity code section C. The Pavitt´s taxonomy (Pavitt, 1984) categorizes the industrial sectors according to their technological characteristics. Therefore, in the present study we apply this taxonomy allowing the identification of the level of innovation present in each sector. The industrial sectors CAE (*Classificação Portuguesa de Actividades Económicas*), are segmented according to the Pavvitt taxonomy.

According to this taxonomy we can identify four categories of sectors;

(1) <u>Scale intensive industries</u>, is composed by firms that produce basic materials and consumer goods, according to the Portuguese classification of economic activities the following industries are included: CAE (10 ,11 ,12 ,24, 25, 29).

(2) <u>Supplier Dominated Sectors</u>, includes firms from the traditional manufacturing such as textiles, the following industries are included CAE (13, 14, 15, 16, 17, 18, 31, 32, 33).

(3) <u>Specialized-suppliers</u>, this sector is composed by firm that produce technology goods, there's a higher level of innovation and knowledge, the following industries are included, CAE (26, 27, 28, 30).

 (4) <u>Science-Based Industries</u> contains high-tech firms with higher levels of R&D, the following industries are inserted in this sector CAE (19, 20, 21, 22, 23). According to our sample both FF`s and NFF`s in the Portuguese context are more active in the Supplier Dominated sector, figure 6, presenting similar proportions for both.

Figure 6. *Segmentation of innovative intensity according to Pavitt´s (1984) taxonomy*
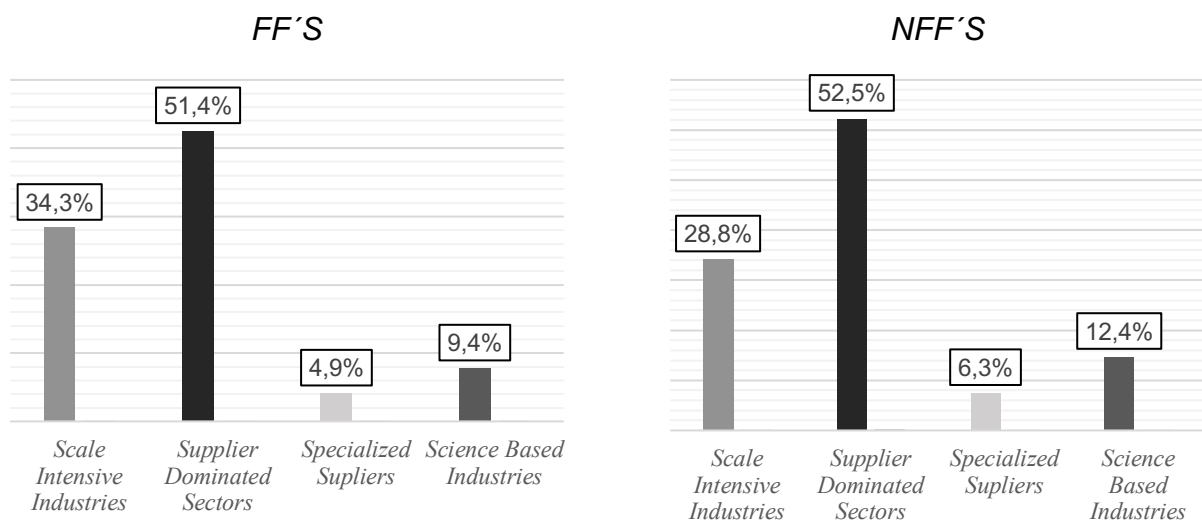
Source: *Own Elaboration according to data from SABI*

The geographical distribution according to NUT II in our sample is similar for both FF`s and NFF`s, figure 7, the largest concentration of companies is in the North of Portugal. This region has the highest concentration of FF`s (53.3%) and of NFF`s (43,9%). The region with the smaller proportion of either FF`s or NFF`s are the regions of Azores and Madeira.

Figure 7. *Geographical location of the firms in the dataset according to Nut II*
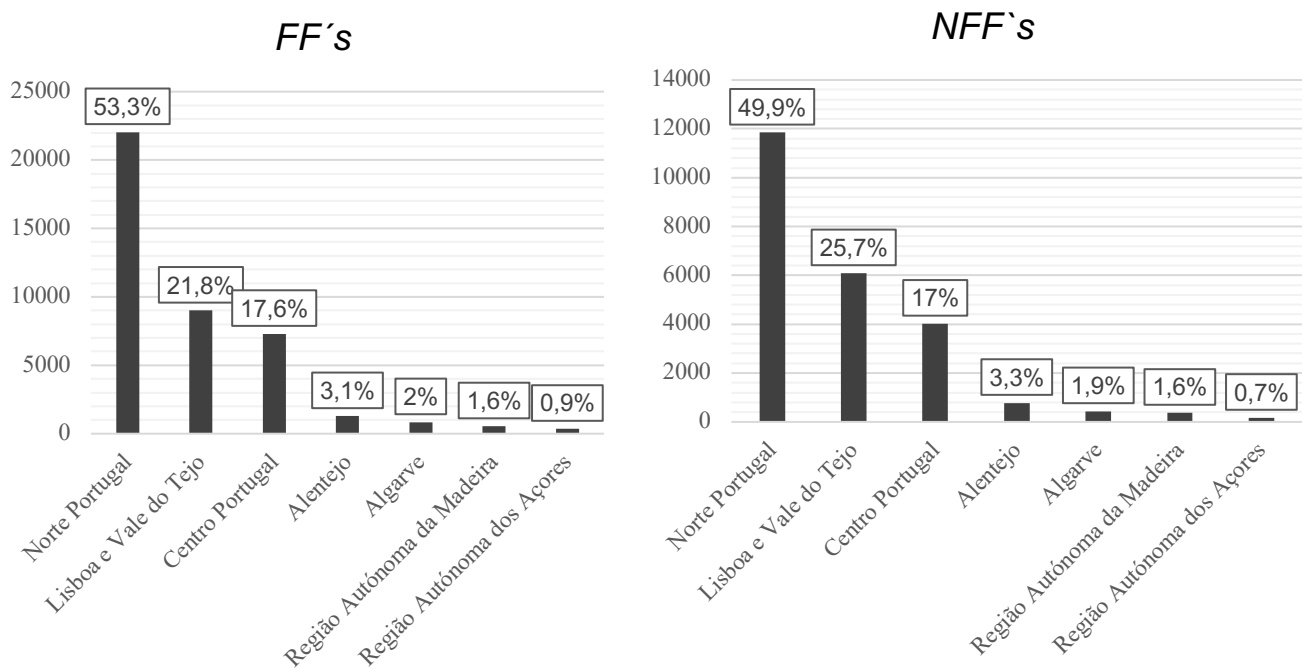
5.2. Methodology

In order to perform the econometric estimation, a panel was constructed which allows us to achieve cross section observations and time series. The use of this model is due to the possibility of tracing the same firm in a time span, the efficiency of the estimators and the strong information of these (Baltagi, 2009). We have used Pooled Regression (Ordinary Least Square), relying on the Ordinary Least Square method assuming that each observation as independent. The option for the pooled model can be consider as simplistic due to the inability to identify individual effects (fixed or idiosyncratic), even though, due to time invariance of our central explanatory variable it could not be omitted in the estimation. So, we have opted for sub sampling and perform the same model to FF`s and NFF`s to address eventual differences. Despite the knowledge that the correct form to correct time invariance is the Wooldridge correction (Wooldridge, 2005), the applicability of the technic is out of reach in the study. The following estimation will proceed accordingly.

Model 1

$$Exports_{it\,(Global)} = \beta_1 + \beta_2 Innovation_{it} + \beta_3 FF_{it} + \beta_4 age_{it} + \beta_5 Size_{it} + \beta_6 ROE_{it} +$$
$$\beta_7 ROA_{it} + \beta_8 Finan.Aut.Ratio_{it} + \beta_9 \frac{D}{E} Ratio_{it} + \beta_{10} Supplier_{it} + \beta_{11} Specialized_{it} +$$
$$\beta_{12} Science_{it} + \varepsilon_{it}$$

Model 2

$$Innovation_{it\,(Global)} = \beta_1 + \beta_2 Exports_{it} + \beta_3 FF_{it} + \beta_4 Age_{it} + \beta_5 Size_{it} + \beta_6 ROE_{it} +$$
$$\beta_7 ROA_{it} + \beta_8 Finan.Aut.Ratio_{it} + \beta_9 \frac{D}{E} Ratio_{it} + \beta_{10} Supplier_{it} + \beta_{11} Specialized_{it} +$$
$$\beta_{12} Science_{it} + \varepsilon_{it}$$

Model 3

$$Exports_{it\,(FF)} = \beta_1 + \beta_2 Innovation_{it} + \beta_3 age_{it} + \beta_4 Size_{it} + \beta_5 ROE_{it} + \beta_6 ROA_{it} +$$

$$\beta_7 Finan.Aut.Ratio_{it} + \beta_8 \frac{D}{E} Ratio_{it} + \beta_9 Supplier_{it} + \beta_{10} Specialized_{it} + \beta_{11} Science_{it} +$$

$$\varepsilon_{it}$$

Model 4

$$Innovation_{it\,(FF)} = \beta_1 + \beta_2 exports_{it} + \beta_3 age_{it} + \beta_4 Size_{it} + \beta_5 ROE_{it} + \beta_6 ROA_{it} +$$

$$\beta_7 Finan.Aut.Ratio_{it} + \beta_8 \frac{D}{E} Ratio_{it} + \beta_9 Supplier_{it} + \beta_{10} Specialized_{it} + \beta_{11} Science_{it} +$$

$$\varepsilon_{it}$$

Model 5

$$Exports_{it\,(NFF)} = \beta_1 + \beta_2 Innovation_{it} + \beta_3 age_{it} + \beta_4 Size_{it} + \beta_5 ROE_{it} + \beta_6 ROA_{it} +$$

$$\beta_7 Finan.Aut.Ratio_{it} + \beta_8 \frac{D}{E} Ratio_{it} + \beta_9 Supplier_{it} + \beta_{10} Specialized_{it} + \beta_{11} Science_{it} +$$

$$\varepsilon_{it}$$

Model 6

$$Innovation_{it\,(NFF)} = \beta_1 + \beta_2 exports_t + \beta_3 age_{it} + \beta_4 Size_{it} + \beta_5 ROE_{it} + \beta_6 ROA_{it} +$$

$$\beta_7 Finan.Aut.Ratio_{it} + \beta_8 \frac{D}{E} Ratio_{it} + \beta_9 Supplier_{it} + \beta_{10} Specialized_{it} + \beta_{11} Science_{it} +$$

$$\varepsilon_{it}$$

5.3. Variables

5.3.1. Dependent Variable

Internationalization - There are several methods to measure the level of internationalization in a firm. One of the most common and valid methods is through export performance (Katsikeas, 2000). The export performance of a business is a reflection of its ability to capitalize their resources and capabilities this being an indicator of success in their international operations (Beleska-Spasova, 2014). There are two ways to measure export performance (Katsikeas, 2000), the first is through economic data such as sales and profits the second is over noneconomic elements like market knowledge, experience know-how, etc.

For this reason, our dependent variable regarding internationalization performance relies on export intensity, for this purpose we create a ratio relating sales abroad and the total of sales. In doing so we apprise internationalization intensity.

Innovation - One of the most common ways of measuring the level of innovation in a company by means of R&D. However, in doing so, one will apprise innovative affect in term of inputs to innovation rather than out comes to the innovative process (Hoffmann et al, 1998).

Another way to measure the level of innovation within a company would be by means of the number of new products, however, it is difficult to obtain data on these since firms tend to not disclose this type of information.

Intangible assets have good coverage and proxy accuracy, therefore being recurrently implemented in innovation studies such as Hall (1999). So, in order to analyse the level of innovation present in each firm of our sample, we made a ration between the intangible assets and the total assets, thus we can observe in a valid and concrete method the effort that companies have in their innovation practices, compared to its valuation.

5.3.2. Independent Variables

Family-Firm - There are several concepts of family-businesses, however there is no general consensus among authors. In the present study the concept of FF was made according to the European Commission, (2016) in which there must to be one or more family members involved in the management of the company and there must be at least 25% of capital belonging to family or individual. The criterion was firstly adopted for PLC and our decision was to be implemented to all societal forms.

Thus, in the present study a business is considered as FF if it belongs to an individual or family that holds at least 25% of the capital and has at least a member of the family within the administrative council.

5.3.3. Control Variables

Considering that firms have other relevant characteristic that explain their innovative and internationalization process not directly connected to ownership a vector of controls was included in all models. The control variables present in the study are the following:

Age: the number of years that the company in operation until the year of 2017. Established firms have a greater propensity to create projects and infrastructures to internationalize and innovate (Zahra, 2003).

Size: this control variable measures firm dimension by means of the numbers of employees. Firms with a larger dimension have greater resources that strengthen the process of internationalization and innovation (Moini, 1995; Zahra, 2003).

Sales: This control variable indicates the logarithm value of the company's total sales for each respective year. (Llach & Nordqvist, 2010)

Return on Equity (ROE): The ROE is a ratio between the net income and shareholder equity indicating the amount of profit that the company obtains relative to the capital

invested by the shareholders, the higher the ROE the greater propensity to new investors. (Martínez et al., 2007)

Return on Assets (ROA): This ratio indicates whether the firm is using its assets efficiently, is calculated by dividing the earnings (before interest and taxes) and the total value of its asset, higher ROA means better use of company assets. (Martínez et al., 2007)

D/E Ratio: Financial ratio that indicates the amount of shareholders equity and debt that is used to finance firm assets. It is estimated by dividing the firm's liabilities with its shareholders equity. A high level usually represents a greater aggressiveness of financing by the company. (Aghion et al., 2004)

Financial Autonomy Ratio: This ratio indicates the financial autonomy present in the firm is calculated through the shareholders equity by the total assets (Ciumag, 2008).

Industrial Sectors: Using Pavitt´s taxonomy (1984) it is possible to classify the sectors according to their technological characteristics, with four classifications: (1) scale intensive industries; (2) Supplier Dominated Sectors; (3) specialized-suppliers; (4) Science-Based Industries.

Table 3 - *Variables in analysis*

	Description	Unit
Dependent Variables		
Exports	Degree of Internationalization, measured by the percentage of Exports regarding the total value of sales	*Ratio*
Innovation	Degree of Innovation, measured by the Intangible assets regarding all of the Assets of the firm	*Ratio*
Independent Variables		
Family Firm	Dummy variable that assumes value "1" for Family-Firm and "0" for Non-Family- Firm	*Dummy Variable*
Control Variables		
Age	Number of years that the company is active for the time period of 2014 until 2017	*Absolut Value*
Size	Number of paid employees within the company	*Absolut Value*
Sales	Logarithm value for total sales in each year	*Logarithm*
ROE	Return on Equity	*Ratio*
ROA	Return on Assets	*Ratio*
D/E Ratio	Liabilities/Shareholders Equity; financial aggressiveness of the firm	*Ratio*
Financial Autonomy Ratio	Shareholders Equity/ Assets; Financial autonomy of the firm	*Ratio*
Scale Intensive Industries	Dummy variable that assumes value "1" when the firm belongs to scale intensive industry	*(Default) Dummy Variable*
Supplier Dominated Sectors	Dummy variable that assumes value "1" when the firm belongs to the supplier dominated sector	*Dummy Variable*
Specialized- Suppliers	Dummy variable that assumes value "1" when the firm belongs to the specialized supplier	*Dummy Variable*
Science-Based Industries	Dummy variable that assumes value "1" when the firm belongs to the science-based industries	*Dummy Variable*

Source: *Own Elaboration*

5.4. Statistical analysis

The main objective of this study is to highlight the relationship between innovation and internationalization in FF. Thus, it is appropriate to emphasise the relationship between the variables used in the study with the objective of concluding the association among them.

Table 4 shows the correlations between the variables in analysis. Although in a general way the significance level of the variables is not very high the correlation is significant between evidencing the independence between the variables.

According to our results FF's and exports have a negative correlation (-0173**). Regarding the correlation of FFs with innovation there is also a negative effect although with a low value (-0.031**).

The relationship between exports and innovation according to our sample, a positive and significant (0.025**), which comes to confirm the literature in the sense that there is an inter-relation between these two variables as one exerts influence in the other and vice-versa.

Being in the presence of a significant and negative correlation between the variable of Innovation and the variable Age we can affirm that in our sample older companies are less innovative yet there is a positive significant correlation of (0.083**), the link between Exports and Age which lead us to conclude that older companies are more likely to exports having a more active internationalization process.

The relationship between ROA and ROE is positively and significant, (0.043**) these variables validate the economic efficiency of the company.

Taking into account the financial variables (Financial Autonomy Ratio and the D / E Ratio) there is no significant correlation between them.

Table 4. *Correlation Matrix of Model Variables*

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
Exports [1]	1													
Innovation [2]	0.025**	1												
Family-Firm (Dummy) [3]	-0.173**	-0.031**	1											
Age [4]	0.083**	-0.045**	-0.143**	1										
Size [5]	0.262**	0.000	-0.243**	0.202**	1									
Log_Sales [6]	0.372**	0.001	-0.239**	0.284**	0.392**	1								
ROE [7]	0.000	-0.002	0.001	-0.001	0.000	0.001	1							
ROA [8]	0.008*	0.000	0.014**	0.005	0.003	0.022**	0.043**	1						
Financial Autonomy Ratio [9]	0.009**	0.001	0.008**	-0.005	0.004	0.025**	0.000	0.033**	1					
D/E Ratio [10]	0.018**	0.006	0.022**	-0.053**	0.016**	0.017**	-0.001	0.001	0.002	1				
Scale-intensive [11]	-0.132**	-0.009	0.056**	0.011**	-0.012**	-0.031**	0.004	0.002	0.002	0.015**	1			
Supply-dominated [12]	0.077**	-0.008	-0.011**	-0.054**	-0.024**	-0.061**	-0.003	0.003	-0.003	-0.020	-0.716**	1		
Specialized-suppliers [13]	0.063**	0.018**	-0.029*	0.022**	0.041**	0.058**	-0.001	-0.005*	0.001	-0.001	-0.166**	-0.249**	1	
Science-based [14]	0.033**	0.009	-0.047**	0.088**	0.028**	0.095**	0.000	-0.004	0.001	0.010**	-0.236**	-0.355**	-0.082**	1

∗ *Significance level at 5%*

∗∗ *Significance level at 10%*

Source: *Own Elaboration*

Covering of the period between 2014 to 2017 and covering individually, the table below presents the descriptive statistics for the following variables: Exports, Innovation, Size and Sales, due to their importance in the study.

Then, the sample was divided into two separate groups: FF`s and NFF`s. The behaviour of each of these variables in each year and in the overall period is the following:

- *Exports* - From the results obtained (Table 5), we can verify that there is a large difference between the mean in FF`s and NFF`s regarding exports, NFF`s have a higher mean compared to FF. There is a positive and increasing evolution over the period of time of export in NFF, however, the value in FF remains quite unchanged and there is no evolution, which may indicate a lower propensity to invest in projects of internationalization. This result evidences that, on average export intensity is higher among NFF`s, evidencing more openness to external markets of the second.

Table 5. *Descriptive Statistics for Variable Exports*

	Family-Firm			Non-Family-Firm			
Year	Mean	Max	Min	Year	Mean	Max	Min
2014	0.139	1	0	2014	0.259	1	0
2015	0.136	1	0	2015	0.266	1	0
2016	0.136	1	0	2016	0.287	1	0
2017	0.135	1	0	2017	0.304	1	0
(2014-2017) Global	0.137	1	0	(2014-2017) Global	0.277	1	0

Source: *Own Elaboration*

- *Innovation* - In the results presented in relating innovation, highlight that there is a difference among FF`s and NFF`s (Table 6). However, in the year of 2017 we can observe that the mean values are identical which may suggest that there is an increasing trend in FF companies to innovate more. However, as the values found are very close between the groups, we can suggest that the difference is not evident. Overall, it can be seen that FF`s cannot overcome NFF`s at the innovation level, reaching an average level of 0.011 (FF) oppose to 0.003 (NFF).

Table 6. *Descriptive Statistics for Variable Innovation*

	Family-Firm				Non-Family-Firm		
Year	*Mean*	*Max*	*Min*	*Year*	*Mean*	*Max*	*Min*
2014	0.011	0.262	0	*2014*	0.003	0.875	0
2015	0.001	0.752	0	*2015*	0.003	0.970	0
2016	0.001	0.319	0	*2016*	0.003	0.894	0
2017	0.001	0.549	0	*2017*	0.003	0.322	0
(2014-2017) Global	0.001	0.751	0	*(2014-2017) Global*	0.003	0.970	0

Source: *Own Elaboration*

- *Size* –NFF`s have a larger dimension comparing to FF`s, something that has already been already mentioned, in which there is a big difference between the two groups (Table 7). Once mentioned in the present study, FF`s tend to be smaller companies compared to NFF`s, this is true given the results in the Portuguese industry, which can be a handicap towards innovation and internationalization performance and sustainability.

Table 7. *Descriptive Statistics for Variable Size*

	Family-Firm				Non-Family-Firm		
Year	*Mean*	*Max*	*Min*	*Year*	*Mean*	*Max*	*Min*
2014	12.049	987	1	*2014*	52.314	3409	1
2015	12.238	1204	1	*2015*	58.031	3386	1
2016	12.393	1295	1	*2016*	65.176	3453	1
2017	12.399	1408	1	*2017*	59.347	4540	1
(2014-2017) Global	12.274	1408	1	*(2014-2017) Global*	58.413	4540	1

Source: *Own Elaboration*

- *Sales* - Regarding sales, through the results obtained we conclude that there is a great difference among the two groups (Table 8). There is an increasing and positive evolution of the mean in both groups over the period analysis. However, FF`s present smaller results compared to NFF, which may be a

consequence of the previously studied variable, Size, larger companies naturally tend to have larger business turnovers.

Table 8. *Descriptive Statistics for Variable Sales*

	Family-Firm			Non-Family-Firm			
Year	*Mean*	*Max*	*Min*	*Year*	*Mean*	*Max*	*Min*
2014	11.936	18.660	0.916	*2014*	13.114	22.993	2.496
2015	11.934	18.649	0.182	*2015*	13.401	22.859	2.970
2016	11.935	18.587	0.470	*2016*	13.620	22.727	2.995
2017	11.972	18.713	0.182	*2017*	14.029	22.909	2.166
(2014-2017) Global	11.944	18.713	0.182	*(2014-2017) Global*	13.504	22.993	2.167

Source: *Own Elaboration*

- *Age* - The age of a company has a major impact on its economic activity, older companies tend to be more conservative regarding their innovation and internationalization projects. However, in this variable we can observe that there is not a big difference between the two types of companies, even if the NFF`s are older there is not a significant difference allowing us to state that age is a factor that has a great impact on their economic performance (Table 9).

Table 9. *Descriptive Statistics for Variable Age*

	Family-Firm			Non-Family-Firm			
Year	*Mean*	*Max*	*Min*	*Year*	*Mean*	*Max*	*Min*
(2014-2017) Global	18.420	115	2	*(2014-2017) Global*	22.747	119	2

Source*: Own Elaboration*

5.4.1 Econometric Results and Analysis

Table 10 - Results of Panel Data estimated through Pooled Regression

				Model 1
				Obs=17227
				F (11, 17215) = 190.79
				Prob > F = 0.0000
				R-Squared = 0.1087
Variable	Coef.		Std. Errors	P>z
Exports				
Innovation	0.5713	***	0.1936	0.003
Family-Firm	-0.0635	***	0.0054	0.0000
Age	0.0005	***	0.0014	0.0010
Size (Employees)	0.0005	***	0.0000	0.0000
ROE	0.0002		0.0017	0.2890
ROA	0.2432	***	0.0048	0.0000
Finan. Aut. Ratio	0.0004	**	0.0001	0.0130
D/E Ratio	0.0000		0.0001	0.9120
Supplier Dominated	0.1648	***	0.0062	0.0000
Specialized- Suppliers	0.1501	***	0.0098	0.0000
Science Industries	0.0432	***	0.0074	0.0000
_cons	0.2405		0.0068	0.0000
				Model 2
				Obs=17227
				F (11, 17215) = 9.80
				Prob > F = 0.0000
				R-Squared = 0.0062
Variable	Coef.		Std. Errors	P>z
Innovation				
Exports	0.0009	***	0.0003	0.003
Family-Firm	-0.0009	***	0.0002	0.000
Age	0.0000	***	0.0000	0.000
Size (Employees)	0.0000		0.0000	0.774
ROE	0.0000		0.0000	0,749
ROA	-0.0008	***	0.0002	0.000
Finan. Aut. Ratio	0.0000		0.0000	0.528
D/E Ratio	0.0000		0.0000	0.694
Supplier Dominated	0.0000		0.0002	0.963
Specialized- Suppliers	0.0018	***	0.0004	0.000
Science Industries	0.0005		0.0003	0.119
_cons	0.0027		0.0003	0.000

*** P-Value < 0,01
** P-Value < 0,05
* P-Value < 0,10

Source: *Own Elaboration*

Table 10 shows the results from the pooled estimation of our panel data model.

The results obtained in the first part of the table show that the coefficient of exports taking into account the explanatory variable of innovation has a positive and significant coefficient. Internationalization is seen in the literature as a vehicle for firms to innovate (Cheng and Bolon, 1993; Kafouros et al., 2008). In other words, a unitary change in the export intensity ratio rises innovation intensity ratio by 0.195 points.

Family-Ownership has a negative and significant effect on the internationalization process of the firm, proposing that the family ownership has a negative impact if the firm intention to become operate abroad. This result, despite statistically significant does not support our hypothesis H1b), the direction of the effect is opposite from our previous posit. Family-ownership negatively influences the propensity for international expansion. This result is related to the literature, many authors (Gallo & Sveen, 1991; Gómez-Mejía et al., 2007; Kafourus, 2008) support that FF`s are more risk averse, thus avoiding projects such as internationalization since they can put their SEW and their survival at risk.

The firm's age has a positive and significant effect on the internationalization process. These values are consistent with the literature since some authors (Majocchi et al., 2005), claim that older companies are more active internationally.

The size of the firm, measured in employed persons, also a positive and significant effect on the firm's internationalization processes, in the literature there is a positive relationship between internationalization and firm size (Ruzzier, 2014) in the sense that larger firms have more resources to enter into new markets.

Regarding the financial indicators there is a positive and significant relationship between Exports and ROA, meaning that the more financially efficient the business are more prone to enter the internationalization projects. However, in relation to the ROE, D/E Ratio and Financial Autonomy Ratio variables, there is no evidence of relationship between them taking in relation to Exports. The industrial sectors according to the Pavitt taxonomy all have a positive and significant relation with exports.

The second part of the table 10 has innovation as endogenous variable. It can be observed that there is a positive and significant relationship with the variable Exports. This data is consistent with the literature being that innovative firms have a higher tendency to be more thriving in the internationalization activity (Filippetti et al., 2015).

Family ownership has a negative and significant effect on the company's degree of innovation. This result does not support our hypotheses H1b) meaning that family-ownership influences negatively internationalization propensity. Some authors claim (Graves & Thomas, 2008; Pukall & Calabrò, 2014) that FF`s have lower innovation processes than NFF`s because of their economic constraints such as lack of financial resources and their risk aversion nature leading to a reduction in their R&D investment.

Regarding the age of the firm, it can be observed that there is a negative and significant relation, with the innovation intensity meaning that older companies tend to be more conservative regarding their innovation projects thus not investing actively in R&D.

The Size variable does not have a significant relationship with innovation. However the literature points to larger firms having the ability to have more R&D and innovation projects, they also have the facility to invest in higher risk projects due to their human and material resources in contrast to smaller firms that have more struggles (Knott & Vieregger, 2016).

Taking into account financial performance indicators the ROA and innovation have a negative and significant relationship, the prospects regarding this relationship would be positive due to the fact that that more financially efficient companies would have a greater degree of innovation.

As far as the industrial sectors are concerned, there is a positive and significant relationship between innovation and specialized suppliers. This value indicates that this is the most innovative sector at the industrial level in the context of the Portuguese economy.

Taking into account the results obtained relating the family-ownership dimension our hypotheses H1 is not supported being that there is a negative influence in the innovation and internationalization processes.

As presented so far, underlying on the significance of the dummy variable that proxies capital ownership, it seems to exist a structural difference between FFs and NFFs; thus, in order to have a better understanding of the differences we decided to compare the entire sample with two segmented groups with means all firms, FF`s and NFF`s.

This separation allows to observe if there are significant differences between the different groups, so we ran the Kruskall-Wallis test for the variables. This non-parametric test analyses the statistical differences present between the groups. In the presence of the null hypotheses, the parameters are of the same in the groups otherwise the groups have different parameters. For all the variables studied (table 10) the null hypothesis was rejected, which leads us to conclude that statistically there is a difference between FFs and NFF's. Due to the great number of samples in the database we performed the Kruskall Wallis test for the year 2017.

Table 11 - *Kruskall-Wallis test*

	Mean			Kruskal Wallis Test (Independent Samples)	
	All Sample	Family-Firm	Non-Family-Firm	P-Value	Decision
Exports	0.16	0.14	0.30	0.000	Reject H0
Innovation	0.001	0.001	0.001	0.000	Reject H0
Age	20.00	18.42	22.75	0.000	Reject H0
Size	19.30	12.40	59.35	0.000	Reject H0
ROA	-0.11	-0.12	-0.01	0.000	Reject H0
ROE	-0.40	-0.10	-2.42	0.000	Reject H0
Sales	12.24	11.97	14.03	0.000	Reject H0
Financial Autonomy Ratio	-2.64	-2.50	-3.59	0.000	Reject H0
D/E Ratio	4.94	5.73	3.51	0.000	Reject H0
Scale Intensive	0.32	0.34	0.29	0.000	Reject H0
Supply	0.52	0.51	0.52	0.007	Reject H0
Specialized	0.05	0.05	0.06	0.000	Reject H0
Science	0.10	0.09	0.12	0.000	Reject H0

Source: *Own Elaboration*

Table 12 – *Results of Panel Data estimated through Pooled Regression for FF`s and NFF`s*

	All Firms			Family – Firms			Non-Family-Firms		
	Model 1 Obs=17227 F (11, 17217) = 190.79 Prob > F = 0.0000 R-Squared = 0.1087			**Model 3** Obs=9123 F (10, 9112) = 176.46 Prob > F = 0.0000 R-Squared = 0.1622			**Model 5** Obs=8104 F (10, 8093) = 83.36 Prob > F = 0.0000 R-Squared = 0.0934		
Variable	Coef.	Std. Errors	P>z	Coef.	Std. Errors	P>z	Coef.	Std. Errors	P>z
Exports									
Innovation	0.5713 ***	0.1936	0.003	0.7547 **	0.3284	0.022	0.3271	0.2378	0.169
Family-Firm	-0.0635 ***	0.0054	0.0000	N. A	N. A	N. A	N. A	N. A	N. A
Age	0.0005 ***	0.0014	0.0010	0.0005	0.0002	0.833	0.0000	0.0002	0.864
Size (Employees)	0.0005 ***	0.0000	0.0000	0.0019 ***	0.0001	0.000	0.0004 ***	0.0000	0.000
ROE	0.0002	0.0017	0.2890	0.0001	0.0002	0.420	0.0004	0.0005	0.449
ROA	0.2432 ***	0.0048	0.0000	0.0227 **	0.0099	0.022	0.0188 ***	0.0063	0.003
Finan. Aut. Ratio	0.0004 ***	0.0001	0.0130	0.0033	0.0046	0.476	0.0003 **	0.0001	0.033
D/E Ratio	0.0000	0.0001	0.9120	0.0000	0.0001	0.704	0.0002	0.0001	0.154
Supplier Dominated	0.1648 ***	0.0062	0.0000	0.1622 ***	0.0079	0.000	0.1476 ***	0.0095	0.000
Specialized- Suppliers	0.1501 ***	0.0098	0.0000	0.1315 ***	0.0132	0.000	0.1634 ***	0.0140	0.000
Science Industries	0.0432 ***	0.0074	0.0000	0.5084 ***	0.0105	0.000	0.0275 ***	0.0102	0.007
_cons	0.2405	0.0068	0.0000	0.1252	0.0085	0.000	0.2739	0.0086	0.000

*** P-Value < 0,01
** P-Value <0.05

* P-Value < 0,10

Source: *Own Elaboration*

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In table 12 we can observe the results for all the firms, FF`s and NFF`s s being that we have the export variable as an endogenous variable. As already mentioned, we couldn´t estimate the model through a fixed effects estimation due to time invariant variables, this solution allows us to obtain the desired results with an estimation in pooled regression.

There is a contrast in the results found between FF`s and NFF`s. In relation to the innovation being a driver for the internationalization process in FF`s there is positively significant result, meaning that in agreement with the literature FF`s that innovate more are also more active in international markets. This result supports our hypothesis H3 a) in the sense that innovation influences positively internationalization among FF`s.

In contrast the result obtained for NFF's is not significant thus our hypotheses H3 b) is not supported. Bearing this, innovation in NFF`s does not influence the internationalization process. This leads to the conclusion that innovation impacts differently the internationalization strategies among FF`s and NFF`s thus supporting our hypothesis H3.

As far as financial indicator are concerned, there is a positive correlation between the ROA and exports in the FF`s as well as in the NFF's, although it is a lower value for the NFF's, this relation shows that financial stability encourages internationalization.

It should be noted that in NFF, the variable of financial autonomy ratio has a positive and significant coefficient with exports, which leads us to affirm that NFF's in our study are more autonomous financially, with the outcome of having a positive impact in the process of internationalization.

The industrial sectors in FFs and NFFs all have a positive and significant correlation with the export variable.

Table 13 *Results of Panel Data estimated through Pooled Regression for FF`s and NFF`s*

	All Firms			Family – Firms			Non-Family-Firms		
	Model 2 Obs=17227 F (11, 17217) = 9.80 Prob > F = 0.0000 R-Squared = 0.0062			**Model 4** Obs=9123 F (10, 9112) = 176.46 Prob > F = 0.0000 R-Squared = 0.1622			**Model 6** Obs=8104 F (10, 8093) = 6.06 Prob > F = 0.0000 R-Squared = 0.0074		
Variable	Coef.	Std. Errors	P>z	Coef.	Std. Errors	P>z	Coef.	Std. Errors	P>z
Innovation									
Exports	0.5713 **	0.0003	0.003	0.0008 **	0.0003	0.022	0.0007	0.0005	0.169
Family-Firm	-0.0635 ***	0.0002	0.000	N. A	N. A	N. A	N.A	N.A	
Age	0.0005 ***	0.0000	0.000	-0.0002 **	0.0000	0,021	-0.0001 ***	0.0000	0.000
Size (Employees)	0.0005	0.0000	0.774	0.0000 ***	0.0000	0,027	0.0000	0.0000	0.901
ROE	0.0002	0.0000	0,749	0.0000	0.0000	0,857	0.0000	0.0000	0.295
ROA	0.2432 ***	0.0002	0.000	-0.0005 *	0.0003	0,088	-0.0011 ***	0.0029	0.000
Finan. Aut. Ratio	0.0004	0.0000	0.528	0.0001	0.0001	0,466	0.0000	0.0000	0.426
D/E Ratio	0.0000	0.0000	0.694	0.0000	0.0000	0,147	0.0000	0.0000	0.173
Supplier Dominated	0.1648	0.0002	0.963	0.0002	0.0003	0,377	-0.0003	0.0004	0.472
Specialized-Suppliers	0.1501 ***	0.0004	0.000	0.0015 ***	0.0004	0,000	0.0020 ***	0.0007	0.003
Science Industries	0.0432	0.0003	0.119	0.0002	0.0003	0,520	0.0006	0.0005	0.204
_cons	0.2405	0.0003	0.000	0.0010	0.0003	0.000	0.0033	0.0004	0.000

*** P-Value < 0,01
** P-Value < 0,05
* P-Value < 0,10

Source: *Own Elaboration*

Table 13 presents the results obtained in the pooled regression for all companies, FFs and NFFs with the endogenous variable being innovation.

According to the results in FF`s there is a positive and significant relation in internationalization being a driver for innovation, meaning that in these firms, internationalization has a positive influence in the innovation, supporting our hypothesis H2b). According to some authors (Kobrin, 1991; Arregle et al., 2007) the internationalization process encourages innovation due to the creation of new alliances and partnerships leading to the expansion of R&D development and innovative capabilities.

In NFF`s there is no significance among internationalization being a driver for innovation, this result hinges that the internationalization process impacts differently innovation strategies between FF`s and NFF`s, supporting our hypothesis H2.

Taking into account all the estimations, we can observe that innovation and internationalization are self-reinforced. However, this aspect is only present in FFs, in this way we can partially support the hypothesis H4.

Regarding the age, there is a negative and significant relation in FF`s and in NFF`s. Although, there is a positive relationship between age and internationalization, the same is not true in innovation with older companies tending to have less innovation projects being more conservative.

The size of the firm is also positively and significantly correlated with innovation in FF's, this is in line with evidence found in the literature in which some authors (Knott & Vieregger, 2016) argue that the size of the company has an positive impact on its innovation processes due to the greater amount of resources.

There is a positive and significant correlation with ROA and innovation in FF`s and NFF's. This value is expected since firms with higher financial performance have a positive relation with innovation.

In the industrial sectors according to the Pavitt Taxonomy(Pavitt, 1984), there is only a positively significant correlation with the innovation, that is in both types of firms, with the Specialized Suppliers, this sector is the one that has a greater degree of innovation.

Table 14 - Hypotheses Result

Number	Hypotheses Description	Expected Outcome	Result Outcome
H1	Family-Ownership influences managerial strategy on both vectors		Positive
H1a)	Family-Ownership influences innovation propensity	Positive	Negative
H1b)	Family-Ownership influences internationalization propensity	Negative	Negative
H2	Internationalization impacts differently innovation strategies among FF and NFF		Positive
H2a)	Internationalization influences innovation among FF`s	Positive	Positive
H2b)	Internationalization influences innovation among NFF`s	Positive	Negative
H3	Innovation impacts differently internationalization strategies among FF and NFF		Positive
H3a)	Innovation influences internationalization among FF`s	Positive	Positive
H3b)	Innovation influences internationalization among NFF`s	Positive	Negative
H4	Innovation and Internationalization are self-reinforced	Positive	Positive

Source: *Own Elaboration*

Table 14 shows the hypotheses tested and the results obtained. We can observe that in part the results obtained meet the proposed hypotheses.

However, some results are not in agreement with the literature, especially the fact that family ownership has a negative impact both at the innovation level and at the internationalization level.

Regarding the impact of the internationalization process on the innovation process, the results point to a positive relationship in FF and a negative relationship in NFF.

Concerning the impact of the innovation process on the internationalization process, the results point to a positive relationship in FF and negative in NFF.

Finally, it can be concluded that there is an interrelationship between the processes of innovation and internationalization, one process powering the other and vice versa.

Conclusions and policy recommendations

The present study aimed to investigate the complex structure that FF`s are due to the great hierarchical differentiation, thus an opportunity to analyse their innovation and internationalization processes becomes a target of great academic interest.

There are few studies in the literature that analyse the relationship between innovation and internationalization in FF`s, most of the authors tend to focus only on innovation or internationalization. Thus, the creation of this dissertation brings an added value in the sense of trying to fill an existing gap in the literature.

The sample present in the study of 17227 companies is significant so that we can observe the different patterns among the different categories. The empirical results reinforced the existence of a great dynamism in FF's at the innovation level as well as at the internationalization level, being the first more proactive than NFF's. In the first stance regarding the results of our study we can affirm that there is a reinforcement between the dimension of innovation and internationalization. There is an interdependence between the innovation and internationalization processes in the sense that they are mutually reinforcing.

Concerning the impact of family-ownership on innovation the results evidence a positive relationship. These results are consistent with the literature in the sense that if the firm has family-ownership there is a positive impact on its innovation and R&D processes due to the long-term prospects present in this type of company.

Given the differences found, the present study aims to reinforce the need for specific attention from policy makers for these business structures. Capital ownership plays a central role in terms of the managerial strategy, and there is evidence that FFs are more risk adverse in this binomial. Fine tuning policy making is required to address the singularities of FFs given the importance of both innovation and internationalisation and the relative importance of this type of firms in the entrepreneurial fabric.

Moreover, public subsidisation of innovative strategies can be considered, although, the empirical evidence does support that economic performance seems

not to be the accurate factor of choice. On the contrary, in what concerns internationalisation, and for the NFFs it is and enhancer.

Curiously, technological intensity does not influence innovative or internationalisation strategies, either in FF or NFF.

In general, it is urgent to appraise the needs of family firms to become more innovative and internationalised as it is vital for their long-term survival, which is central do sustainable job creation, social inclusion and welfare homogenisation therefore generating sustainable growth.

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