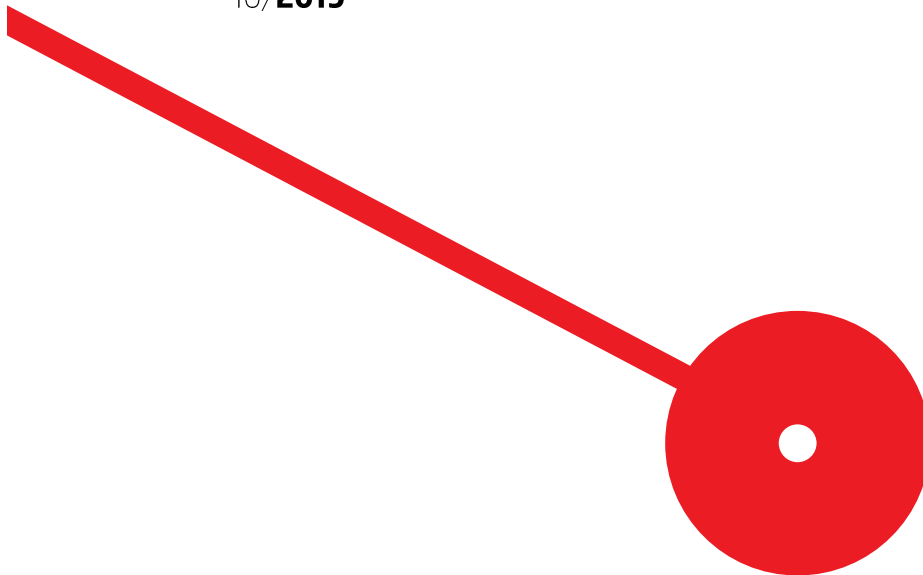




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Carlos Manuel da Silva Pereira Pinheiro de Pinho

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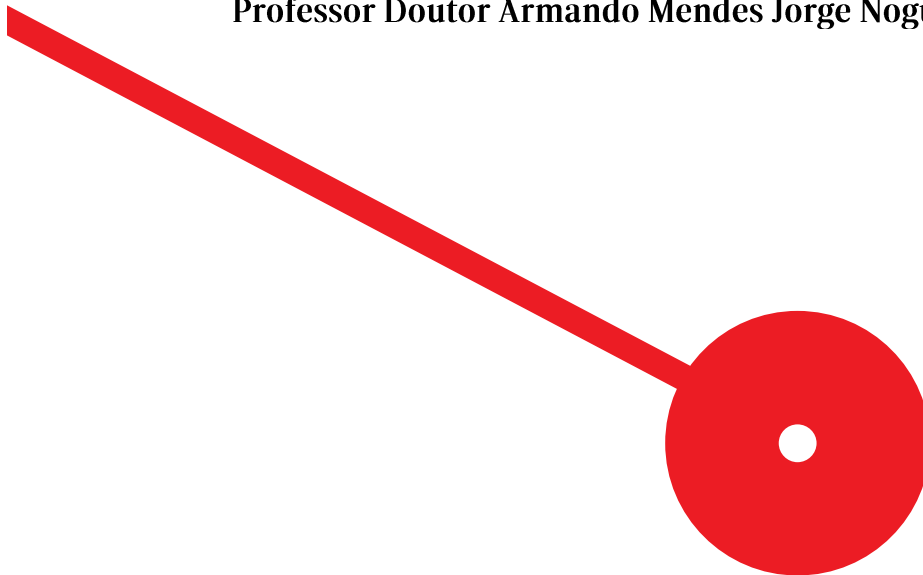




The impact of financial literacy on companies performance: The case of manufacturing industry from North of Portugal

Carlos Manuel da Silva Pereira Pinheiro de Pinho

Master dissertation presented to the Instituto Superior de Contabilidade e Administração do Porto to obtain the Master degree in Corporate Finance, under the supervision of Professor Doutor Armando Mendes Jorge Nogueira da Silva



Dedication

For my parents Carlos and Zulmira, my sister Margarida and my grandparents António, Manuel, Margarida and Maria Rosa. To my family I owe my life and what I am.

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I would also like to thank the companies that participated in the study and whose contribution was fundamental to its realization.

Abstract:

The impact of financial literacy, availability of capital, the flexibility of resources and the technological sophistication level have been analysed independently in the performance of companies. The present study analysed the interaction of these constraints and their impacts on business performance, trying to fill the lack of research of this type in the Portuguese business system.

Thus, the dissertation developed aims to evaluate the impact of financial literacy on the economic and financial performance of companies and to ascertain the consequences that the capital availability, the resources flexibility and the level of technological sophistication provide in the referred relationship between financial literacy and companies performance.

The study included a final sample of 308 companies from the North Region of Portugal with activity in the manufacturing industry. The study data were obtained through a questionnaire survey and still by collecting of financial information of the sample companies from an enterprises database. The data collected were worked by a linear regression model in which was applied the Sandwich estimation method. With the intention of obtaining robust and consistent results, it was decided to use five dependent variables and five measurement methodologies.

The study allowed to conclude that financial literacy improves the performance of the company, but from a specific perspective. In the direct relationship there were no impacts of financial literacy on company performance; in association with capital availability and resource flexibility the financial literacy does not improve company performance. However, it was concluded that to a reduced level of technological sophistication the financial literacy has an impact on company performance.

Key words: Financial literacy, company performance, capital availability, resource flexibility

Resumo:

O impacto da literacia financeira, da disponibilidade de capital, da flexibilidade de recursos e do nível de sofisticação tecnológica têm sido analisados de forma independente no desempenho das empresas. O presente estudo analisou a interação destas condicionantes e seus impactos na performance empresarial procurando colmatar a falta de investigação deste tipo no sistema empresarial português.

Deste modo, a dissertação desenvolvida tem como objetivo avaliar o impacto da literacia financeira no desempenho económico e financeiro das empresas e averiguar quais as consequências que a disponibilidade de capital, a flexibilidade de recursos e o nível de sofisticação tecnológica proporcionam na referida relação entre a literacia financeira e o desempenho da empresa.

O estudo contou com uma amostra final de 308 empresas da Região Norte de Portugal com atividade na indústria transformadora. Os dados do estudo foram obtidos através de um inquérito por questionário e ainda pela recolha de informação financeira das empresas da amostra junto de uma base de dados empresarial. Os dados recolhidos foram trabalhados por um modelo de regressão linear no qual foi aplicado o método de estimação Sandwich. Com a intenção de se obter resultados robustos e consistentes decidiu-se utilizar cinco variáveis dependentes e cinco metodologias de medição.

O estudo desenvolvido permitiu concluir que a literacia financeira melhora o desempenho da empresa, mas numa perspetiva específica. Na relação direta não se observaram impactos da literacia financeira no desempenho da empresa; em associação com a disponibilidade de capital e a flexibilidade de recursos a literacia financeira não melhora o desempenho da empresa. No entanto, concluiu-se que para um nível de sofisticação tecnológica reduzido, a literacia financeira tem impacto no desempenho das empresas.

Palavras-chave: Literacia financeira, desempenho da empresa, disponibilidade de capital, flexibilidade de recursos

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CHAPTER – INTRODUCTION

The human being, as the fundamental link of a society, lives in constant adaptation and evolution. Humanity deepens its knowledge as it makes new discoveries, presents new theories, and creates new rules that govern society. These steps are established in all areas of knowledge so that they can be understood, studied and applied by everyone.

The area of finance, among many others that the human being studies, has a strong impact on society. The practical application of financial knowledge to life in society and the establishment of its rules for use of all makes it essential that this knowledge is passed to all who need apply. Emphasizing the area of business finance, understanding the concepts is essential for entrepreneurs to develop and evolve their business, hence the importance of financial literacy.

However, for various reasons, financial knowledge does not reach everyone who needs it, and those who do, many do not understand it. For this and other reasons, the academic community has been deepening studies in the area of finance that so concerns academics, governments, markets, business structures and society in general.

In a period in which the management methods suffer considerable changes and developments, added to an increasingly complex and diverse financial and banking system, in a digital and global age, in consideration of Rahmandoust, Shah Norouzi, Hakimpoor and Khani (2011), the financial literacy of entrepreneurs is an extremely important aspect for the success of the companies.

Currently, compulsory and necessary financial information for the functioning of a company is becoming larger and more complex. Despite the simplifications that the legislature applies to smaller companies, lack of literacy may mean that the less educated entrepreneurs financially have difficulty understanding the financial information and take the most appropriate and effective decisions, affecting the company performance (Brown, Saunders & Beresford, 2006).

Nowadays, on what the flexibility of the market is large, the flexibility of the companies must also follow the dictates of the market. Resource flexibility is one of the key aspects of its survival and evolution. According to Sanchez (1995), the ability that companies have in shaping their resources and adapt to market requirements is a predominant factor in their performance.

In an increasingly technological society and economy, the production and information systems of a company have to keep up with this technological evolution, and companies that do not do so are subject to their extinction. The technological evolution of a company is intrinsically associated with financial literacy and company performance. According to Mabula and Ping (2018), the financial literacy of entrepreneurs, coupled with the adoption of appropriate technology, will enable a reinforcement of operational means, which if well understood and applied, will certainly reinforce the effective practices of companies, improving their performance.

The present study does not only focus on the direct effects that (lack of) financial literacy brings to the company performance. There is also a concern to analyse the implication of internal components of the company in this relationship. Thus, the study is also based on the motivation to investigate which implications the capital availability and the resources flexibility have on the relationship between financial literacy and business performance. In addition, the technological level of the companies studied may also be a factor in the relationship between financial literacy and company performance. The study is adapted to the portuguese enterprise system, specifically in the companies of manufacturing industry from the North Region of Portugal.

In a complex context of financial literacy analysis and company performance, the following central research question is posed: Does financial literacy improve or not the economic and financial performance of the companies?

The object of study are portuguese companies classified as manufacturing industries based in the North Region of Portugal. The companies were selected according to a set of criteria (highlighting the most relevant ones), such as being based in the North Region of Portugal; according to the Portuguese Classification of Economic Activities Rev.3 (CEA) are classified as manufacturing industries; have activity started before 1 January 2013; classified as small and medium enterprises.

The objective of the study is to evaluate the impact of financial literacy on the economic and financial performance of companies and to ascertain the consequences that the capital availability, the resources flexibility and the level of technological sophistication provide in the relationship between financial literacy and companies performance.

Thus, we intend to contribute to the financial literature, evidencing an association between financial literacy and company performance after controlling for other determinants of

company performance, such as: company size, seniority of company, type of industry in which it operates and region of activity; on the other hand, we evidenced three channels through which the relationship between financial literacy and company performance can be improved: through the moderating role of capital availability, of resource flexibility and through of the association by different levels of technological sophistication.

The present study consists of four chapters. The first chapter presents the literature review, approaching the arguments of several authors on the main themes that support the study.

The second chapter consists of empirical study and establishes the connection between the theoretical development and practical part; based on the literature review, this chapter still defines the research hypotheses, the sample, the variables and the econometric model used.

The third chapter comprises the presentation of results, consisting of the presentation of descriptive statistics, the analysis of correlations and the results obtained in the regressions that allow the validation of research hypotheses.

The fourth chapter consists of the conclusion, study limitations, and clues of future research.

CHAPTER I – LITERATURE REVIEW

1.1. Financial literacy

1.1.1. Definition of financial literacy

Financial literacy is recognized by many authors (for example: Orton, 2007) as an important tool that helps people improve their decision making and choice of financial products, contributing to their financial stability. However, existing concepts do not concretely distinguish a financially literate person from a financially illiterate person. There is also no consensus on the measurement of the concept of financial literacy, and although its importance is considered unquestionable by many researchers, there are few who focus on its measurement (Huston, 2010).

The definition of financial literacy has several approaches: while some authors advocate a broader concept, others turn to a narrower concept. According to Schagen and Lines (1996), financial literacy combines the ability to understand key concepts related to money management, knowledge of the functioning of financial institutions, services and systems, analytical capacity and responsible financial management. This operationalization of financial literacy includes two components: cognitive component and psychological component (will and confidence).

In the perspective of Moore (2003), people are financially literate when they can demonstrate the knowledge acquired. Literacy is obtained through practical experience and active knowledge integration. As people become more literate, they become financially more sophisticated and consequently more competent.

According to Orton (2007), financial literacy is the ability to read, analyse and communicate about personal financial conditions that affect material well-being. It includes the ability to discern financial decisions, discuss financial matters, and respond competently to the various life stages and events that affect financial decisions, including events in the general economy.

A common element among the various definitions of financial literacy involves an individual's ability to acquire essential knowledge and skills in order to make decisions conscious of the possible financial consequences. Includes being able to

manage personal finances in changing circumstances (Mota, Trindade & Silva 2017, p.139).

1.1.2. The importance of financial literacy in the individual and in society

The technological evolution of the last decades has shaped society and all that integrates it. The relationship between society and the financial world has also been the target of increasing technological complexity, requiring that this relationship remains in constant evolution. Thus, an individual who has understood financial markets for 15 or 20 years does not mean that they understand them today, meaning, in the perspective of the Australian Securities & Investments Commission (2003), the evaluation of the financial knowledge of an individual is something dynamic and subjective. According to Volpe and Mumaw (2010), the level of financial literacy of the individuals did not follow the various changes of the market, this is, they were confronted with the emergence of many financial products for which their financial knowledge were inadequate to carry out a competent assessment.

Lack of financial literacy, even in the most common financial applications such as loans and deposits, have consequences in the lives of individuals. Stango and Zinman (2007) found that individuals who fail to make the correctly calculations underestimate loan interest rates and underestimate the future values resulting from capitalization of interest, leading to a lack of interest in savings, to higher indebtedness and low wealth accumulation. Thus less financially literate individuals, along with the increasing complexity of financial products, can promote misallocation of wealth and savings, leading to social decline and increased public spending, particularly in unemployment benefit and health care costs (Habschick, Seidl & Evers, 2007).

Hendriks (2010) reinforces the idea that financial education can help initiate savings plans, manage debt and make strategic investment decisions to reform of the individual or for the education of their children. Looking at the retirement factor, a concern for most individuals, according to Lusardi (2008), those who are financially knowledgeable are more likely to have a retirement plan.

At national level financial literacy is also a prominent. The Banco de Portugal, the Comissão do Mercado de Valores Mobiliários and the Instituto de Seguros de Portugal (2011)

recognize that financial literacy, in addition to strengthening regulation and transparency of information, emerges as a way to contribute to a sustainable economic recovery and the prevention of future crises. In Portugal, these aspects are of particular importance due to the high level of indebtedness of the economy and the low level of savings, also aggravated by the demographic conditions of the country.

It can be concluded that financial literacy is important to society because it can constrain or reflect a diverse set of financial decisions and behaviours, including debt, retirement planning, wealth accumulation, capital market participation, among others. Kefela (2011) highlights the importance and purpose of financial education, with the aim that people become able to make informed financial decisions, develop awareness of financial issues and learn the basics concepts about income, spending, budgeting, economics, loans and investments. Thus, financial literacy can help people set financial goals and optimize their financial options.

1.1.3. The importance of financial literacy for company performance

According to Drucker (2004), companies must be managed as living organisms as organizations in continuity with the goal of creating wealth. To verify that the investments made in assets are creating value, it is necessary to identify the factors affecting the performance of companies so that decisions are taken in good time. One of the aids in the identification of these factors is the assessment of financial performance, particularly through the analysis of financial statements of companies.

According to Mota and Custódio (2008), the referred financial statements are a fundamental source of information, including allowing the calculation of several indicators that make it possible to obtain an adequate picture of the company's financial performance.

Financial indicators can be grouped according to approaches such as traditional assessment approach of financial performance and value creation approach. Considering the purpose of the study, reference is made to the traditional approach of financial performance.

Segundo Peterson and Peterson (1996; cited by Krauter, 2006), traditional measures of financial performance are based on accounting data. The most cited are the Return On Investment (ROI), Return On Assets (ROA), Return On Equity (ROE) and Earnings Per

Share (EPS). The advantages of these indicators are easy calculation and interpretation and easy to obtain because they are available in the organizations reports (Peterson & Peterson, 1996; cited by Krauter, 2006). As main disadvantages of these indicators, Martin and Petty (2004) refer to the fact that accounting profits and cash flows are not equal, accounting data do not reflect the risk of operations, do not consider the opportunity cost of equity or the time value of the money. The adoption of different accounting practices by companies can also skew reported earnings, reducing the reliability of the indicator. Although some important disadvantages are evident in the use of these indicators, it is the most common procedure in the analysis of financial performance and on which there are considerable studies that test their validity, since it allows to analyse and report what happened in the past and provides support for understanding what might happen in the future (Iudícibus, 2008).

Entrepreneurs, being an integral part of society, play an important role as economic drivers of a society. As its success is an important element for the sustainable development of a society, strengthening the financial literacy of entrepreneurs is an important aspect for their success and for the success of society itself (Rahmandoust et al., 2011).

Globalization and the introduction of technologies in the economic system changed the way business is currently performing. Today, companies have access to huge sources of financial information and this results, according to Gouws and Shuttleworth (2009, p.142), “the need for information processing, understanding and analysis by individuals who cannot necessarily make an authentic connection between financial numbers and the real context of the business world”. Thus, it is important to strike a balance between the information that is relevant and the ability people have to interpret it. According to Ditillo (2004), understanding how an organization can manage knowledge is a subject that has received increasing attention. This is a focus that Gouws and Shuttleworth (2009) highlight in their study, showing that the information management process, especially financial information, influences the way decision makers’ act, plan strategies and gain competitive advantage.

Currently, the responsibilities and financial decisions are disseminated throughout the organization and not just in the financial director, requiring a high level of financial literacy of different managers of an organization (Beauchamp & Hicks, 2005; cited by Gouws & Shuttleworth, 2009).

In modern financial management theory, management functions and behavioural functions of finance are dominant, strengthening the position of financial management. However, real

life experience shows that small business owners often perform multiple functions and can personally handle accounting, payments and taxes, even if they do not have right skills (Rahmandoust, 2011; cited by Ishmuhametov & Kuzmina-Merlino, 2017).

According to Brown et al. (2006), individuals as business owners, even though they may have the ability to read and understand fundamental financial statements, may not have the ability to make informed judgments and make effective decisions regarding the use and management of money. In this perspective, Sage (2012), in a study of Canadian entrepreneurs, showed that when confronted with their financial knowledge limitations, 71% use consulting services to decrease these limitations. Those who use this type of service admit that there are areas of business activity about which they need to develop knowledge such as tax, sales management, marketing and finance management. In a study similar to the previous one but with English entrepreneurs, Brown et al. (2006) identified the top five areas that lead english entrepreneurs to seek outside services: finance, accounting, business planning, insurance, and information technology. In addition, Brown et al. (2006) concluded that entrepreneurs, despite being aware of their lack of financial knowledge, did not understand its importance, thinking that the need to educate themselves is not more important than other aspects of company management.

Sometimes the efforts made do not achieve the intended objectives. However, according to Bayrakdaroğlu and San (2014), training entrepreneurs, according to their basic financial needs, is the most appropriate and efficient way of economic development and business growth.

According to Bayrakdaroğlu and San (2014), the low level of financial literacy and financial awareness can increase the psychological barriers in financial markets at the same time decreasing the confidence on the market. Thus, financial education can be considered as one of the basic requirements needed to facilitate robust financial decision making (Ishmuhametov & Kuzmina-Merlino, 2017; Gouws & Shuttleworth, 2009).

In his study, Ishmuhametov and Kuzmina-Merlino (2017) recognized that financial education is an important step towards sustainability and that it would be beneficial for the organization that the decision makers at all levels to be financially educated. Thus, they conclude that an organization with a financially literate workforce has a competitive advantage over one that does not.

The relationship between financial literacy and company performance can be conditioned in several ways as shown below. Eniola and Entebang (2015) consider that financial literacy is an important factor for employees but also for employers and the company as a whole, contributing to their productivity and effectiveness. According to Cakebread (2014), the advantages of financial literacy are not only unilateral, they provide employees with information to become financially informed, but they will also improve the company's financial results.

According to Bannon, Ford and Meltzer (2014), financial literacy can be beneficial for employees and employers, and consequently can positively influence company performance. The authors highlight the benefits for employers, such as increased productivity, cost reduction with health insurance (financial knowledge reduces the impact with personal financial concerns) and higher employee retention. With regard to employee benefits, the authors concluded that employees improve their financial decisions, build assets and reduce debt, contributing more to retirement plans.

In line with what was said earlier, Joo and Garman (1998) state that company productivity is affected by the financial problems of its employees, concluding that in the genesis of many cases are problems caused by reasons of lack of financial literacy. Wood (2017) refers that the Financial Education and Literacy Advisers estimates that US workers spend an average of 28 hours per month researching financial issues. The causes mentioned are the lack of literacy, mainly in the mathematical and financial areas. Consequently, time wasted due to lack of financial literacy of employees affects company performance. (Mousinho, 2013).

Taking a different approach to the relationship between financial literacy and company performance, Eniola and Entebang (2015) analyse the impact of financial literacy on company performance from a perspective where financial literacy is understood in three dimensions, knowledge, awareness and attitude. Regarding the knowledge dimension, Kidwell and Turrisi (2004; cited by Eniola & Entebang, 2015) indicate that companies with better financial knowledge maintain detailed financial records and have a greater competitive advantage in accessing external financing than other companies that do not. In the awareness dimension, this comes from the management part, where it is the manager's duty to take care of the organization for the well-being of the business. The ability to read, analyse, manage and discuss various financial conditions are important for the performance and well-being of the company (Lusardi & Tufano, 2009; Vitt & Ward, 2000; cited by Eniola & Entebang, 2015). Braunstein and Welch (2002; cited by Eniola & Entebang, 2015) point out that

obtaining additional information can lead to a better financial attitude. However, the attitudes of entrepreneurs may be conditioned by certain factors. Bond and Meghir (1994; cited by Eniola & Entebang, 2015) observed that, when credit conditions are favourable, the attitudes of entrepreneurs to access this credit tend to be positive and, therefore, the expansion of capital leads to increased commercial activity.

Another approach to the relationship between financial literacy and the company performance consist in the develop theories. According to Peteraf and Barney (2003), theories based on resources and capabilities of a company are the fundamental factors of the performance of a company. Managing these resources requires financial knowledge, and company performance is dependent on financial literacy.

Exchange theory, proposed by Robson and Ladner (2006; cited by Chamwada, 2015), affirms that interpersonal, interactional, procedural and informational factors are linked to literacy skills. Hence, the higher the interactions, the higher the level of literacy the individual will have.

Transaction theory, described by Polski et al, (2001; cited by Chamwada, 2015), affirms that organizations incur costs as they acquire, configure and utilize resources. This transaction costs reflect the costs of economic or organization both outside the firm and inside the firm. In addition to that, they are means by which one can measure the efficiency of different institutional designs in achieving economic outcomes in particular environments. In order for an individual to effectively manage transactions, they ought to have financial management skills.

Prospect theory was developed by Kahneman and Tversky (1979; cited by Chamwada, 2015) and affirms that decisions pertaining to financial matters of organizations are always among alternatives that involve risks (this is, alternatives with uncertain outcomes) where the probabilities are known. This model theory is descriptive in that it tries to describe real-life choices rather than optimal decisions. Prospect theory speculates that before the owner makes any financial decisions, he must consider most of the risks involved.

1.2. Capital availability

Obtaining capital may have a key role in the success and strategic definition of companies, and their rejection may compromise such objectives. Brush, Greene, Hart and Edelman (1997) noted that due to the financial capital restrictions, many innovative products and services may never reach the market. Access to finance capital provides companies with the time needed to explore intensive growth strategies in resources and experience innovative projects that otherwise would be impossible to achieve in an environment with limited resources (Mousa, 2009). According to Inmyxai and Takahashi (2010), the business financing is an important factor to fund strategic resources, restructure and or expand business in accordance with the objectives of profit maximization business. Barney (1991) argues that companies need sufficient financial capital to support the implementation of internal growth strategies and also to gain competitive advantage through superior returns.

Just as access to or restriction of capital can influence the success of a company, the way one accesses such capital can be an important and influential factor.

The availability of capital a company can have several sources, and according to Tavares, Pacheco and Almeida (2015), according to the corporate governance model adopted by the company and its needs, the sources of financing may be internal or external. Given that the amount of start-up capital is often related to the stipulated start-up strategy, especially in Small and Medium Enterprises (SME), this availability may largely depend on informal sources of funding such as family members and friends. However, not everyone can get capital by sources of domestic financing, and forced to seek external financing which is often not available, particularly for SME (Coleman, 2007).

The relationship between capital availability and company performance, especially the effects of capital availability on company performance, has been a source of study for several researchers.

Kidwell and Turrisi (2004) report that firms with better financial knowledge keep detailed firm financial records and have a competitive advantage in accessing external funding than other companies who keep not. The availability of financial capital influences growth and performance of companies (Cooper, Gimeno-Gascon & Woo, 1994).

Robb and Coleman (2009), in a study made with data collected by the US Federal Reserve in 1998 on the small business finance, found that the human capital in the form of business experience and financial capital in the form of loans were omens of growth for companies. Although the results are not consistent, they seem to suggest a connection between financial capital and company performance.

Access to financial capital is a critical resource necessary to achieve the objectives of a business, such as growth and performance as well as the realization of development and innovation activities (Sexton & Bowman-Upton, 1991). According to Adomako and Danso (2014), the availability of financial resources can support the effective implementation of business management plans, allowing that the companies access to financing that although they may be more demanding in terms of guarantee requirements also have a better chance of success.

Ngek (2016, p.356) argues that

the availability of financial resources has more probability to increase the relationship between financial literacy and company performance, so that this relationship becomes more positively correlated with company performance under high levels of financial capital availability. Consequently, the availability of financial capital is expected to positively moderate the relationship between financial education and company performance.

Sometimes the impact of capital availability may not prove positive for the company. Filser, Eggers, Kraus and Málovics (2014) analyzed the impact of the availability of financial capital on the growth of small and medium enterprises in Austria and Hungary from two perspectives: for entrepreneurs and customers. Results were mixed, while in Hungary the availability of financial capital had a positive impact on both perspectives and consequently on growth; while in Austria the availability of financial capital had a positive impact on the entrepreneur's perspective but negative on the customer's perspective, affecting the long-term growth of the company. Filser et al. (2014) concluded that the less financial resources are available, the more likely the company is to be targeted from the customer's perspective, responding only to their needs and eliminating investment projects considered important from the entrepreneur's perspective but not necessarily from the customer's perspective.

1.3. Resource flexibility

Currently, the business world is undergoing a change in patterns. The logic of mass production and the low cost is shifting to a logic of producing high quality goods and services, made individually or in small batches to meet the specificities of small consumer groups. This change requires greater flexibility in the manufacturing system to adapt rapid changes in product design to customer requirements. (Wagner & Hollenbeck, 2010).

Today, the market is clearly determined by the customer; in other words, the producer must produce what the consumer wants, making markets more uncertain due to resource scarcity and rapid product innovations, increasing the complexity of the decision in the manufacturing system (Zapfel, 1998). Flexibility is an attribute and an essential intangible asset in company with capacity survivable (Chauhan & Singh, 2013).

According to Flynn and Flynn (2004), companies have to achieve a high level of performance in various dimensions of competitive performance, such as quality, flexibility and innovation, arguing that only those who achieve the required high performance will thrive. The required flexibility can only be achieved with flexible resources, namely the flexibility of machines and the workforce, the most important resources of an organization (Chauhan & Singh, 2011).

Emphasizing the importance of resource flexibility in the performance of the organization and its adaptation to market disturbances, Rudd, Greenley, Beatson and Lings (2008) analysed the impact of various resources on the organization's financial and nonfinancial performance. They concluded that the flexibility of operational and financial resources have positive impacts on the organization's financial performance. Regarding non-financial performance, improvements were noted when flexibility was checked at the structural and technological level of the organization. Despite the different impacts that resource flexibility has in the organization, the authors concluded that the management team should be able to make an effective mediation of the flexibility of resources in order to anticipate and prevent the market disturbances and also monitor these changes over this period. Managers must be aware of the risks but must be willing to make appropriate decisions about changes in their operations, finances, structure and technology in order to achieve the necessary flexibility to impact their performance.

The flexibility of human resources can be fundamental to promote the ability of organizations to respond to the changes required by the market, be adaptable and successfully operate in dynamic environments, and thus positively influence the performance of organizations (Lepak, Takeuchi & Snell, 2003; Wright & Snell, 1998). The influence of human resources on the performance of an organization is demonstrated in the study developed by Ketkar and Sett (2010), having verified the effects direct and statistically significant that flexibility of human resource fulfils as structural mechanism for company performance. The study concluded that human resources practices can have two independent but complementary roles. One of the roles is to help convey skills and flexible behaviours, helping the company maintain superior performance. The other role, as an institutional system, is to ensure that the company continues to develop new skills and behaviours consistently, as the environment undergoes significant changes. In another study, it is concluded that the implementation of flexibility mechanisms in the allocation of financial, human and physical resources, even partially, generates substantial improvements in operational performance (Daniels, Mazzola & Shi, 2004).

The companies may be influenced by the extent to which flexible resources allow them to explore business opportunities in less developed market economies. Consequently, it is likely that the flexibility of resources enhances financial literacy and the relationship with the company performance, so the impact on the overall performance is strongly positive (Adomako & Danso, 2014).

In the opinion of Sanchez (1995), resource flexibility enhances performance, that is, it increases the ability of companies to easily transform resources and get a quick response to changing market preferences. Similarly, Sirmon and Hitt (2003) reinforce this position by stating that when resource flexibilities are improved, companies can extend the range of their use, allowing them to find adaptive resources to show a higher set of capabilities.

1.4. Level of technological sophistication

In general, SME are managed by the owner himself or by a very small management team, implying a high cost to obtain relevant information as a basis for rational decision making. Therefore, the use of technology, associated with financial literacy, can greatly improve the decision making process (Mabula & Ping, 2018).

According to Servon and Kaestner (2008), especially in developing economies, there is a predominance of low technology, being the use of technology a fundamental basis for the success of organizations.

The general extent of utilization of technology by SME is at low level (Rahman, Yaacob & Radzi, 2016). However, the literature provides ample evidence that the use of technology is an important determinant of SME success (Oyeku, Oduyoye, Asikhia, Kabuoh & Elemo, 2014). Because of their size, SME are more likely to cash flow problems, and therefore have fewer resources available to a sophisticated management of financial instruments, since they do not participate in economies of scale and not have the market power that large companies have (Fariselli, Oughton, Picory & Sugden, 1999; Premkumar & Roberts, 1999).

According to Berisha-Namani (1999), the use of information technology by SME can benefit them by developing competences for managing, information intensive resources, reduce the transaction costs and develop capability to gather information locally and internationally resulting into rapid flow of information. Iansiti and Lakhani (2014) report that in addition to the challenges created, broad benefits justify the adoption of new technologies by individuals and companies. The adoption of new technologies opens the way for the acquisition of new skills and knowledge, at the same time that these technological innovations provide new types of business, mainly related to e-commerce.

The productivity of a company can be improved by adopting technological innovations, allowing the reduction of transaction costs, advertising and promotion, eliminating the traditional supply chain and streamlining communication with customers. Adherence to technological innovations allows SME to survive and compete against larger organizations (Sun & Zhang, 2006; Talukder & Quazi, 2010; Kim, Chan & Gupta, 2007).

At company level, financial literacy emphasizes the ability of the manager/owner of the company be able to apply their financial knowledge in business operations. The concept of financial literacy for SME stems from the nature that characterizes SME, from a small entity with one or a few owners, in which they try to apply their knowledge in company management (Messy & Monticone, 2012). Olawale (2014) conducted a study on South African microenterprise financial literacy and concluded that there is limited use of technology by most companies, particularly the situation where most companies have no email address and the inaccessibility of access to internet in the workplace. The restriction of access to financial literacy and basic education results in limited access to financial services, focusing on the use of informal financial systems with which they are most familiar. According to Bansal (2014), this barrier can be overcome by applying information technology, enabling a feasible option to reduce transaction costs and create convenient platforms for users.

Coupled with the low technological level, developing economies show divergences in the adoption of new technologies, while some have been able to capitalize on technological benefits, others have not (Datta, 2011). The choice of technology is considered the most important decision, especially for developing economies. On the other hand, financial literacy, especially in developing economies, is considered relatively low (Messy & Monticone, 2012). Therefore, analysing this matrix of financial literacy and the impact of technology application on the practices and performance of SME, Mabula and Ping (2018, p.80) concluded in their study that

the most of SME finds it is cost ineffective to monitor the present and updating to upcoming newer information technology versions which are emerging now and then. In addressing these challenges it is important to understand the relative impact of financial literacy and information technology on firm practices as it has been exemplified in this study. Situating SME owner/managers financial knowledge and skills entwined with right technology adoption has an array of operational reinforcement of which if well understood and utilized will definitely enhance firm effective practices ultimately improve performance. Investment on SME risk management good practices and a good system of financial information collection, processing, keeping and dissemination has valuable tie with firm performance.

1.5. Resource-Based View

Analysing the theoretical perspectives of various authors who support the relationship between financial literacy and firm performance with the implications of capital availability and resource flexibility, there is a need to better understand these relationships.

It is with this purpose that we highlight the Resource-Based View (RBV). This theory allows us to discuss the beneficial effects of resource flexibility and capital availability on the relationship between financial literacy and firm performance, arguing that the relationship between financial literacy and firm performance is positively moderated by the capital availability and the resource flexibility.

The RBV comes in an attempt to explain the performance of a company is or is not related to the external side (industry) or the internal dimension (specific factors of the company). The RBV explain, through the internal side, that competitive advantage is created by the accumulation of resources, capacity and knowledge unique (Cater, 2005).

According to Barney (1991), companies that have and exploit rare and valuable resources will be able to achieve a competitive advantage, manifesting a better short-term performance. Thus, the RBV is one of the most accepted strategic management theories, presenting resources and capabilities as an essential and indispensable source for obtaining competitive advantage and, consequently, a higher performance for companies.

Barney (1991) shows that the superior performance of a company is sustainable when it has resources capable of providing unique results. These resources can be valuable (those that exploit opportunities and neutralize threats), rare (those that are not present in any concurrent change), imperfectly imitable, and have no strategic equivalent.

According to Wernerfelt (1984), Barney (1991) and Grant (1991), to achieve a competitive and sustainable advantage through a RBV should be noted two basic assumptions. The first is that companies within an industry may have differentiated resources (heterogeneous) to develop different strategies. The second is that resources may not have perfect mobility by companies, allowing for heterogeneity long term. According to Wang, Lin and Chu (2011), the competitive advantage of a company allows it to stand out from the competition and get the same benefits as its competitors at a lower cost, ensuring benefits that surpass competitive products. According to Sirmon, Gove and Hitt (2008), for the competitive

advantage to happen it is necessary to identify the main activities of the company so that there is a concentration on the resources necessary and indispensable for its good performance. The adoption of this set of resources is fundamental to achieve a competitive advantage and, consequently, an increase in the company performance (Leonidou, Leonidou, Fotiadis & Zeriti, 2013).

According to Barney (1991), the main idea of the RBV theory is that a company can achieve a competitive advantage and possibly growth and superior performance compared to its competitors, if it can acquire and control valuable, rare, inimitable and non-replaceable resources, provided that it has the ability to absorb them and apply¹.

¹ In this sense, the valuable and rare resources would be the flexibility of resources and the availability of capital and the ability to absorb and use them would derive from financial literacy.

CHAPTER II – EMPIRICAL STUDY

2.1. Formulation of research hypotheses

After the formulation of the research problem and the literature review, the investigator makes the research hypotheses. These are previous answers to the proposed central research question and are usually developed on the basis of previous studies. Research hypotheses are admissible assumptions that attempt to solve the starting question and help to understand the subject. These are not necessarily true, as they are formulated so that at the end of the investigation they are considered true or false (Sousa & Baptista, 2011).

Remembering, the central research question is: Does financial literacy improve or not the economic and financial performance of the companies?

The first research hypothesis is based on the direct relationship between financial literacy and company performance. According to Bannon et al. (2014), financial literacy can be beneficial for employees and employers and can positively influence company performance. According to Ishmuhametov and Kuzmina-Merlino (2017), financial education is an important step for the sustainability of the organization, that is, an organization with a financially literate workforce has a competitive advantage over one that does not. Based on the studies previously exposed (Eniola & Entebang, 2015; Cakebread, 2014; Bannon et al., 2014; Lusardi, 2008; Wood, 2017; Mousinho, 2013; Ishmuhametov & Kuzmina-Merlino, 2017; Peteraf & Barney, 2003; Chamwada, 2015), research hypothesis is proposed:

H1: The financial literacy generates improvement of the company financial performance, *ceteris paribus*.

The second research hypothesis is based on the influence of capital availability on the relationship between financial literacy and company performance. Sexton and Bownman-Upton (1991) consider that access to financial capital is a critical resource necessary to achieve the objectives of a business, such as growth and performance as well as the realization of development and innovation activities. According to Kidwell and Turrisi (2004), companies with better financial knowledge maintain financial records and have a competitive advantage in accessing external finance than other companies that do not. According to Ngeek (2016), the availability of financial resources generates more probability to increase the relationship between financial literacy and business performance, such that

this relationship becomes even more positive in high levels of financial capital availability. According to Adomako and Danso (2014), as well as support the effective implementation of plans of business and financial management, the availability of financial resources allows access to more stringent financing in terms of guarantee requirements and the best chance of success. In addition to the studies previously presented, it is considered that, in fact, having financial literacy and capital availability, it is possible to implement choices of various types of financial resources that will help business development; if there is no capital available, financial literacy does not materialize in this area as it is not possible to choose the most appropriate means of financing, thus losing this development channel. Accordingly, research hypothesis is proposed:

H2: The positive influence of financial literacy about company financial performance is stronger the greater capital availability of company, *ceteris paribus*.

The third research hypothesis is the influence of resource flexibility on the relationship between financial literacy and company performance. According to Sanchez (1995), resource flexibility enhances performance, that is, it increases the ability of companies to easily transform resources and get a quick response to changing market preferences. According to Daniels et al. (2004), implementing flexibility mechanisms in the allocation of financial, human and physical resources, even partially, shows substantial improvements in operational performance. According to Adomako and Danso (2014), entrepreneurs with a high level of financial literacy are more likely and better able to change existing resources and above all know how to do so as this is a feature of financial literacy; however, if there is no resource flexibility this channel of financial literacy cannot be exercised. Thus, research hypothesis is proposed:

H3: The positive influence of financial literacy about company financial performance is stronger the greater flexibility resources of company, *ceteris paribus*.

The following research hypotheses are supported by the relationship between financial literacy and company performance according to the company's technological level. According to Rahman et al. (2016), in general, the use of technology by SME is low level. In this sense, the use of information technology can benefit SME, such as the development of a set of skills and knowledge, promoting new types of business (Berisha-Namani, 1999; Iansiti & Lakhani, 2014). In this context, financial literacy plays a relevant role, according to Messy and Monticone (2012), financial literacy reinforces the ability of managers to be able to apply their financial knowledge in company operations. Therefore, incorporating the use of technology to construct the financial literacy studies verifies a remarkable impact on practices and the financial performance of companies (Olawale, 2014). Complementarily, in companies with less technological resources, the ability of managers to have greater financial literacy, greater capital availability and greater resources flexibility increases the probability of higher performance, for each of the variables mentioned above can act as a substitute for the reduced level of technological sophistication, allowing to solve problems and gaps that under normal conditions would be solved with the use of technological resources. Thus, the following research hypotheses are proposed:

H4a: The financial literacy causes stronger positive effects about company performance in environments of smaller technological sophistication, *ceteris paribus*.

H4b: The capital availability causes stronger positive effects about company performance in environments of smaller technological sophistication, *ceteris paribus*.

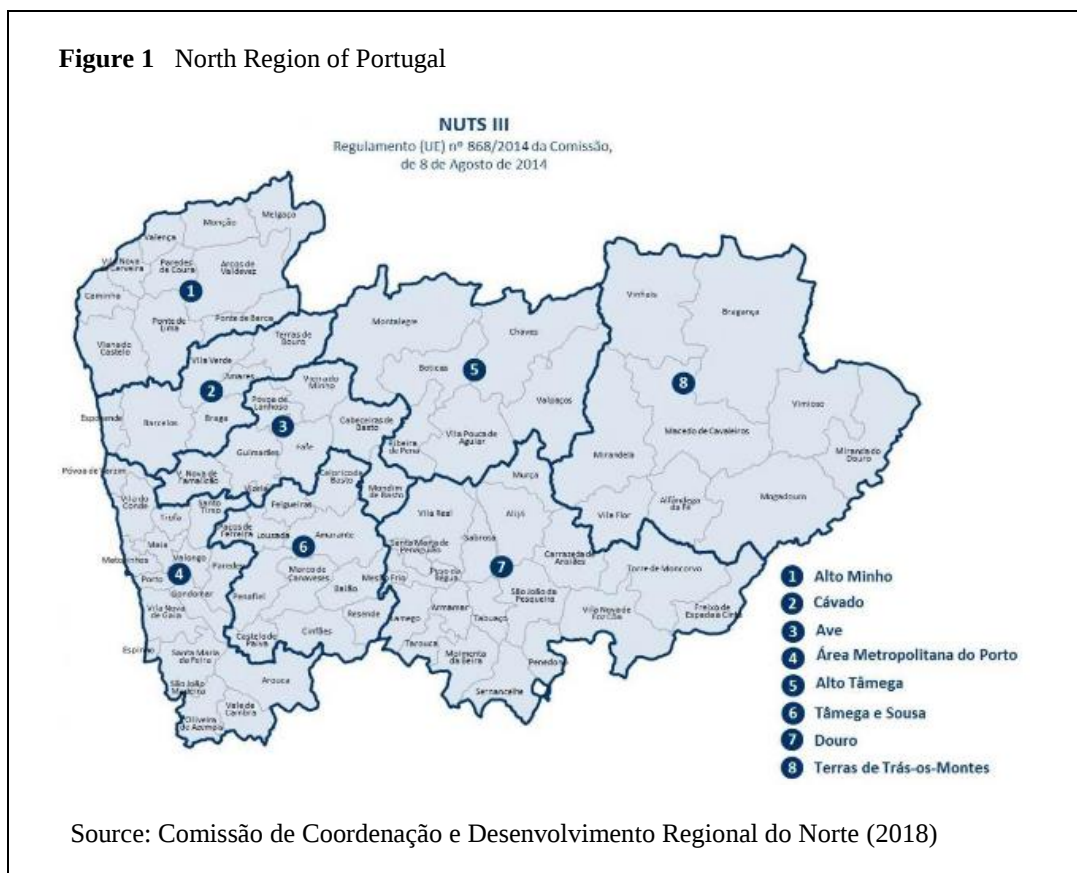
H4c: The resources flexibility causes stronger positive effects about company performance in environments of smaller technological sophistication, *ceteris paribus*.

2.2. Characterization of the sample

The criteria used to define the sample of the present study were:

1. Companies based in the North of Portugal. The Commission Regulation (EU) 868/2014 of 8 August 2014 defines, in the form of the Common Nomenclature of Territorial Units Statistics, the North Region of Portugal as shown in Figure 1.

Figure 1 North Region of Portugal



According to Comissão de Coordenação e Desenvolvimento Regional do Norte (2018), the North Region of Portugal is made up of 3,6 million inhabitants concentrating almost 35% of the resident population in Portugal. Being a large industrial force, it constitutes around 39% of national exports and represents about 29% of the Gross Domestic Product (GDP) of the national economy. At the administrative level, the North Region of Portugal is composed of 86 municipalities and 1426 parishes. The municipalities are grouped into eight intercity communities as shown in Figure 1.

2. Another criterion of the sample is the Portuguese Classification of Economic Activities Rev.3 (CEA), opting for the typology of companies in Section C - Manufacturing industries. This choice is due to the characteristics of the companies that characterize this sector and its frame with the hypothesis of the study, namely the characteristics, needs and resources that these companies and their directors/managers/responsible need to manage their companies. These are companies in which the directors/managers/responsible need financial knowledge, are companies that need resources, both human and technological, and are companies that need continuous availability of capital for its activity and modernization. For the type of activity that these companies develop, these features are essential to its operation and performance. In short, considering that in manufacturing industries the role of resource flexibility, capital availability or differentiation of technological sophistication plays a larger role than in primary or tertiary activities, it was decided to work with companies in section C.

According to the Instituto Nacional de Estatística (INE, 2007), manufacturing industries are characterized by entities that in their activity transform, by any process, raw materials from various economic activities into new products.

Within the section are included the target companies of the study, which are circumscribed in 24 divisions, which are:

Table 1

Description of the divisions of Section C that compose the study sample

Division	Description
10	Food industries
11	Beverage industry
12	Tobacco industry
13	Manufacture of textiles
14	Clothing industry
15	Leather and leather products industry
16	Wood and cork industries and articles thereof, except furniture; Manufacture of basketry and espadrilles
17	Manufacture of pulp, paper and paperboard (except corrugated)
18	Printing and reproduction of recorded media
19	Manufacture of coke, refined petroleum products and of combustible agglomerates
20	Manufacture of chemicals and of synthetic fibers or artificial, except pharmaceuticals
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
22	Manufacture of rubber and plastics articles
23	Manufacture of other non-metallic mineral products
24	Basic metallurgical industries
25	Manufacture of metal products, except machinery and equipment
26	Computer equipment manufacturing, equipment for communications and electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment, N. E.
29	Manufacture of motor vehicles, trailers, semi-trailers and components for motor vehicles
30	Manufacture of other transport equipment
31	Manufacture of furniture and mattresses
32	Other manufacturing industries
33	Repair, maintenance and installation of machinery and equipment

Source: Instituto Nacional de Estadística (2007)

3. The stability and recognition in the market are important factors for the success of a company. The first years of activity are usually of instability and financial data, in this period, do not demonstrate the behaviour of a stable and consolidated company in the market. Thus, another criterion applied was the selection of companies with more than five years of activity, started before of 1 January 2013.

4. Small and medium enterprises categorize most of the portuguese business system. It is in this category of companies that there is the greatest diversity, especially with regard to levels of education and career paths. For this reason, another criterion of the sample corresponds to the selection of small and medium enterprises. According to article 9 n°3 of Decree Law 98/2015, to be a medium-sized company, at the balance sheet date, two of the following three limits cannot be exceeded: balance sheet total (20.000.000,00€), turnover (40.000.000,00€) and average number of employees during the period (250 people).

In addition to those mentioned, another set of criteria was used to define the study sample:

- 5.** Legal form of companies: Sole proprietorship of shares; Private limited company; Anonymous society;
- 6.** Companies with telephone contact and email address;
- 7.** Exclusion of subsidiaries and affiliates;
- 8.** Exclusion from companies without available financial information.

The Iberian Balance Sheet Analysis System (SABI) was the database provided by Instituto Superior de Contabilidade e Administração do Porto that enabled the collection of data that constituted the initial study sample: 3015 companies.

2.3. Definition and justification of variables used

Variables are constructed based on research data. The data collected for an investigation presuppose a set of characteristics that insert them into different research methodology approaches. According to Fortin (1999), the research methodology is a strategic process of how to conduct an investigation.

Dependent variables

The dependent variables of the study consist of financial ratios/indicators that attempt to measure the economic and financial performance of companies; for its calculation, the data were obtained in the database SABI for the year 2017. According to Mattar (1996), these data are classified as secondary data because they are data that have already been collected, tabulated and sorted, and its will be uses for analysis.

The financial ratios collected and dealt with in the study are Return On Assets (ROA), Return On Equity (ROE), Solvency (Solv), General Liquidity (GL) and Financial Leverage (FL_{lev}).

Return On Assets

The ratio results from dividing net income by asset (Equation 1). According to Nunes, Serrasqueiro and Sequeira (2009), this indicator is used for the management of companies as a way to measure the ability of the company assets generate value. The greater the result of the division, the better the ability of corporate assets to generate profitability.

$$Return\ On\ Assets = \frac{Net\ profit}{Asset} \times 100 \quad (1)$$

Return On Equity

The ratio results from dividing net income by equity (Equation 2). This is an indicator that measures a company's ability to add value from its own resources and investor money. This indicator allows the return on capital invested to be measured. This ratio also makes it possible to compare the return rates on the capital market with the return on equity, taking into consideration the cost of financing (Encarna  o, 2009).

$$\text{Return On Equity} = \frac{\text{Net profit}}{\text{Equity}} \times 100 \quad (2)$$

Solvency

The ratio results from dividing equity by liabilities (Equation 3). This ratio provides an analysis of the company's ability to meet its obligations in the medium and long term. The value of this ratio ranges from 0 to 1. The indicator with a value of 1 represents that the equity of the company is identical to the value of its liability and therefore has sufficient capital to cover all the credits obtained. If the indicator is below 0.5 indicates a strong dependence of the company to its creditors, a high economic and financial fragility and a great risk to your creditors. The higher its value, the greater the independence of the company face the responsibilities assumed, creating greater security for creditors in the situation of its liquidation or dissolution (Encarna  o, 2009).

$$\text{Solvency} = \frac{\text{Equity}}{\text{Liabilities}} \times 100 \quad (3)$$

General liquidity

The ratio results from dividing current assets by current liabilities (Equation 4). This indicator makes it possible to compare the company's ability to carry out liquidity, other than fixed assets, with short-term debt, that is, its ability to repay its short-term liabilities with its short-term assets. A value greater than 1 can be considered reasonable as it has short-term financial capacity (Encarnação, 2009).

$$\text{General Liquidity} = \frac{\text{Current assets}}{\text{Current liabilities}} \times 100 \quad (4)$$

Financial Leverage

The ratio results from dividing the company's assets by its equity multiplied by the difference between Return on Equity and Average Cost of Debt Capital (Equation 5). According to Nunes et al. (2009), financial leverage corresponds to a financial effect of the increase in return on equity, produced by increasing the level of indebtedness. This effect always occurs that financing costs are lower than the return on a given investment operation or the investment of the enterprise as a whole. Boosting an improvement in return on equity, financial leverage brings benefits to the company's equity holders because, without having to increase their own invested capital, they achieve higher financial returns. Considering the above, the existence or not of financial leverage depends not only on the return on the investments made, but also on the conditions and financing achieved in the market, namely the financing costs. Obviously, in a financing decision, in addition to the financing conditions, it is also necessary to pay attention to the influence that the increase in indebtedness has on the financial structure of the company and on the short and long term financial risk.

$$\text{Financial Leverage} = \frac{\text{Asset}}{\text{Equity}} \times (\text{Return on Equity} - \text{Average Cost of Debt Capital}) \quad (5)$$

Independent variables

The independent variables come from the data collected in the questionnaire survey. This data is classified as primary data because it is data that has not been previously collected and is collected for the purpose of meeting the specific needs of ongoing research (Mattar, 2005).

The selected companies were invited by e-mail to participate in the questionnaire survey, aiming to obtain data on the areas addressed in the literature review and demonstrated in the research hypotheses. The main areas of inquiry were financial literacy, capital availability and resource flexibility. The information obtained from the questionnaire surveys will be accompanied by the financial indicators obtained for each company and made available by the SABI database².

The survey questionnaire³ consists of 19 questions divided into four groups, available in Appendix A. The questionnaire survey was addressed to the governing body of each entity, specifically to the director/manager/responsible. To participate in the study the entity's email was requested to further validate the response; in order to be able to submit the questionnaire, respondents were required to answer all questions. All recipients were also ensured that the data collected would be treated confidentially and would never be presented individually but only at aggregate levels.

The questions were elaborated and grouped according to the research hypotheses. The question groups concerned:

- Group I: General information (questions 1 to 5). This set of questions intended to know some information about the respondent, in particular about his academic and professional career;
- Group II: Financial literacy (questions 6 to 9). This set of questions intended to analyse the financial literacy level of the respondent;
- Group III: Capital availability (questions 10 to 12). This set of questions intended to obtain some information about the relationship of the entity with the origin of the capital, either own or external;

² The level of participation in the study was 10.22%.

³ The questionnaire survey was conducted using the Google Forms platform.

- Group IV: Resource flexibility (questions 13 to 17). This set of questions intended to understand the ability of company in the flexibility of its resources and to adapt to market requirements.

For the construction of the independent variables were used the data of the Group II (Financial literacy), Group III (Capital availability) and Group IV (Resource flexibility). Depending on the type of question, there were two answer templates⁴: 5-point Likert scale and single-choice answer.

In order to properly convert the answers collected, we did an analysis of the methods adopted by various authors in similar methodological situations. Some examples are:

- The Organisation for Economic Co-operation and Development (2016) has created a guide for building financial literacy indices. In general the index assigned the value of 1 for correct answer and 0 for any other answer.
- Roy Morgan Research (2003; cited by Worthington, 2006) assign responses with quotation ranging from -2 to 2, that is, -2 (not good), -1 (not very good), 1 (good), 2 (very good). When the answer was true or false, 2 points were awarded if the answer was correct and -2 points if the answer was incorrect. After summing up the total score, it was verified which quintile accommodates, ranging from 1 (lowest financial literacy score quintile) to 5 (highest financial literacy score quintile);
- Mendes and Abreu (2006) sought to identify the factors that influence the level of financial literacy of individual investors, for that used three survey questions conducted by the Comissão do Mercado de Valores Mobiliários in 2000 to gain investor financial knowledge. In two of the three questions a score ranging from 0 to 5 was given, and in another question a score of 5 was given if the answer was correct and 0 if incorrect;

Considering the existing literature, it became necessary to convert the different answers into uniform values and framed on the same scale. Considering the methods applied by several authors, it was decided to create a model, based on that used by Roy Morgan Research (2003; cited by Worthington, 2006):

⁴ Appendix A contains the answer templates applied to each question.

- Questions where the answer is single choice, were assigned a value of -2 if the answer was negative and a value of 2 if the answer was positive.
- Questions where the answer is given through the 5-point Likert scale, were scored in the same proportion as the Likert scale, that is, -2 (very irrelevant), -1 (irrelevant), 0 (indifferent), 1 (relevant), 2 (very relevant).

Subsequently to the answers of each group, that is, to each of the three independent variables, five measurement methodologies were applied, obtaining five types of results, allowing to obtain more than one measurement for the same independent variable.

The measurement methodologies used were:

Sum

This methodology corresponds to the simple sum of the values of each answer for each independent variable. Thus, the measurement of each of the variables will have a measurement scale: the financial literacy variable (4 questions) translates to a scale of -8 to 8, the capital availability variable (3 questions) translates to a scale of - 6 to 6, and the resource flexibility variable (5 questions) comprises a scale of -10 to 10⁵. This form of measurement translates into a direct measurement of each indicator, that is, the higher the value obtained the higher the Financial Literacy (FL), Capital Availability (CA) and Resource Flexibility (RF).

Theoretical percentage index

This methodology corresponds to the calculation of a percentage index from the sum of the values of each response of each independent variable (Equation 6). The Theoretical Percentage Index (TPI) is characterized by comparing the value obtained in each company by the sum explained above with the possible theoretical maximum of the independent variable. The maximum percentage of 100% corresponds to the maximum possible points; the minimum percentage of 0% corresponds to the

⁵ Table 6 of the Descriptive statistics section has more information on the independent variables under the measurement methodology: Sum.

minimum possible points, even in case of negative score⁶. This form of measurement translates into a direct measurement of each indicator, that is, the higher the value obtained the higher the FL, CA and RF.

$$TPI = \frac{\text{Sum of the values of the group's responses}}{\text{Maximum theoretical group score}} \times 100 \quad (6)$$

Real percentage index

This methodology corresponds to the calculation of a percentage index based on the sum of the values of each response of each independent variable (Equation 7). The Real Percentage Index (RPI) is characterized by the comparison between the numerator (evaluated by the difference between the real maximum of the group and the real value of each respondent) and the denominator obtained by the largest possible difference between responses of all companies, for this group. For the financial literacy variable the maximum difference obtained was 14 points (the real minimum and maximum obtained were -6 and 8). For the capital availability variable the maximum difference obtained was 12 points (the real minimum and maximum obtained were -6 and 6). For the resource flexibility variable the maximum difference was 19 points (the real minimum and maximum obtained were -9 and 10)⁷. This form of measurement translates into an inverse measurement of each indicator, that is, the lower the value obtained the higher the FL, CA and RF.

$$RPI = \frac{(\text{Real maximum of group score} - \text{Sum of values of the group responses})}{(\text{Real maximum of group score} - \text{Real minimum of group score})} \times 100 \quad (7)$$

⁶ Table 7 of the Descriptive statistics section has more information on the independent variables under the measurement methodology: Theoretical percentage index.

⁷ Table 8 of the Descriptive statistics section has more information on the independent variables under the measurement methodology: Real percentage index.

Theoretical scale index

This methodology corresponds to the calculation of a scaled index based on the sum of the values of each response of each independent variable. The Theoretical Scale Index (TSI) is characterized by the conversion in scale of the values obtained in the Theoretical percentage index for each of the independent variables⁸. The proposed conversion scale, applied in several studies (Pires, 2014; Galstian, 2017; Nogueira, 2011; Fernandes, 2015) comprises:

Table 2

Conversion scale of the Theoretical percentage index for Theoretical scale index

Theoretical percentage index		Theoretical scale index
0% to 20%		1
21% to 40%		2
41% to 60%		3
61% to 80%		4
81% to 100%		5

Source: Own elaboration

This form of measurement translates into a direct measurement of each indicator, that is, the higher the value obtained the higher the FL, CA and RF.

Real scale index

This methodology corresponds to the calculation of a scaled index based on the sum of the values of each response of each independent variable. The Real Scale Index (RSI) is characterized by the scaling of the values obtained in the Real percentage index for each of the independent variables⁹. The conversion scale, applied in several studies (Pires, 2014; Galstian, 2017; Nogueira, 2011; Fernandes, 2015) comprises:

⁸ Table 9 of the Descriptive statistics section has more information on the independent variables under the measurement methodology: Theoretical scale index.

⁹ Table 10 of the Descriptive statistics section has more information on the independent variables under the measurement methodology: Real scale index.

Table 3

Conversion scale of the Real percentage index for Real scale index

Real percentage index		Real scale index
0% to 20%		1
21% to 40%		2
41% to 60%		3
61% to 80%		4
81% to 100%		5

Source: Own elaboration

This form of measurement translates into an inverse measurement of each indicator, that is, the lower the value obtained, the higher the FL, CA and RF.

Control variables

Gender

In Group I of the questionnaire survey was requested from the director/manager/responsible of each company to provide information on your gender¹⁰. In converting this information to numerical data, the value 0 was assigned to the male gender and the value 1 to the female gender. With control variable Gender (Gen) is intended to know the possibility of the company performance depends on the gender of the director/manager/responsible of the company.

¹⁰ In the Appendix C can be found more data on this control variable.

Age

In Group I of the questionnaire survey was requested from the director/manager/responsible of each company to provide respective age¹¹. The data used correspond to numbers integers. With control variable Age (Age) is intended to know the possibility of the company's performance depends on the age of the director/manager/responsible of the company.

Level of education

In Group I of the questionnaire survey was requested from the director/manager/responsible of each company to provide information concerning level of education¹². With control variable Level of Education (LE) is intended to know the possibility of the company's performance depends on the level of education of the director/manager/responsible of the company. Each level was converted to an integer number in ascending order as shown in the following table.

Table 4
Conversion of level of education into values

Level of education	Values
1st cycle of studies	1
2nd cycle of studies	2
3rd cycle of studies	3
Secondary (scientific-humanistic aspect)	4
Secondary (professional aspect)	5
Baccalaureate	6
Graduation	7
Postgraduate studies	8
Master degree	9
PhD	10

Source: Own elaboration

¹¹ In the Appendix C can be found more data on this control variable.

¹² In the Appendix C can be found more data on this control variable.

Logarithm of total assets

The total assets of each company for the year 2017 was obtained from the SABI database. The collected data were converted to logarithms¹³. With control variable Logarithm of Total Assets (LogTA) is intended to know the possibility of the company's performance depends of the total assets of the company.

Level of internationalization

The level of internationalization of each company for the year 2017 was obtained from the SABI database. According to Sullivan (1994), the level of internationalization is a criterion that identifies the situation in which the process of international expansion in terms of growth and value creation of the company is in relation to operations that perform in the foreign market. One of the most used criteria for a long time to characterize the level of internationalization of a company is the international sales volume, and nowadays there are more evaluation criteria (Sullivan, 1994). For this study, data are presented as a percentage resulting from the division of international sales by the turnover of company. With control variable Level of Internationalization (LI) is intended to know the possibility of the company's performance depends of the level of internationalization of the company.

Economic activity sector to Pavitt

According to Pavitt (1984), considering the associated technological sophistication, Pavitt's taxonomy divides industries into five groups. These are organized in ascending order from the least technologically sophisticated industry/sector to the most technologically sophisticated industry/sector. The groups are:

- Group 1: Food, beverages and tobacco;
- Group 2: Textiles, clothing and leather;
- Group 3: Wood, pulp, paper, printing, furniture;

¹³ The conversion into logarithm understand the fact of the variables have different scales, intended to reduce the high variance of asset variable.

- Group 4: Chemicals, rubber, plastics, non-metallic products, basic metal products, metal fabricated products, recycling sectors;
- Group 5: Machines, office machines, electrical machines, medical instruments, motor vehicles, other transport equipment.

The conversion of the CEA into groups was made in direct correspondence to the groups defined by Pavitt's taxonomy. With the control variable Economic Activity Sector to Pavitt (EASP) is intended to control the possibility of the company's performance depends on the level of technological sophistication, especially as this level has an impact on how financial literacy impacts performance.

2.4. Econometric model used

The relationship between two or more variables can be explained through an econometric model that allows to test the various hypotheses and make the respective validation. The econometric model used was the linear regression model, in which was applied the estimation method Sandwich obtained through the command "VCE (robust)". The choice for the Huber-White estimation method is due to the fact that has been admitted the heteroscedasticity with the use of the OLS method; this way, the sandwich estimator (Huber-White) is asymptotically not biased, presenting estimation errors with variance not dependent on explanatory variables; this way the use of this estimation method allow to correct the problem of heteroscedasticity that would be associated with usual estimator OLS.

The hypotheses 1, 2 and 3 were tested in the Stata statistical software for each of the following measurement methodologies represented. To test the hypotheses 4a, 4b and 4c the sample were divided into three sub-groups (depending on the technological sophistication level of companies) and were repeated for each sub-group the regressions initially applied to the global sample.

Sum methodologies

$$Y_i = \beta_0 + \beta_1 FL_S + \beta_2 CA_S + \beta_3 FR_S + \beta_4 (FL_S \times CA_S) + \beta_5 (FL_S \times RF_S) + \beta_6 Gen + \beta_7 Age + \beta_8 LE + \beta_9 LogTA + \beta_{10} LI + \beta_{11} EASP + \xi \quad \text{Model 1}$$

Note: $i = 1, 2, 3, 4, 5$ represent the 5 dependent variables; S represents the Sum methodology

Theoretical percentage index methodologies

$$Y_i = \beta_0 + \beta_1 FL_{TPI} + \beta_2 CA_{TPI} + \beta_3 RF_{TPI} + \beta_4 (FL_{TPI} \times CA_{TPI}) + \beta_5 (FL_{TPI} \times RF_{TPI}) + \beta_6 Gen + \beta_7 Age + \beta_8 LE + \beta_9 LogTA + \beta_{10} LI + \beta_{11} EASP + \xi \quad \text{Model 2}$$

Note: $i = 1, 2, 3, 4, 5$ represent the 5 dependent variables; TPI represents the Theoretical percentage index methodologies

Real percentage index methodologies

$$Y_i = \beta_0 + \beta_1 FL_{RPI} + \beta_2 CA_{RPI} + \beta_3 RF_{RPI} + \beta_4 (FL_{RPI} \times CA_{RPI}) + \beta_5 (FL_{RPI} \times RF_{RPI}) + \beta_6 Gen + \beta_7 Age + \beta_8 LE + \beta_9 LogTA + \beta_{10} LI + \beta_{11} EASP + \xi \quad \text{Model 3}$$

Note: i = 1,2,3,4,5 represent the 5 dependent variables; RPI represents the Real percentage index methodologies

Theoretical scale index methodologies

$$Y_i = \beta_0 + \beta_1 FL_{TSI} + \beta_2 CA_{TSI} + \beta_3 RF_{TSI} + \beta_4 (FL_{TSI} \times CA_{TSI}) + \beta_5 (FL_{TSI} \times RF_{TSI}) + \beta_6 Gen + \beta_7 Age + \beta_8 LE + \beta_9 LogTA + \beta_{10} LI + \beta_{11} EASP + \xi \quad \text{Model 4}$$

Note: i = 1,2,3,4,5 represent the 5 dependent variables; TSI represents the Theoretical scale index methodologies

Real scale index methodologies

$$Y_i = \beta_0 + \beta_1 FL_{RSI} + \beta_2 CA_{RSI} + \beta_3 RF_{RSI} + \beta_4 (FL_{RSI} \times CA_{RSI}) + \beta_5 (FL_{RSI} \times RF_{RSI}) + \beta_6 Gen + \beta_7 Age + \beta_8 LE + \beta_9 LogTA + \beta_{10} LI + \beta_{11} EASP + \xi \quad \text{Model 5}$$

Note: i = 1,2,3,4,5 represent the 5 dependent variables; RSI represents the Theoretical scale index methodologies

CHAPTER III – PRESENTATION OF THE RESULTS

3.1. Descriptive statistics

The descriptive statistics allow to observe the mean, median, standard deviation, maximum and minimum of each of the variables. Descriptive statistics of dependent, independent and control variables are presented. In Appendix B are the descriptive statistics of the dependent, independent and control variables for each defined level of technological sophistication. In Appendix C is a brief characterization of the profile of the director/manager/responsible that compose the study sample.

Dependent variables

Table 5

Descriptive statistics of dependent variables

	ROA	ROE	Solv	GL	FLev
Mean *	5,29%	14,22%	37,85%	2,35%	124,49%
Median	3,51%	10,04%	38,73%	1,22%	52,04%
Standard deviation	8,20%	26,97%	46,32%	3,45%	434,43%
Maximum	35,14%	187,32%	97,22%	26,05%	6181,29%
Minimum	-22,42%	-94,07%	-573,49%	-0,31%	-915,92%

Source: Own elaboration

*: The mean shown is the trimmed mean of the five highest and lowest observations of the sample

The ROA ratio present the value of 10,95% at the national¹⁴ level, a percentage that is more than double the average of the companies analysed. For the ROE ratio verify the opposite, at the national level the average ratio was 11,69%, below the average value of the firms analysed, that is, there is a greater ability of the study firms to generate value from their own resources. The solvency ratio present the value of 67,70% at the national level, and despite being substantially higher than the average ratio presented by the study companies, on average, both have a good capacity to honour their financial commitments. The general liquidity ratio shows very different values, the study companies have an average liquidity of 2,35% and the national level of 138,99%. In the financial leverage ratio the opposite happens,

¹⁴ Banco de Portugal (2019), Sector Tables. Information collected about the year 2017.

the average study companies is 124,49% and the national level is 20,53%. These data show that the companies in our sample are particularly indebted and with particularly low liquidity levels¹⁵.

Independent variables

Table 6

Descriptive statistics of the independent variables: Sum methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	5,35	2,30	2,52	13,17	14,28
Median	7,00	4,00	3,00	16,00	12,00
Standard deviation	2,95	3,79	2,95	24,70	19,73
Maximum	8,00	6,00	10,00	48,00	80,00
Minimum	-6,00	-6,00	-9,00	-48,00	-63,00

Source: Own elaboration

Under the Sum methodology, it is observed that the sample respondents have a level of financial literacy of 66,88% compared to the theoretical maximum. Regarding the availability of capital, it is observed that the sample entities have a capacity of 38,33% relative to the theoretical maximum. With regard to resource flexibility, it is observed that the sample entities have a capacity of 25,2% relative to the theoretical maximum. The data allow to conclude that the entrepreneurs who participated in the study have a reasonable level of financial literacy but a lower capacity of capital availability and resource flexibility.

¹⁵ Considering the high standard deviations of the averages obtained, any analysis made with these values should be prudent in the conclusions drawn.

Table 7

Descriptive statistics of the independent variables: Theoretical percentage index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	68,37%	51,90%	28,59%	37,29%	20,18%
Median	87,50%	66,67%	30,00%	33,33%	15,00%
Standard deviation	32,98%	41,03%	23,57%	36,98%	21,02%
Maximum	100,00%	100,00%	100,00%	100,00%	100,00%
Minimum	0,00%	0,00%	0,00%	0,00%	0,00%

Source: Own elaboration

Table 8

Descriptive statistics of the independent variables: Real percentage index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	18,94%	30,87%	39,37%	6,38%	7,75%
Median	7,14%	16,67%	36,84%	1,19%	3,38%
Standard deviation	21,06%	31,60%	15,54%	10,89%	10,16%
Maximum	100,00%	100,00%	100,00%	65,48%	63,16%
Minimum	0,00%	0,00%	0,00%	0,00%	0,00%

Source: Own elaboration

Table 9

Descriptive statistics of the independent variables: Theoretical scale index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	3,80	3,16	1,89	12,30	7,27
Median	5,00	4,00	2,00	10,00	5,00
Standard deviation	1,47	1,70	0,99	8,67	5,07
Maximum	5,00	5,00	5,00	25,00	25,00
Minimum	1,00	1,00	1,00	1,00	1,00

Source: Own elaboration

Table 10

Descriptive statistics of the independent variables: Real scale index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	1,62	2,08	2,51	3,44	4,14
Median	1,00	1,00	2,00	2,00	3,00
Standard deviation	0,90	1,51	0,76	3,36	2,94
Maximum	5,00	5,00	5,00	20,00	20,00
Minimum	1,00	1,00	1,00	1,00	1,00

Source: Own elaboration

Control variables**Table 11**

Descriptive statistics of the control variables

	Gen	Age	LE	Log TA ¹⁶	LI	EASP
Mean	0,47	45,25	5,83	5,93	30,02%	3,08
Median	0,00	44,00	6,00	5,90	7,98%	3,00
Standard deviation	0,50	10,65	1,86	0,70	39,44%	1,21
Maximum	1,00	80,00	9,00	8,37	330,66%	5,00
Minimum	0,00	21,00	1,00	3,80	0,00%	1,00

Source: Own elaboration

Analysing the descriptive statistics presented finds a mean value of 0,47 for the genre of the directors/managers/responsible that participated in the study, that is, there is a majority of the females. As regards the age of the directors/managers/responsible there is a mean age around 45 years. The mean value of 5,83 for the level of education, reinforced by the proximity to the median, confirms that most of the directors/managers/responsible have licensure as academic degree. Regarding the logarithm of total assets, the mean size of the companies studied, reinforced by the proximity to the median, is approximately 851

¹⁶ Used base 10 for logarithm calculation.

thousand euros. The mean value of 30,02% for the level of internationalization, considerably closer to the minimum value than the maximum value, indicates a very small bet on the internationalization of the companies that participated in the study. The mean value of 3,08 for the economic activity sector to Pavitt, reinforced by the median value and the centrality between the minimum and maximum value, indicates that most of the companies participating in the study belong to a medium level of technological sophistication.

3.2. Analysis of the correlations

After of descriptive statistics are presented the correlation matrices between the dependent and independent variables, demonstrated by measurement methodologies mentioned above.

Table 12
Correlation matrix: Sum methodology

	ROA	ROE	Solv	GL	FLev	FL	CA	RF	FLxCA	FLxRF
ROA	1,0000									
ROE	0,0411 (0,4725)	1,0000								
Solv	0,3533* (0,0000)	-0,0475 (0,4064)	1,0000							
GL	0,0801 (0,1607)	-0,0396 (0,4889)	0,3187* (0,0000)	1,0000						
FLev	0,1404* (0,0137)	-0,1074* (0,0598)	-0,0564 (0,3240)	-0,0524 (0,3592)	1,0000					
FL	0,0164 (0,7738)	-0,0320 (0,5764)	0,0157 (0,7840)	-0,1905* (0,0008)	0,0186 (0,7457)	1,0000				
CA	0,1955* (0,0006)	-0,0498 (0,3840)	0,3144* (0,0000)	0,1059* (0,0634)	-0,0162 (0,7773)	0,0807 (0,1579)	1,0000			
RF	0,0644 (0,2598)	-0,0710 (0,2141)	0,1014* (0,0757)	0,0568 (0,3205)	0,0642 (0,2612)	0,0807 (0,1579)	0,2176* (0,0001)	1,0000		
FLxCA	0,1710* (0,0026)	-0,0423 (0,4594)	0,2271* (0,0001)	0,0568 (0,3205)	-0,0279 (0,6256)	0,3416* (0,0000)	0,8655* (0,0000)	0,2077* (0,0002)	1,0000	
FLxRF	0,0626 (0,2733)	-0,0565 (0,3234)	0,1041* (0,0681)	-0,0126 (0,8258)	0,0156 (0,7851)	0,3915* (0,0000)	0,2027* (0,0003)	0,8206* (0,0000)	0,3242* (0,0000)	1,0000

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10%

Table 13

Correlation matrix: Theoretical percentage index methodology

	ROA	ROE	Solv	GL	FLev	FL	CA	RF	FLxCA	FLxRF
ROA	1,0000									
ROE	0,0411 (0,4725)	1,0000								
Solv	0,3533* (0,0000)	-0,0475 (0,4064)	1,0000							
GL	0,0801 (0,1607)	-0,0396 (0,4889)	0,3187* (0,0000)	1,0000						
FLev	0,1404* (0,0137)	-0,1074* (0,0598)	-0,0564 (0,3240)	-0,0524 (0,3592)	1,0000					
FL	0,0262 (0,6472)	-0,0395 (0,4893)	0,0243 (0,6715)	-0,2094* (0,0002)	0,0078 (0,8915)	1,0000				
CA	0,1736* (0,0022)	-0,1040* (0,0684)	0,2732* (0,0000)	0,0625 (0,2741)	-0,0295 (0,6057)	0,1370* (0,0162)	1,0000			
RF	0,0431 (0,4505)	-0,1046* (0,0667)	0,0923 (0,1058)	0,0385 (0,5009)	0,0548 (0,3379)	0,0991* (0,0825)	0,1775* (0,0018)	1,0000		
FLxCA	0,1503* (0,0082)	-0,0766 (0,1798)	0,1945* (0,0006)	-0,0593 (0,2999)	-0,0455 (0,4260)	0,5453* (0,0000)	0,8242* (0,0000)	0,1811* (0,0014)	1,0000	
FLxRF	0,0401 (0,4832)	-0,0777 (0,1737)	0,0977* (0,0870)	-0,0417 (0,4657)	0,0080 (0,8885)	0,4896* (0,0000)	0,1949* (0,0006)	0,8284* (0,0000)	0,3989* (0,0000)	1,0000

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10%

Table 14

Correlation matrix: Real percentage index methodology

	ROA	ROE	Solv	GL	FLev	FL	CA	RF	FLxCA	FLxRF
ROA	1,0000									
ROE	0,0411 (0,4725)	1,0000								
Solv	0,3533* (0,0000)	-0,0475 (0,4064)	1,0000							
GL	0,0801 (0,1607)	-0,0396 (0,4889)	0,3187* (0,0000)	1,0000						
FLev	0,1404* (0,0137)	-0,1074* (0,0598)	-0,0564 (0,3240)	-0,0524 (0,3592)	1,0000					
FL	-0,0164 (0,7738)	0,0320 (0,5764)	-0,0157 (0,7840)	0,1905* (0,0008)	-0,0186 (0,7457)	1,0000				
CA	-0,1955* (0,0006)	0,0498 (0,3840)	-0,3144* (0,0000)	-0,1059* (0,0634)	0,0162 (0,7773)	0,0807 (0,1579)	1,0000			
RF	-0,0644 (0,2598)	0,0710 (0,2141)	-0,1014* (0,0757)	-0,0568 (0,3205)	-0,0642 (0,2612)	0,1043* (0,0675)	0,2176* (0,0001)	1,0000		
FLxCA	-0,1095* (0,0550)	0,0564 (0,3242)	-0,2301* (0,0000)	0,0327 (0,5680)	-0,0288 (0,6150)	0,6401* (0,0000)	0,5683* (0,0000)	0,1815* (0,0014)	1,0000	
FLxRF	-0,0282 (0,6226)	0,0554 (0,3324)	-0,0291 (0,6108)	0,1470* (0,0098)	-0,0653 (0,2529)	0,8852* (0,0000)	0,1290* (0,0236)	0,3864* (0,0000)	0,6482* (0,0000)	1,0000

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10%

Table 15

Correlation matrix: Theoretical scale index methodology

	ROA	ROE	Solv	GL	FLev	FL	CA	RF	FLxCA	FLxRF
ROA	1,0000									
ROE	0,0411 (0,4725)	1,0000								
Solv	0,3533* (0,0000)	-0,0475 (0,4064)	1,0000							
GL	0,0801 (0,1607)	-0,0396 (0,4889)	0,3187* (0,0000)	1,0000						
FLev	0,1404* (0,0137)	-0,1074* (0,0598)	-0,0564 (0,3240)	-0,0524 (0,3592)	1,0000					
FL	0,0256 (0,6542)	-0,0379 (0,5071)	0,0108 (0,8502)	-0,2134* (0,0002)	-0,0057 (0,9202)	1,0000				
CA	0,1766* (0,0019)	-0,1024* (0,0728)	0,2723* (0,0000)	0,0610 (0,2860)	-0,0230 (0,6877)	0,1226* (0,0315)	1,0000			
RF	0,0146 (0,7983)	-0,0851 (0,1363)	0,0825 (0,1487)	0,0276 (0,6299)	0,0255 (0,6554)	0,0867 (0,1289)	0,1433* (0,0118)	1,0000		
FLxCA	0,1488* (0,0089)	-0,0809 (0,1565)	0,1928* (0,0007)	-0,0686 (0,2302)	-0,0435 (0,4472)	0,6098* (0,0000)	0,8091* (0,0000)	0,1532* (0,0071)	1,0000	
FLxRF	0,0250 (0,6625)	-0,0717 (0,2096)	0,0741 (0,1945)	-0,0773 (0,1758)	-0,0028 (0,9608)	0,5809* (0,0000)	0,1714* (0,0025)	0,8112* (0,0000)	0,4432* (0,0000)	1,0000

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10%

Table 16
Correlation matrix: Real scale index methodology

	ROA	ROE	Solv	GL	FLev	FL	CA	RF	FLxCA	FLxRF
ROA	1,0000									
ROE	0,0411 (0,4725)	1,0000								
Solv	0,3533* (0,0000)	-0,0475 (0,4064)	1,0000							
GL	0,0801 (0,1607)	-0,0396 (0,4889)	0,3187* (0,0000)	1,0000						
FLev	0,1404* (0,0137)	-0,1074* (0,0598)	-0,0564 (0,3240)	-0,0524 (0,3592)	1,0000					
FL	-0,0470 (0,4109)	0,0336 (0,5568)	-0,0374 (0,5132)	0,1796* (0,0016)	-0,0604 (0,2907)	1,0000				
CA	-0,1995* (0,0004)	0,0451 (0,4298)	-0,2950* (0,0000)	-0,1026* (0,0721)	0,0054 (0,9249)	0,0526 (0,3578)	1,0000			
RF	-0,0914 (0,1093)	0,0513 (0,3698)	-0,0943* (0,0984)	-0,0403 (0,4810)	-0,0708 (0,2155)	0,1179* (0,0387)	0,1960* (0,0005)	1,0000		
FLxCA	-0,1715* (0,0025)	0,0598 (0,2954)	-0,2829* (0,0000)	0,0109 (0,8485)	-0,0488 (0,3931)	0,5865* (0,0000)	0,7460* (0,0000)	0,2161* (0,0001)	1,0000	
FLxRF	-0,0792 (0,1656)	0,0518 (0,3652)	-0,0692 (0,2259)	0,1206* (0,0343)	-0,1029* (0,0712)	0,8642* (0,0000)	0,1275* (0,0252)	0,5297* (0,0000)	0,5906* (0,0000)	1,0000

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10%

Analysing the correlation matrices presented by the various methodologies, there are several associations between the dependent and independent variables. For the Real percentage index and Real scale index methodology, an important aspect should be highlighted; given the construction of the index, the evaluation of the respective association must be done carefully, in that a negative coefficient reflects a positive relationship between the variables.

In the independent variable Financial Literacy evidence up, for all correlation matrices presented, the negative sign in the correlation with the dependent variable General Liquidity. Regarding for the independent variable Capital Availability evidence up, for all correlation matrices presented, a positive correlation with the dependent variable ROA.

3.3. Results

3.3.1. Analysis of the results

Considering the tests of research hypotheses 1, 2 and 3, the regressions produced the following results demonstrated by each of the measurement methodologies.

Table 17

Results: Sum methodology

	ROA	ROE	Solv	GL	FLev
FL	-0,0001788 (0,0032892)	-0,0692783 (0,0949679)	-0,0015828 (0,0192276)	-0,0018813 ** (0,0007632)	0,2815207 * (0,1490312)
CA	0,0056696 * (0,0030953)	-0,0507838 (0,0644873)	0,0687247 (0,0443851)	0,0021803 (0,0015143)	0,1147542 (0,1460096)
RF	-0,0003085 (0,0044345)	-0,0347322 (0,0364564)	-0,0143756 (0,0318444)	0,000722 (0,0013623)	0,3033689 ** (0,1187255)
FLxCA	-0,0001331 (0,0005045)	0,0100411 (0,0124878)	-0,0054396 (0,0059019)	-0,0001951 (0,0002148)	-0,032356 (0,0234852)
FLxRF	0,0002215 (0,000701)	-0,0006514 (0,0056001)	0,0036774 (0,0040393)	0,0000144 (0,0001956)	-0,0340793 ** (0,0161319)
Gen	-0,0186176 (0,0133405)	0,2416278 (0,2918719)	0,0017223 (0,0396106)	-0,0083284 ** (0,0038978)	-0,7523766 (0,6932899)
Age	-0,0002562 (0,0005867)	0,0218284 (0,0165083)	-0,0010538 (0,0051868)	0,0000884 (0,0001668)	-0,0390067 (0,0339533)
LE	-0,0011726 (0,0045187)	0,2328998 (0,199451)	0,0172096 (0,0224453)	0,0000116 (0,0011393)	-0,65468 * (0,3399717)
LogTA	0,0242291 * (0,0129997)	-0,7120844 (0,5473468)	0,0750425 ** (0,0333425)	-0,0022777 (0,0027298)	0,8214207 (0,7844114)
LI	-0,0111571 (0,0149487)	0,03744 (0,1267398)	-0,025981 (0,0782656)	-0,0061601 * (0,0035784)	-0,4893001 (0,4756136)
EASP	0,0126557 ** (0,005466)	0,1147271 (0,0995008)	0,0253089 (0,0199173)	0,0011386 (0,0016423)	-0,0004308 (0,2802149)
Constant	-0,1136156 (0,0871444)	2,133772 (1,894739)	-0,3010571 (0,4653713)	0,0405539 * (0,023133)	0,8407148 (3,430526)
R ²	0,0736	0,0764	0,1325	0,0873	0,0600
Observations	308	308	308	308	308

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 17 presents the results of the regression that integrate the analysis under the Sum methodology (model 1) for the 308 companies that participated in the study. Analysing the results, it is observed that financial literacy generates an inverse effect on general liquidity and a direct effect on financial leverage; at another level, the capital availability generates a direct effect on return on assets while resource flexibility (such as financial literacy) generates a direct effect on financial leverage. The increase of one unit of capital availability measure generates, *ceteris paribus*, an increase of 0,56696 percentage points in return on assets. It should also be noted that in situations of greater resource flexibility the financial literacy generates an inverse effect on financial leverage (opposite to that produced by the singular variable Financial Literacy).

Table 18
Results: Theoretical percentage index methodology

	ROA	ROE	Solv	GL	FLev
FL	-0,0045622 (0,0478364)	-1,139929 (1,414993)	-0,0384231 (0,2079694)	-0,0206188 ** (0,0088411)	3,84024 * (2,146803)
CA	0,0291633 (0,0405564)	-0,9231076 (0,8556915)	0,4975624 * (0,2744755)	0,0184211 (0,0182554)	1,274194 (1,741624)
RF	0,0059175 (0,0541558)	-1,210058 (0,9713049)	-0,2085053 (0,3915846)	-0,0044768 (0,0255644)	4,433191 ** (2,023343)
FLxCA	0,0118905 (0,0510756)	1,081675 (1,224851)	-0,2916806 (0,310537)	-0,0144373 (0,0212712)	-3,069645 (2,148253)
FLxRF	0,0005811 (0,0718538)	0,6266293 (0,9748073)	0,4312211 (0,4184285)	0,0179613 (0,0295256)	-4,406311 ** (2,09003)
Gen	-0,018392 (0,0132933)	0,2454167 (0,2863513)	0,0058167 (0,0412286)	-0,0079352 ** (0,0037477)	-0,7118459 (0,674759)
Age	-0,0002413 (0,000584)	0,0202796 (0,01554)	-0,0010636 (0,0055614)	0,0000687 (0,0001707)	-0,0389421 (0,0331148)
LE	-0,0008929 (0,004411)	0,2305189 (0,1968202)	0,0205657 (0,0206999)	0,0001912 (0,0011162)	-0,6416699 * (0,3314267)
LogTA	0,0239708 * (0,012457)	-0,6538983 (0,5087289)	0,0713708 ** (0,0315614)	-0,0021844 (0,002741)	0,8505687 (0,7385423)
LI	-0,0124344 (0,0149697)	0,0048811 (0,1167144)	-0,0383436 (0,0757318)	-0,0065018 * (0,0036041)	-0,4515792 (0,4931893)
EASP	0,0123514 ** (0,0054448)	0,1187592 (0,1004367)	0,0242664 (0,0200383)	0,0011532 (0,0015889)	-0,0093849 (0,2780728)
Constant	-0,1186087 (0,0917675)	2,490843 (2,223853)	-0,3494111 (0,4857555)	0,0416854 * (0,0236582)	-0,3105599 (3,742968)
R ²	0,0640	0,0861	0,1040	0,0873	0,0626
Observations	308	308	308	308	308

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 18 presents the results of the regression that integrate the analysis under the Theoretical percentage index methodology (model 2). Note that in terms of statistically significant impacts, of the five generated effects, four are coincident with those observed in model 1¹⁷: direct effect of financial literacy on financial leverage, direct effect of resource flexibility on financial leverage and inverse effect of financial literacy on general liquidity. Note also that, coincidentally with the results of model 1, in situations of greater resource

¹⁷ Although of course with different coefficients.

flexibility the financial literacy generates an inverse effect on financial leverage (opposite to that produced by the singular variable Financial Literacy).

Table 19
Results: Real percentage index methodology

	ROA	ROE	Solv	GL	FLev
FL	-0,0173327 (0,0928372)	0,2176374 (0,6873363)	-0,0357519 (0,3367013)	0,0407132 * (0,0218355)	3,547717 (2,446064)
CA	-0,0552566 ** (0,0215119)	-0,354536 (0,4767716)	-0,302495 *** (0,0871401)	-0,0074388 (0,0052737)	1,729124 ** (0,8420985)
RF	-0,0278131 (0,0561494)	0,7589188 (0,6609791)	-0,2858297 ** (0,11857)	-0,0159008 (0,0108228)	-0,839541 (1,249505)
FLxCA	-0,022362 (0,0847502)	1,686898 (2,097954)	-0,9138526 (0,9915183)	-0,0327687 (0,03609)	-5,435805 (3,945506)
FLxRF	0,0589315 (0,1864753)	-0,1732607 (1,489634)	0,9781903 (1,074464)	0,0038183 (0,0520272)	-9,065097 ** (4,291095)
Gen	-0,0186176 (0,0133405)	0,2416278 (0,2918719)	0,0017223 (0,0396106)	-0,0083284 ** (0,0038978)	-0,7523766 (0,6932899)
Age	-0,0002562 (0,0005867)	0,0218284 (0,0165083)	-0,0010538 (0,0051868)	0,0000884 (0,0001668)	-0,0390067 (0,0339533)
LE	-0,0011726 (0,0045187)	0,2328998 (0,199451)	0,0172096 (0,0224453)	0,0000116 (0,0011393)	-0,65468 * (0,3399717)
LogTA	0,0242291 * (0,0129997)	-0,7120844 (0,5473468)	0,0750425 ** (0,0333425)	-0,0022777 (0,0027298)	0,8214207 (0,7844114)
LI	-0,0111571 (0,0149487)	0,03744 (0,1267398)	-0,025981 (0,0782656)	-0,0061601 * (0,0035784)	-0,4893001 (0,4756136)
EASP	0,0126557 ** (0,005466)	0,1147271 (0,0995008)	0,0253089 (0,0199173)	0,0011386 (0,0016423)	-0,0004308 (0,2802149)
Constant	-0,072779 (0,0887659)	1,357383 (1,348707)	-0,120351 (0,5182069)	0,0375916 (0,0242494)	2,535663 (3,01078)
R ²	0,0736	0,0764	0,1325	0,0873	0,0600
Observations	308	308	308	308	308

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 19 presents the results of the regression that integrate the analysis under the Real percentage index methodology (model 3). In this methodology, an important aspect should be highlighted, given the construction of the index, the assessment of its impact must be done carefully, since a negative coefficient translates into a direct effect between the variables.

Note that in terms of statistically significant impacts, of the six generated effects, three are coincident with those observed in models 1 or 2: direct effect of capital availability on asset return, direct effect of capital availability on solvency and inverse effect of financial literacy on general liquidity.

Table 20
Results: Theoretical scale index methodology

	ROA	ROE	Solv	GL	FLv
FL	-0,0026048 (0,0141653)	-0,3338716 (0,3858062)	-0,0096546 (0,0614138)	-0,0059829 * (0,0031508)	1,091115 * (0,6138839)
CA	0,0080193 (0,0116284)	-0,2499832 (0,2453688)	0,1134927 * (0,0708455)	0,0033582 (0,0049401)	0,6055853 (0,5660257)
RF	-0,0060703 (0,0150107)	-0,2950804 (0,2242493)	-0,0269293 (0,0781438)	-0,0025567 (0,0076541)	0,7195578 (0,4953657)
FLxCA	0,0004052 (0,0027238)	0,0538677 (0,0632303)	-0,0106486 (0,015003)	-0,0003387 (0,0010723)	-0,2020397 (0,1266861)
FLxRF	0,0012583 (0,0037049)	0,0357291 (0,0445371)	0,0128503 (0,01647)	0,001007 (0,0016768)	-0,142606 (0,0995656)
Gen	-0,0181593 (0,0132049)	0,2282285 (0,2759271)	0,0031254 (0,0400912)	-0,0078087 ** (0,0038084)	-0,6499908 (0,6638475)
Age	-0,0002469 (0,0005786)	0,0201315 (0,0154792)	-0,0009752 (0,0054057)	0,0000441 (0,0001747)	-0,0391139 (0,0336821)
LE	-0,0010559 (0,0044256)	0,2325765 (0,1984785)	0,0238471 (0,019143)	0,000263 (0,0011309)	-0,6476033 * (0,3346404)
LogTA	0,0242091 * (0,0125096)	-0,6687015 (0,5214242)	0,0681982 ** (0,0326179)	-0,0023658 (0,0027307)	0,8773671 (0,7608579)
LI	-0,0124802 (0,0147867)	0,0101606 (0,1174342)	-0,0358888 (0,0753293)	-0,0066211 * (0,0036501)	-0,4705919 (0,4980599)
EASP	0,0126076 ** (0,005426)	0,1148883 (0,099863)	0,0236815 (0,0208721)	0,0010817 (0,0016102)	0,0039469 (0,2789736)
Constant	-0,1195385 (0,1071562)	3,209725 (2,815075)	-0,434084 (0,5113929)	0,0498655 * (0,0257998)	-1,866909 (4,626234)
R ²	0,0655	0,0836	0,1009	0,0850	0,0567
Observations	308	308	308	308	308

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 20 presents the results of the regression that integrate the analysis under the Theoretical scale index methodology (model 4). Note that in terms of statistically significant impacts, the three effects recorded coincide with the effects recorded in previous models:

direct effect of financial literacy on financial leverage, direct effect of capital availability on solvency and inverse effect of financial literacy on general liquidity.

Table 21

Results: Real scale index methodology

	ROA	ROE	Solv	GL	FLev
FL	-0,0022942 (0,0297622)	0,0464677 (0,2068758)	0,0378854 (0,1328816)	0,0131756 ** (0,0065677)	1,258588 * (0,6508385)
CA	-0,0101335 (0,0080795)	-0,1537263 (0,2177668)	-0,0029559 (0,0680727)	-0,0007936 (0,0020737)	0,5842594 * (0,3412544)
RF	-0,0079507 (0,0172382)	0,1276929 (0,1652269)	-0,0623633 (0,0701455)	-0,0002308 (0,0036288)	0,3336593 (0,3476542)
FLxCA	-0,0016025 (0,0045831)	0,0936817 (0,1303802)	-0,0554139 (0,0567913)	-0,0011648 (0,0015987)	-0,2929341 (0,2146879)
FLxRF	0,000416 (0,0096325)	-0,0293111 (0,071582)	0,0277139 (0,0662193)	-0,0014005 (0,002426)	-0,4911615 ** (0,1931229)
Gen	-0,0194609 (0,0131179)	0,2275913 (0,2849156)	-0,0071454 (0,0394873)	-0,008635 ** (0,0039844)	-0,7216005 (0,6820981)
Age	-0,0002245 (0,0005835)	0,0219664 (0,016547)	-0,0008183 (0,0049821)	0,000077 (0,0001646)	-0,04185 (0,0341609)
LE	-0,0017071 (0,0043715)	0,2334903 (0,2036364)	0,0148219 (0,0219931)	-0,0001128 (0,0011066)	-0,6902681 ** (0,3478612)
LogTA	0,0242018 * (0,0128336)	-0,7203098 (0,5515237)	0,0825645 *** (0,0306371)	-0,0023168 (0,0027548)	0,799502 (0,7795505)
LI	-0,0101197 (0,0150134)	0,0397733 (0,1300251)	-0,0207169 (0,0781952)	-0,0060819 (0,0037279)	-0,4891585 (0,4747214)
EASP	0,0129773 ** (0,005384)	0,1149941 (0,0996471)	0,0262895 (0,0202504)	0,0011491 (0,0016929)	-0,0017161 (0,2804952)
Constant	-0,0513285 (0,0999568)	1,448325 (1,434728)	-0,0706717 (0,5620072)	0,0272249 (0,023802)	1,868613 (3,178722)
R ²	0,0798	0,0754	0,1268	0,0811	0,0685
Observations	308	308	308	308	308

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 21 presents the results of the regression that integrate the analysis under the Real scale index methodology (model 5). In this methodology, an important aspect should be highlighted, given the construction of the index, the assessment of its impact must be done carefully, since a negative coefficient translates into a direct effect between the variables.

Due to the specificity of this methodology it is important to make a comparison with another methodology that has the same specificity, model 3. Note that in terms of statistically significant impacts, of the four effects recorded, three are coincident with model 3: inverse effect of financial literacy on overall liquidity, inverse effect of capital availability on financial leverage; in a situation of greater resource flexibility the financial literacy has a direct effect on financial leverage.

Considering the test of research hypotheses 4a, 4b and 4c, it was decided to apply the same measurement methodologies to the subsections of the total sample.

Thus, following the Pavitt's taxonomy applied to the control variable Economic Activity Sector to Pavitt, the study sample was organized by economic activity sectors corresponding to different levels of technological sophistication (although not directly matching the five levels technological evolution of the economic activity sectors defined by Pavitt's taxonomy; in fact, it was decided to define three major levels of technological sophistication).

The first two levels of the Pavitt's taxonomy (less developed economic activity sectors and technology denominated by "Group 1" and "Group 2" in the original Pavitt's taxonomy) were grouped on the first level, denominated by "Companies with reduced level of technological sophistication". At the third level defined by Pavitt "Group 3" was made direct correspondence, denominated by "Companies with medium level of technological sophistication". The last two levels of the Pavitt's taxonomy (more advanced economic sectors of activity corresponding to the technology before designated "Group 4" and "Group 5") were grouped in the third level, denominated by "Companies with high level of technological sophistication".

The following tables correspond to results of the regressions presented by each of the measurement methodologies for the levels of technological sophistication already mentioned.

Companies with reduced level of technological sophistication

Table 22

Results: Sum methodology

	ROA	ROE	Solv	GL	FLev
FL	0,006181 (0,0059376)	-0,00892 (0,0150374)	0,0101219 (0,0322078)	-0,0028183 (0,002235)	0,1906713 * (0,100972)
CA	0,0159488 ** (0,0063559)	0,0053878 (0,0155299)	0,0614369 ** (0,0265843)	0,0045647 (0,003134)	-0,1803108 (0,20252)
RF	0,0080045 (0,0100359)	-0,0082499 (0,0119552)	0,0332877 (0,069148)	-0,0028354 (0,002801)	0,1951562 (0,153174)
FLxCA	-0,0012597 (0,0009372)	0,0017885 (0,0024642)	-0,0066473 * (0,004022)	-0,0006907 (0,000486)	-0,0057321 (0,022727)
FLxRF	-0,000926 (0,0015045)	-0,0009935 (0,0030734)	-0,0003105 (0,008921)	0,0007398 (0,000475)	-0,030451 (0,020782)
Gen	-0,0322251 (0,0217532)	-0,0405821 (0,0696563)	-0,0351233 (0,05938)	-0,0145132 * (0,007592)	0,8526393 (1,071317)
Age	-0,0006896 (0,0009007)	-0,0038519 * (0,002234)	0,0017445 (0,003584)	-0,0002515 (0,000384)	-0,0480427 (0,033232)
LE	0,0019899 (0,0062299)	-0,0108413 (0,0173641)	0,0565463 * (0,033688)	0,0008716 (0,001892)	-0,5573538 (0,337347)
LogTA	0,0160637 (0,0184535)	-0,0540681 (0,0571554)	0,1421218 ** (0,059081)	0,006401 (0,00479)	0,5416321 (0,360755)
LI	0,045307 ** (0,0227813)	0,1060989 (0,0752732)	-0,0728085 (0,107398)	-0,0096368 (0,007652)	-0,0032099 (0,598253)
EASP	-0,0250666 (0,0241705)	-0,07431 (0,0555043)	-0,0598725 (0,072563)	-0,0043923 (0,008696)	-1,610774 (1,617737)
Constant	-0,0662883 (0,1689972)	0,835816 (0,4203032)	-0,9923364 (0,765273)	0,0165165 (0,034796)	5,662321 (5,397388)
R ²	0,1749	0,0834	0,2285	0,1992	0,1249
Observations	115	115	115	115	115

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 22 presents the regression results that integrate the analysis under the Sum methodology (model 1), applying the defined level of technological sophistication.

Analysing the results, it is observed that financial literacy generates a direct effect on financial leverage, capital availability generates a direct effect on asset profitability and solvency; in the case of capital availability the financial literacy generates an inverse effect on solvency.

Table 23
Results: Theoretical percentage index methodology

	ROA	ROE	Solv	GL	FLev
FL	0,0895779 (0,073186)	-0,1625152 (0,214807)	0,252655 (0,427757)	-0,0194432 (0,017707)	1,208468 (1,409728)
CA	0,1900022 *** (0,069787)	-0,0282804 (0,200917)	0,8009073 ** (0,381607)	0,0502887 * (0,03017)	-3,292328 (2,556085)
RF	0,049688 (0,078963)	-0,0926727 (0,159591)	0,0381706 (0,484244)	-0,0502206 (0,034334)	2,71945 (1,766553)
FLxCA	-0,1439655 * (0,082299)	0,2208613 (0,243744)	-0,7818507 * (0,441548)	-0,0627619 * (0,036816)	1,349752 (1,979105)
FLxRF	-0,0302453 (0,119751)	-0,0828348 (0,330784)	0,3482699 (0,540453)	0,0919431 * (0,046351)	-3,676691 * (2,065953)
Gen	-0,0292747 (0,020533)	-0,0411333 (0,067678)	-0,0145677 (0,06071)	-0,0132587 ** (0,006632)	0,8611837 (1,029572)
Age	-0,0006045 (0,000889)	-0,0037146 * (0,0022)	0,0019033 (0,003527)	-0,0002223 (0,000346)	-0,0523315 (0,0345852)
LE	0,0015752 (0,00594)	-0,0087441 (0,017662)	0,0534359 * (0,029622)	0,0012258 (0,00182)	-0,5500493 * (0,3283904)
LogTA	0,0127079 (0,018333)	-0,0572059 (0,053868)	0,1346356 ** (0,059058)	0,0063623 (0,004607)	0,6498786 (0,453646)
LI	0,0446751 ** (0,0224)	0,0977274 (0,070012)	-0,0756359 (0,115052)	-0,010679 (0,007938)	-0,0386178 (0,6664912)
EASP	-0,0255155 (0,024157)	-0,0747078 (0,055274)	-0,0631495 (0,070673)	-0,004131 (0,008274)	-1,60826 (1,5789)
Constant	-0,1020687 (0,169137)	0,8801322 ** (0,457663)	-1,130761 (0,823919)	0,0083544 (0,031882)	6,14389 (5,662757)
R ²	0,1993	0,0861	0,1040	0,0873	0,0626
Observations	115	115	115	115	115

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 23 presents the regression results that integrate the analysis under the Theoretical percentage index methodology (model 2), applying the defined level of technological sophistication. Note that in terms of statistically significant impacts, of the eight generated effects, three are coincident with those observed in model 1: direct effect of capital availability on return on assets and solvency; in the case of capital availability the financial literacy generates an inverse effect on solvency.

Table 24
Results: Real percentage index methodology

	ROA	ROE	Solv	GL	FLev
FL	0,1489112 (0,176643)	0,1137362 (0,354218)	0,4601421 (0,97723)	-0,0061006 (0,027373)	2,075235 (2,574019)
CA	-0,0704594 ** (0,028343)	-0,2363458 ** (0,099624)	-0,0991004 (0,121969)	0,0115312 (0,011799)	2,714015 ** (1,226454)
RF	-0,0113402 (0,107967)	0,3077563 (0,348326)	-0,5852659 ** (0,23365)	-0,0585824 ** (0,026226)	0,9205781 (1,767053)
FLxCA	-0,2116215 (0,157453)	0,3004618 (0,413982)	-1,116749 * (0,675652)	-0,1160385 (0,081612)	-0,9629995 (3,818173)
FLxRF	-0,2463048 (0,400207)	-0,2642659 (0,817521)	-0,0826005 (2,372995)	0,1967948 (0,126336)	-8,099954 (5,52799)
Gen	-0,0322251 (0,021753)	-0,0405821 (0,069656)	-0,0351233 (0,05938)	-0,0145132 * (0,007592)	0,8526393 (1,071317)
Age	-0,0006896 (0,000901)	-0,0038519 * (0,002234)	0,0017445 (0,003584)	-0,0002515 (0,000384)	-0,0480427 (0,0332321)
LE	0,0019899 (0,00623)	-0,0108413 (0,017364)	0,0565463 * (0,033688)	0,0008716 (0,001892)	-0,5573538 (0,3373472)
LogTA	0,0160637 (0,018454)	-0,0540681 (0,057155)	0,1421218 ** (0,059081)	0,006401 (0,00479)	0,5416321 (0,3607551)
LI	0,045307 ** (0,022781)	0,1060989 (0,075273)	-0,0728085 (0,107398)	-0,0096368 (0,007652)	-0,0032099 (0,5982525)
EASP	-0,0250666 (0,024171)	-0,07431 (0,055504)	-0,0598725 (0,072563)	-0,0043923 (0,008696)	-1,610774 (1,617737)
Constant	0,0243577 (0,1672)	0,720652 * (0,414554)	-0,5537766 (0,589773)	0,0190372 (0,039628)	5,346169 (4,476364)
R ²	0,1749	0,0834	0,2285	0,1992	0,1249
Observations	115	115	115	115	115

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 24 presents the regression results that integrate the analysis under the Real percentage index methodology (model 3), applying the defined level of technological sophistication.

In this methodology, an important aspect should be emphasized, given the construction of the index, the impact assessment must be done carefully, since a positive coefficient translates an inverse effect between the variables.

Note that in terms of statistically significant impacts, of the six generated effects, one is coincident with those observed in models 1 or 2: direct effect of capital availability on return on assets.

Table 25
Results: Theoretical scale index methodology

	ROA	ROE	Solv	GL	FLev
FL	0,0244404 (0,022719)	-0,0537343 (0,069385)	0,0657945 (0,128073)	-0,0070899 (0,005864)	0,3249141 (0,538492)
CA	0,0541017 ** (0,020784)	-0,0143193 (0,058247)	0,222374 * (0,116504)	0,0112469 (0,008475)	-0,7407184 (0,687429)
RF	-0,0028264 (0,018762)	-0,0407833 (0,052234)	-0,0563511 (0,104863)	-0,0158904 (0,010503)	0,6191024 (0,67272)
FLxCA	-0,0082346 * (0,004572)	0,0116158 (0,013197)	-0,0405975 (0,025016)	-0,0025336 (0,001913)	0,0465631 (0,110064)
FLxRF	0,0021043 (0,006076)	0,0011692 (0,018273)	0,0278156 (0,023842)	0,005002 * (0,002582)	-0,1653744 (0,130931)
Gen	-0,0298449 (0,020353)	-0,043149 (0,066965)	-0,0088094 (0,062181)	-0,0130319 (0,006707)	0,8870631 (1,064029)
Age	-0,0006407 (0,000888)	-0,0036554 (0,002205)	0,0016659 (0,003486)	-0,0002636 (0,000353)	-0,0523164 (0,034446)
LE	0,0015882 (0,005866)	-0,0090102 (0,017965)	0,0538795 * (0,029672)	0,0012826 (0,001866)	-0,549037 * (0,323965)
LogTA	0,0134955 (0,018334)	-0,0531174 (0,054098)	0,1286745 ** (0,059053)	0,0053586 (0,004468)	0,6651036 (0,450291)
LI	0,0431459 * (0,021914)	0,0921955 (0,067089)	-0,0734404 (0,111787)	-0,0102548 (0,007761)	-0,0684366 (0,688251)
EASP	-0,0265188 (0,023373)	-0,0714545 (0,052905)	-0,0773907 (0,070813)	-0,0060817 (0,008809)	-1,55252 (1,549422)
Constant	-0,1618744 (0,193441)	0,9386229 (0,553113)	-1,238932 (1,034269)	0,0288282 (0,029656)	6,178814 (7,124335)
R ²	0,2031	0,0841	0,2454	0,2321	0,1431
Observations	115	115	115	115	115

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 25 presents the regression results that integrate the analysis under the Theoretical scale index methodology (model 4), applying the defined level of technological sophistication. Note that in terms of statistically significant impacts, the four effects recorded are coincident with the effects recorded in previous models: direct effect of capital

availability on return on assets and solvency; in the case of capital availability the financial literacy generates an inverse effect on the return on assets and in the situation of resource flexibility the financial literacy generates a direct effect on general liquidity.

Table 26
Results: Real scale index methodology

	ROA	ROE	Solv	GL	FLev
FL	0,0468011 (0,060307)	-0,0702045 (0,092667)	0,2876852 (0,401299)	0,0009906 (0,009591)	0,9417125 (0,760764)
CA	-0,0041087 (0,012673)	-0,0694197 (0,048973)	0,0269787 (0,055472)	0,0038989 (0,005311)	0,681818 * (0,395457)
RF	0,0010254 (0,035856)	-0,0158829 (0,082697)	-0,0023349 (0,177847)	-0,0137628 (0,009249)	0,8257057 (0,634384)
FLxCA	-0,0112922 (0,008125)	0,0208085 (0,030646)	-0,0544966 (0,038863)	-0,0035056 (0,003934)	-0,0905666 (0,209987)
FLxRF	-0,0137708 (0,023238)	0,0250965 (0,031141)	-0,0770649 (0,160628)	0,0057244 (0,00623)	-0,4744239 * (0,282843)
Gen	-0,0357798 (0,021338)	-0,0587193 (0,068565)	-0,024881 (0,064101)	-0,0134309 * (0,007604)	0,9725761 (1,157183)
Age	-0,0006317 (0,000904)	-0,0042754 ** (0,002137)	0,0026571 (0,003936)	-0,0001782 (0,000388)	-0,0486725 (0,033604)
LE	0,0006636 * (0,005906)	-0,0089204 (0,016966)	0,0502384 * (0,030026)	0,0008343 (0,001807)	-0,5708587 (0,350996)
LogTA	0,0193282 (0,018576)	-0,042215 (0,058263)	0,1413206 ** (0,055438)	0,005913 (0,004909)	0,454389 (0,334541)
LI	0,042753 * (0,021665)	0,0994264 (0,0722)	-0,072569 (0,099124)	-0,0088812 (0,007431)	-0,055598 (0,571982)
EASP	-0,0240153 (0,024453)	-0,0653489 (0,056528)	-0,0643092 (0,075756)	-0,0048687 (0,009557)	-1,66046 (1,683652)
Constant	0,0048704 (0,193314)	0,8416708 * (0,462567)	-0,8134425 (0,872752)	0,0195527 (0,041877)	4,203524 (4,487052)
R ²	0,2003	0,0810	0,2446	0,1377	0,1301
Observations	115	115	115	115	115

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 26 presents the regression results that integrate the analysis under the Real scale index methodology (model 5), applying the defined level of technological sophistication. In this methodology, an important aspect should be highlighted, given the construction of the index, the assessment of its impact should be done carefully, as a positive coefficient translates an inverse effect between the variables.

Due to the specificity of this methodology it is important to make a comparison with another methodology that has the same specificity, model 3. Note that in terms of statistically significant impacts, of the two effects recorded, one is coincident with the model 3: inverse effect of capital availability on financial leverage.

Companies with medium level of technological sophistication

Table 27

Results: Sum Methodology

	ROA	ROE	Solv	GL	FLev
FL	-0,0103932 ** (0,00493)	-0,0140566 (0,013549)	-,0282153 (0,0184)	-0,0021102 (0,001558)	0,2149726 (0,159446)
CA	0,0073679 (0,005542)	0,0105572 (0,009917)	0,0059697 (0,027354)	0,002801 (0,004353)	-0,1929115 * (0,102911)
RF	-0,0036302 (0,007079)	0,0057705 (0,01553)	0,0098783 (0,029054)	0,0017566 (0,003388)	0,2936659 (0,201988)
FLxCA	-0,0008291 (0,00086)	-0,0043282 ** (0,00194)	0,0039291 (0,005622)	-0,0001724 (0,00062)	0,0220344 (0,018925)
FLxRF	0,0008608 (0,001152)	0,004723 (0,00369)	-0,0006531 (0,004537)	-0,0002919 (0,000469)	-0,0409732 (0,030932)
Gen	-0,0039331 (0,02217)	-0,0362163 (0,071276)	0,0434153 (0,138953)	-0,0135288 (0,011275)	0,3402735 (0,653671)
Age	-0,000795 (0,000965)	-0,0043518 (0,002989)	0,0028247 (0,005682)	-0,0000303 (0,000535)	0,0210198 (0,021431)
LE	-0,0055681 (0,005221)	-0,0250561 (0,016452)	-0,0153812 (0,02744)	-0,0023082 (0,002896)	-0,0155776 (0,133418)
LogTA	-0,0110611 (0,017025)	0,1236799 ** (0,060152)	0,0289853 (0,105196)	-0,0156099 (0,01039)	1,301622 ** (0,501945)
LI	0,0198486 (0,047037)	-0,0250117 (0,113716)	-0,14369 (0,313726)	0,0129946 (0,015798)	-1,591248 (0,952733)
EASP	0	0	0	0	0
Constant	0,2250905 * (0,12685)	-0,0140566 (0,409171)	-0,0282153 (0,737006)	-0,0021102 (0,086411)	-8,391528 *** (2,672192)
R ²	0,1701	0,1944	0,1907	0,1444	0,3292
Observations	62	62	62	62	62

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 27 presents the regression results that integrate the analysis under the Sum methodology (model 1), applying the defined level of technological sophistication. Analysing the results, it can be observed that financial literacy generates an inverse effect

on return on assets, capital availability generates an inverse effect on financial leverage; in the case of capital availability the financial literacy generates an inverse effect on the return on equity.

Table 28
Results: Theoretical percentage index methodology

	ROA	ROE	Solv	GL	FLev
FL	-0,1276705 * (0,065938)	-0,0888872 (0,177703)	-0,4815788 * (0,250462)	-0,0243334 (0,016529)	2,309115 (2,115544)
CA	-0,0700394 (0,073882)	0,030881 (0,154651)	-0,2076681 (0,305485)	0,0117643 (0,062337)	0,3907099 (1,763351)
RF	-0,0300886 (0,129901)	0,0886913 (0,257426)	0,3540106 (0,429283)	0,0418215 (0,081693)	3,151216 (2,741331)
FLxCA	0,1050662 (0,093363)	-0,1583734 (0,214844)	0,6403449 (0,496533)	0,0117419 (0,078717)	-1,550554 (2,399743)
FLxRF	0,037368 (0,154036)	0,2750702 (0,415598)	-0,1659654 (0,504449)	-0,0528498 (0,091481)	-2,718631 (3,287725)
Gen	-0,0028902 (0,022317)	-0,0509105 (0,069353)	0,0422567 (0,136183)	-0,0118799 (0,010484)	0,3768926 (0,6309759)
Age	-0,0004812 (0,000974)	-0,0047659 (0,003033)	0,0050548 (0,006505)	0,0001196 (0,000642)	0,0121878 (0,0234697)
LE	-0,001224 (0,005491)	-0,0158601 (0,015134)	-0,0035962 (0,028176)	-0,0009811 (0,003003)	-0,1131942 (0,1775391)
LogTA	-0,0046005 (0,015246)	0,1266264 ** (0,057212)	0,0288723 (0,109232)	-0,0172183 (0,01293)	1,289106 ** (0,5824642)
LI	-0,0001547 (0,045307)	-0,0429656 (0,117734)	-0,1561584 (0,312714)	0,0101528 (0,015083)	-1,238375 (1,033821)
EASP	0	0	0	0	0
Constant	0,194938 (0,116214)	-0,2712119 (0,41546)	0,1385386 (0,743512)	0,1320941 (0,102961)	-8,035203 *** (2,707913)
R ²	0,1504	0,1245	0,2113	0,1563	0,2666
Observations	62	62	62	62	62

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 28 presents the regression results that integrate the analysis under the Theoretical percentage index methodology (model 2), applying the defined level of technological sophistication. Note that in terms of statistically significant impacts, of the two effects generated, one is coincident with those verified in model 1: inverse effect of financial literacy on return on assets.

Table 29
Results: Real percentage index methodology

	ROA	ROE	Solv	GL	FLev
FL	0,0946359 (0,142952)	-0,1008533 (0,392979)	0,156407 (0,469006)	0,0848909 (0,054243)	0,8757447 (2,669599)
CA	-0,0088251 (0,034328)	0,2888202 * (0,157651)	-0,4488281 (0,289905)	-0,0170578 (0,021267)	0,1996393 (1,099113)
RF	-0,0618668 (0,08478)	-0,8275295 * (0,462167)	-0,0884154 (0,318545)	0,0109906 (0,020077)	0,6482735 (1,382177)
FLxCA	-0,1392829 (0,144405)	-0,7271372 ** (0,325936)	0,6600853 (0,944443)	-0,0289707 (0,104114)	3,701772 (3,179333)
FLxRF	0,2289701 (0,306488)	1,256307 (0,981521)	-0,1737274 (1,206844)	-0,0776388 (0,12483)	-10,89887 (8,227905)
Gen	-0,0039331 (0,02217)	-0,0362163 (0,071276)	0,0434153 (0,138953)	-0,0135288 (0,011275)	0,3402735 (0,6536712)
Age	-0,000795 (0,000965)	-0,0043518 (0,002989)	0,0028247 (0,005682)	-0,0000303 (0,000535)	0,0210198 (0,021431)
LE	-0,0055681 (0,005221)	-0,0250561 (0,016452)	-0,0153812 (0,02744)	-0,0023082 (0,002896)	-0,0155776 (0,1334181)
LogTA	-0,0110611 (0,017025)	0,1236799 ** (0,060152)	0,0289853 (0,105196)	-0,0156099 (0,01039)	1,301622 ** (0,501945)
LI	0,0198486 (0,047037)	-0,0250117 (0,113716)	-0,14369 (0,313726)	0,0129946 (0,015798)	-1,591248 (0,9527328)
EASP	0	0	0	0	0
Constant	0,1789188 (0,128598)	-0,0581132 (0,48338)	0,2753498 (0,793968)	0,1233932 (0,080848)	-7,112764 ** (2,661901)
R ²	0,1701	0,1944	0,1907	0,1444	0,3292
Observations	62	62	62	62	62

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 29 presents the regression results that integrate the analysis under the Real percentage index methodology (model 3), applying the defined level of technological sophistication.

In this methodology, an important aspect should be emphasized, given the construction of the index, the impact assessment must be done carefully, since a positive coefficient translates an inverse effect between the variables.

Note that in terms of statistically significant impacts, of the three effects generated, none coincide with those observed in models 1 or 2.

Table 30
Results: Theoretical scale index methodology

	ROA	ROE	Solv	GL	FLev
FL	-0,0349299 (0,024147)	-0,0313903 (0,065666)	-0,1214124 (0,092023)	-0,0028044 (0,006411)	0,6867508 (0,665717)
CA	-0,0197753 (0,021383)	0,0218805 (0,043923)	-0,0828057 (0,098334)	0,0021466 (0,017241)	0,274276 (0,557082)
RF	-0,0158846 (0,040114)	-0,0258563 (0,089736)	0,1142094 (0,12524)	0,0109884 (0,024806)	0,6021653 (0,707538)
FLxCA	0,0052995 (0,00499)	-0,0091904 (0,011883)	0,0369126 (0,028598)	0,0006977 (0,004055)	-0,1060276 (0,13651)
FLxRF	0,0031841 (0,008804)	0,0238618 (0,024991)	-0,0186301 (0,027075)	-0,0030354 (0,005195)	-0,1014339 (0,150395)
Gen	-0,0023317 (0,022852)	-0,043892 (0,067576)	0,036863 (0,135076)	-0,0112872 (0,010577)	0,4210019 (0,642072)
Age	-0,0006445 (0,000965)	-0,0046092 (0,002946)	0,0052305 (0,00651)	0,0000759 (0,000655)	0,0120933 (0,025596)
LE	-0,0010808 (0,005527)	-0,0174151 (0,014825)	0,0012449 (0,029751)	-0,0008755 (0,002971)	-0,1315955 (0,193298)
LogTA	-0,0054145 (0,016032)	0,1215319 ** (0,057521)	0,0366256 (0,112706)	-0,017565 (0,014069)	1,27211 ** (0,606767)
LI	-0,0041702 (0,045652)	-0,0328398 (0,123979)	-0,1665659 (0,314198)	0,0092515 (0,014038)	-1,183772 (1,122116)
EASP	0	0	0	0	0
Constant	0,2598964 * (0,153738)	-0,2283778 (0,52951)	0,1296542 (0,720653)	0,1276395 (0,113648)	-8,91095 *** (3,163359)
R ²	0,1328	0,1320	0,2128	0,1512	0,2478
Observations	62	62	62	62	62

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 30 presents the regression results that integrate the analysis under the Theoretical scale index methodology (model 4), applying the defined taxonomy level. In this case there are no statistically significant results.

Table 31
Results: Real scale index methodology

	ROA	ROE	Solv	GL	FLev
FL	0,0386432 (0,041883)	-0,0176511 (0,11953)	0,1088204 (0,133842)	0,0313972 * (0,016178)	0,918407 (0,978345)
CA	-0,0022124 (0,012271)	0,0712334 (0,046999)	-0,1165825 (0,100158)	-0,000228 (0,007421)	-0,1392533 (0,261393)
RF	-0,0008167 (0,029438)	-0,1870731 (0,132447)	0,0523564 (0,112146)	0,0105607 (0,009315)	0,7482191 (0,61672)
FLxCA	-0,0036217 (0,006979)	-0,0286822 * (0,0169)	0,0267795 (0,043437)	-0,0024281 (0,004894)	0,1723887 (0,129525)
FLxRF	-0,0000182 (0,015592)	0,0437071 (0,049798)	-0,0348728 (0,056184)	-0,0056897 (0,006042)	-0,6610754 (0,411182)
Gen	-0,0043345 (0,021198)	-0,0391128 (0,068523)	0,0376018 (0,141138)	-0,0148681 (0,011794)	0,0721446 (0,641287)
Age	-0,0006591 (0,000947)	-0,003827 (0,002948)	0,0030651 (0,005601)	-0,0000691 (0,000505)	0,0177079 (0,020506)
LE	-0,0054201 (0,005189)	-0,0274448 (0,017609)	-0,0160871 (0,029208)	-0,0026226 (0,00308)	0,0232182 (0,123642)
LogTA	-0,0114429 (0,016493)	0,1334528 ** (0,062726)	0,0234449 (0,100861)	-0,0152463 (0,009755)	1,342669 *** (0,49211)
LI	0,0173086 (0,045896)	-0,0385752 (0,117604)	-0,1397785 (0,3046)	0,0142092 (0,015978)	-1,391387 (0,976066)
EASP	0	0	0	0	0
Constant	0,132293 (0,136989)	-0,0555789 (0,527028)	0,1743143 (0,782178)	0,0865757 (0,073009)	-8,345603 *** (3,06197)
R ²	0,1696	0,1680	0,2026	0,1637	0,3865
Observations	62	62	62	62	62

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 31 presents the regression results that integrate the analysis under the Real scale index methodology (model 5), applying the defined level of technological sophistication. In this methodology, an important aspect should be emphasized, given the construction of the index, the impact assessment must be done carefully, since a positive coefficient translates an inverse effect between the variables.

Due to the specificity of this methodology it is important to make a comparison with another methodology that has the same specificity, model 3. Note that in terms of statistically significant impacts, the two effects recorded, one is coincident with the model 3: in the case of capital availability the financial literacy generates a direct effect on the return on equity.

Companies with high level of technological sophistication

Table 32

Results: Sum methodology

	ROA	ROE	Solv	GL	FLev
FL	0,0052739 (0,006107)	-0,1920686 (0,257716)	0,028069 (0,047464)	-0,0012367 (0,000869)	0,5218638 (0,384519)
CA	0,0063671 (0,005254)	-0,0896751 (0,159942)	0,1344621 (0,100893)	0,0017317 (0,001467)	0,2949048 (0,295621)
RF	-0,00322 (0,004469)	-0,0777567 (0,099894)	-0,0544839 (0,055055)	0,0017771 (0,001291)	0,408197 (0,321784)
FLxCA	-0,0004489 (0,000923)	0,0157396 (0,029875)	-0,0146992 (0,013661)	-0,0001168 (0,000203)	-0,0495973 (0,049331)
FLxRF	0,0005651 (0,000773)	0,0031382 (0,0174)	0,0078685 (0,007164)	-0,0001582 (0,00017)	-0,0563786 (0,046083)
Gen	-0,0161884 (0,02265)	0,5756228 (0,746324)	0,0319282 (0,066895)	-0,0030656 (0,005027)	-3,009318 * (1,617291)
Age	-0,0000839 (0,001094)	0,0536894 (0,036852)	-0,0025208 (0,008346)	0,0002848 (0,000212)	-0,1187687 (0,084393)
LE	-0,0053432 (0,009415)	0,6480992 (0,528002)	0,0092577 (0,035431)	0,0005042 (0,001696)	-1,787679 * (1,01534)
LogTA	0,0420229 ** (0,019267)	-1,344108 (0,984493)	0,0723823 * (0,04023)	-0,001537 (0,003324)	0,5568164 (1,388836)
LI	-0,04682 (0,024233)	0,0456763 (0,330252)	0,0363579 (0,067931)	-0,0089878 ** (0,004179)	-0,9972489 (0,786491)
EASP	0,0673849 ** (0,025824)	0,1399311 (0,778715)	0,2090958 ** (0,094511)	0,0137827 * (0,007251)	0,989281 (1,385893)
Constant	-0,4588796 ** (0,183861)	2,363874 (4,822207)	-1,157814 ** (0,445778)	-,0365707 (0,046071)	8,649461 (13,33813)
R ²	0,1492	0,1538	0,2200	0,1368	0,1452
Observations	131	131	131	131	131

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 32 presents the regression results that integrate the analysis under the Sum methodology (model 1), applying the defined level of technological sophistication. In this situation there are no statistically significant results.

Table 33
Results: Theoretical percentage index methodology

	ROA	ROE	Solv	GL	FLev
FL	0,0429354 (0,078122)	-2,693443 (3,390884)	0,0783288 (0,326565)	-0,0109531 (0,012811)	6,914551 (4,82783)
CA	0,0274926 (0,055794)	-2,106062 (1,978057)	0,7528897 (0,568831)	0,0076512 (0,017802)	3,386714 (3,084718)
RF	-0,0101413 (0,086552)	-2,843597 (2,518525)	-0,8021083 (0,796691)	0,0186551 (0,026478)	7,275601 (5,134022)
FLxCA	-0,0005972 (0,076955)	1,986522 (2,698249)	-0,5801268 (0,634952)	-0,0044611 (0,019239)	-4,813556 (4,1091)
FLxRF	0,0003038 (0,107528)	1,898582 (2,912805)	0,9044753 (0,86222)	-0,0117151 (0,027888)	-8,393923 (5,817623)
Gen	-0,0183137 (0,022611)	0,5208945 (0,72393)	0,0215739 (0,062006)	-0,003247 (0,004992)	-2,983665 * (1,587016)
Age	-0,0002077 (0,001031)	0,0451506 (0,031614)	-0,0056521 (0,011438)	0,000234 (0,000209)	-0,1111158 (0,080403)
LE	-0,0047588 (0,008767)	0,5962584 (0,473545)	0,0060013 (0,033734)	0,0003831 (0,001696)	-1,676719 * (0,9482)
LogTA	0,0423025 ** (0,018818)	-1,167067 (0,861237)	0,0836635 ** (0,036801)	-0,0008037 (0,003398)	0,4714642 (1,230058)
LI	-0,0469436 * (0,024133)	0,1533455 (0,349389)	0,0419884 (0,069392)	-0,0083506 ** (0,004162)	-0,9996085 (0,823365)
EASP	0,0681885 ** (0,025977)	0,1477358 (0,766478)	0,2158368 ** (0,100823)	0,0141091 * (0,007317)	1,029398 (1,364522)
Constant	-0,46441 ** (0,180403)	3,473849 (5,531464)	-1,022708 ** (0,405948)	-0,0389509 (0,047206)	5,890328 (13,65321)
R ²	0,1412	0,1727	0,1420	0,1192	0,1479
Observations	131	131	131	131	131

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 33 presents the regression results that integrate the analysis under the Theoretical percentage index methodology (model 2), applying the defined level of technological sophistication. In this situation there are no statistically significant results.

Table 34
Results: Real percentage index methodology

	ROA	ROE	Solv	GL	FLev
FL	-0,1152464 (0,114304)	0,9274795 (2,252875)	-0,2598185 (0,535889)	0,049277 * (0,027183)	4,753086 (5,525131)
CA	-0,0333111 (0,04518)	-0,4349046 (1,126066)	-0,202421 (0,158641)	-0,0095654 * (0,005074)	1,222487 (1,800115)
RF	-0,0247198 (0,085175)	1,000368 (1,784959)	-0,160814 (0,227662)	-0,0097174 (0,014229)	0,8138032 (3,122058)
FLxCA	-0,0754146 (0,155026)	2,644261 (5,01904)	-2,469468 (2,294976)	-0,0196264 (0,034162)	-8,332352 (8,287577)
FLxRF	0,1503253 (0,205737)	0,8347668 (4,628451)	2,093015 (1,905626)	-0,0420839 (0,045111)	-14,99671 (12,25817)
Gen	-0,0161884 (0,02265)	0,5756228 (0,746324)	0,0319282 (0,066895)	-0,0030656 (0,005027)	-3,009318 * (1,617291)
Age	-0,0000839 (0,001094)	0,0536894 (0,036852)	-0,0025208 (0,008346)	0,0002848 (0,000212)	-0,1187687 (0,084393)
LE	-0,0053432 (0,009415)	0,6480992 (0,528002)	0,0092577 (0,035431)	0,0005042 (0,001696)	-1,787679 * (1,01534)
LogTA	0,0420229 ** (0,019267)	-1,344108 (0,984493)	0,0723823 * (0,04023)	-0,001537 (0,003324)	0,5568164 (1,388836)
LI	-0,04682 * (0,024233)	0,0456763 (0,330252)	0,0363579 (0,067931)	-0,0089878 ** (0,004179)	-0,9972489 (0,786491)
EASP	0,0673849 ** (0,025824)	0,1399311 (0,778715)	0,2090958 ** (0,094511)	0,0137827 * (0,007251)	0,989281 (1,385893)
Constant	-0,3870222 ** (0,191323)	0,5182685 (4,099332)	-0,7474129 (0,517702)	-0,0365675 (0,048734)	11,78481 (13,63681)
R ²	0,1492	0,1538	0,2200	0,1368	0,1452
Observations	131	131	131	131	131

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 34 presents the regression results that integrate the analysis under the Real percentage index methodology (model 3), applying the defined level of technological sophistication.

In this methodology, an important aspect should be emphasized, given the construction of the index, the impact assessment must be done carefully, since a positive coefficient translates an inverse effect between the variables.

Analysing the results, it is observed that financial literacy generates an inverse effect on general liquidity and the capital availability generates a direct effect general liquidity.

Table 35
Results: Theoretical scale index methodology

	ROA	ROE	Solv	GL	FLev
FL	0,0093921 (0,021824)	-0,71795 (0,907577)	0,0294411 (0, 096615)	-0,0038276 (0, 005046)	1,826381 (1,322531)
CA	0,0062285 (0,016185)	-0,5466021 (0,540453)	0,1744952 (0, 136162)	0,0012474 (0, 005536)	1,269505 (1,010505)
RF	-0,0073106 (0,028193)	-0,5553934 (0,596392)	-0,1099527 (0, 13573)	0,0027525 (0, 007566)	1,098071 (1,142937)
FLxCA	0,0001496 (0,004122)	0,0996313 (0,137215)	-0,0235204 (0, 027543)	-0,0000481 (0, 001178)	-0,3185252 (0,23442)
FLxRF	0,0001113 (0,006185)	0,0733532 (0,134521)	0,0232612 (0, 028258)	-0,0001425 (0, 001625)	-0,2575401 (0,24907)
Gen	-0,0189143 (0,022189)	0,4840356 (0,694235)	0,0089445 (0, 05595)	-0,0029769 (0, 005074)	-2,839384 * (1,534026)
Age	-0,0002268 (0,001019)	0,0466491 (0, 032571)	-0,005705 (0, 011555)	0,0002103 (0, 000208)	-0,1095731 (0,080349)
LE	-0,005111 (0,008876)	0,6147312 (0, 48987)	0,0135344 (0, 029698)	0,0004446 (0, 001706)	-1,688233 * (0,966073)
LogTA	0,0433796 ** (0,019169)	-1,23927 (0, 913)	0,072909 * (0, 038946)	-0,0006708 (0, 003417)	0,5808775 (1,306215)
LI	-0,0459127 * (0,023749)	0,1683284 (0, 366649)	0,0373883 (0, 062896)	-0,0082396 ** (0, 004091)	-0,9903606 (0,793841)
EASP	0,0682196 *** (0,025735)	0,1170443 (0, 751989)	0,2079253 ** (0, 096059)	0,0143157 * (0, 007366)	1,05768 (1,3339)
Constant	-0,4710998 *** (0,178128)	4,959403 (6,665536)	-1,117222 ** (0, 449014)	-0,0352196 (0, 047099)	2,953505 (14,3414)
R ²	0,1444	0,1671	0,1272	0,1236	0,1404
Observations	131	131	131	131	131

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 35 presents the regression results that integrate the analysis under the Theoretical scale index methodology (model 4), applying the defined level of technological sophistication. In this situation there are no statistically significant results.

Table 36
Results: Real scale index methodology

	ROA	ROE	Solv	GL	FLev
FL	-0,0357921 (0,040562)	-0,0598824 (0,803619)	-0,0588383 (0,183214)	0,0120448 (0,008317)	2,415571 (1,932084)
CA	0,0025049 (0,015572)	-0,2434567 (0,573553)	0,1309049 (0,154946)	-0,0017083 (0,002257)	0,8730686 (0,854509)
RF	-0,0124917 (0,026876)	-0,1319583 (0,604942)	-0,1306171 (0,117562)	-0,0003996 (0,003926)	1,023257 (1,041389)
FLxCA	-0,0081078 (0,008178)	0,1514841 (0,337496)	-0,1578211 (0,128684)	-0,0008858 (0,00153)	-0,6103062 (0,509359)
FLxRF	0,0091908 (0,011741)	0,112786 (0,268204)	0,1120507 (0,102786)	-0,0019086 (0,002156)	-0,9912316 (0,658425)
Gen	-0,0153058 (0,021767)	0,5473873 (0,709522)	0,0230147 (0,065109)	-0,003277 (0,005047)	-2,885292 * (1,533023)
Age	0,0000587 (0,001107)	0,0544967 (0,036355)	-0,0015748 (0,007344)	0,0002453 (0,000209)	-0,119596 (0,085069)
LE	-0,0058198 (0,009161)	0,6629008 (0,541395)	0,0170391 (0,031809)	0,0002242 (0,001655)	-1,906774 * (1,029592)
LogTA	0,0435826 ** (0,018442)	-1,400209 (1,017742)	0,0893794 ** (0,039079)	-0,0020585 (0,003491)	0,5279843 (1,39634)
LI	-0,0447764 * (0,024652)	-0,0298037 (0,317723)	0,0382723 (0,071085)	-0,0091274 ** (0,004247)	-0,87107 (0,774689)
EASP	0,0674496 *** (0,025261)	0,1284031 (0,75953)	0,2147218 ** (0,095335)	0,0136189 * (0,007298)	0,822441 (1,378327)
Constant	-0,3618182 * (0,193864)	1,412451 (5,120053)	-0,8964237 * (0,523809)	-0,0351086 (0,050383)	11,14245 (14,76847)
R ²	0,1715	0,1547	0,2485	0,1315	0,1665
Observations	131	131	131	131	131

Source: Own elaboration

Note: Value in parentheses corresponds to standard deviation

* Significantly different from zero at a significance level of 10% (p value)

** Significantly different from zero at a significance level of 5% (p value)

*** Significantly different from zero at a significance level of 1% (p value)

The table 36 presents the regression results that integrate the analysis under the Real scale index methodology (model 5), applying the defined level of technological sophistication. In this case there are no statistically significant results.

3.3.2. Summary of results

After the presentation the detailed results proceeded to the presentation of the tables of statistical significance, demonstrated by each dependent variable for the general model and total sample.

Table 37
Statistical significance for the dependent variable ROA

	Sum	TPI	RPI	TSI	RSI
FL					
CA	DE		DE		
RF					
FLxCA					
FLxRF					

Source: Own elaboration

Note: DE means a direct effect of the independent variable on the dependent variable

Table 38
Statistical significance for the dependent variable Solvency

	Sum	TPI	RPI	TSI	RSI
FL					
CA		DE	DE	DE	
RF			DE		
FLxCA					
FLxRF					

Source: Own elaboration

Note: DE means a direct effect of the independent variable on the dependent variable

Table 39

Statistical significance for the dependent variable General Liquidity

	Sum	TPI	RPI	TSI	RSI
FL	IE	IE	IE	IE	IE
CA					
RF					
FLxCA					
FLxRF					

Source: Own elaboration

Note: IE means an inverse effect of the independent variable on the dependent variable

Table 40

Statistical significance for the dependent variable Financial Leverage

	Sum	TPI	RPI	TSI	RSI
FL	DE	DE		DE	IE
CA			IE		IE
RF	DE	DE			
FLxCA					
FLxRF	IE	IE	DE		DE

Source: Own elaboration

Note: DE means a direct effect of the independent variable on the dependent variable

IE means an inverse effect of the independent variable on the dependent variable

From the analysis of the tables presented above, it is confirmed that the dependent variable financial leverage has the largest number of statistically significant regression coefficients, it is also observed (practically for all measurement model typologies) that there is a direct effect of the explanatory variables Financial Literacy and Resource Flexibility in the dependent variable, that is, the increase in financial literacy and resource flexibility generates an increased in indebtedness.

Regarding the dependent variable ROE, no statistically significant result is found.

In the dependent variable ROA, statistically significant results are observed for the explanatory variable Capital Availability, verifying, depending on the measurement model, two direct effects.

The same situation of direct and inverse effects is found for the dependent variable Solvency, in this situation through the explanatory variables Capital Availability and Resource Flexibility.

With regard to the dependent variable General Liquidity also observe direct and inverse effects, depending on the measurement methodology, but in this situation only to the explanatory variable Financial Literacy.

Presented the tables of statistical significance for the general model and total sample, proceeds to the presentation of the tables of statistical significance by each dependent variable for the levels of technological sophistication defined.

Companies with reduced level of technological sophistication

Table 41

Statistical significance for the dependent variable ROA

	Sum	TPI	RPI	TSI	RSI
FL					
CA	DE	DE	DE	DE	
RF					
FLxCA		DE		IE	
FLxRF					

Source: Own elaboration

Note: DE means a direct effect of the independent variable on the dependent variable

IE means an inverse effect of the independent variable on the dependent variable

Table 42

Statistical significance for the dependent variable ROE

	Sum	TPI	RPI	TSI	RSI
FL					
CA			DE		
RF					
FLxCA					
FLxRF					

Source: Own elaboration

Note: DE means a direct effect of the independent variable on the dependent variable

Table 43

Statistical significance for the dependent variable Solvency

	Sum	TPI	RPI	TSI	RSI
FL					
CA	DE	DE		DE	
RF			DE		
FLxCA	IE	IE	DE		
FLxRF					

Source: Own elaboration

Note: DE means a direct effect of the independent variable on the dependent variable

IE means an inverse effect of the independent variable on the dependent variable

Table 44

Statistical significance for the dependent variable General Liquidity

	Sum	TPI	RPI	TSI	RSI
FL					
CA		DE			
RF			DE		
FLxCA		IE			
FLxRF		DE		DE	

Source: Own elaboration

Note: DE means a direct effect of the independent variable on the dependent variable

IE means an inverse effect of the independent variable on the dependent variable

Table 45

Statistical significance for the dependent variable Financial Leverage

	Sum	TPI	RPI	TSI	RSI
FL	DE				
CA			IE		IE
RF					
FLxCA					
FLxRF		IE			DE

Source: Own elaboration

Note: DE means a direct effect of the independent variable on the dependent variable

IE means an inverse effect of the independent variable on the dependent variable

For this level of technological sophistication, in an analysis of the tables of statistical significance shown, it is confirmed that the dependent variable Solvency has the largest number of statistically significant regression coefficients. Both the dependent variable Solvency as the dependent variable ROA, stands out the direct effect of the independent variable Capital Availability. Different measurement methodologies ensure the validity of results, where the capital availability is a major factor in the ability of companies to meet their commitments and their ability to generate profits from their assets.

Companies with medium level of technological sophistication

Table 46

Statistical significance for the dependent variable ROA

	Sum	TPI	RPI	TSI	RSI
FL	IE	IE			
CA					
RF					
FLxCA					
FLxRF					

Source: Own elaboration

Note: IE means an inverse effect of the independent variable on the dependent variable

Table 47

Statistical significance for the dependent variable ROE

	Sum	TPI	RPI	TSI	RSI
FL					
CA			IE		
RF			DE		
FLxCA		IE	DE		DE
FLxRF					

Source: Own elaboration

Note: DE means a direct effect of the independent variable on the dependent variable

IE means an inverse effect of the independent variable on the dependent variable

Table 48

Statistical significance for the dependent variable Solvency

	Sum	TPI	RPI	TSI	RSI
FL		IE			
CA					
RF					
FLxCA					
FLxRF					

Source: Own elaboration

Note: IE means an inverse effect of the independent variable on the dependent variable

Table 49

Statistical significance for the dependent variable General Liquidity

	Sum	TPI	RPI	TSI	RSI
FL					IE
CA					
RF					
FLxCA					
FLxRF					

Source: Own elaboration

Note: IE means an inverse effect of the independent variable on the dependent variable

Table 50

Statistical significance for the dependent variable Financial Leverage

	Sum	TPI	RPI	TSI	RSI
FL					
CA	IE				
RF					
FLxCA					
FLxRF					

Source: Own elaboration

Note: IE means an inverse effect of the independent variable on the dependent variable

For this level of technological sophistication, in an analysis of the tables of statistical significance shown, there is a low number of statistically significant effects. Only the dependent variable ROE has more than a statistically significant result in the same measurement methodology, even so it does not allow any kind of relevant analysis.

Companies with high level of technological sophistication

Table 51

Statistical significance for the dependent variable General Liquidity

	Sum	TPI	RPI	TSI	RSI
FL			IE		
CA			DE		
RF					
FLxCA					
FLxRF					

Source: Own elaboration

Note: DE means a direct effect of the independent variable on the dependent variable

IE means an inverse effect of the independent variable on the dependent variable

For this level of technological sophistication, due to the scarcity of statistically significant results, any analysis of the tables of statistical significance demonstrated would be of little relevance.

The following are presented the summary tables of statistical significance, by the general model and global sample, by different perspectives: measurement methodologies, independent variables and dependent variables.

Table 52

Summary of statistical significance from the perspective of measurement methodologies

	Direct effect	Inverse effect	Total of effects
Sum	3	2	5
TPI	3	2	5
RPI	4	2	6
TSI	2	1	3
RSI	1	3	4
			23

Source: Own elaboration

Note: Values correspond to the number of times the effect has occurred

From the analysis to table 52 it can be observed that the methodologies involving scales present less efficacy in the objective of evaluating cause and effect relations between the dependent and independent variables.

Table 53

Summary of statistical significance from the perspective of independent variables

	Direct effect	Inverse effect	Total of effects
FL	3	6	9
CA	5	2	7
RF	3	0	3
FLxCA			
FLxRF	2	2	4
			23

Source: Own elaboration

Note: Values correspond to the number of times the effect has occurred

From analysis to table 53 register the fact that the explanatory variable Financial Literacy had the highest number of statistically significant coefficients for the four dependent variables, while the resources flexibility has the lowest number of statistically significant cases. It should also be noted that the interaction variable between financial literacy and capital availability has no statistical significance, while the same interaction variable applied between financial literacy and resource flexibility has some statistically significant records.

Table 54

Summary of statistical significance from the perspective of dependent variables

	Direct effect	Inverse effect	Total of effects
ROA	2		2
ROE			
Solv	4		4
GL		5	5
FLev	7	5	12
			23

Source: Own elaboration

Note: Values correspond to the number of times the effect has occurred

From the analysis to table 54 it can be observed that the dependent variable Financial Leverage presents the largest amount of significant results; the opposite for ROE without any significant result.

From the global analysis to the various tables referenced above, it can be seen that the return on assets improves with the increase of capital availability; the solvency improves with increasing capital availability but also with increasing resource flexibility; the general liquidity worsens face the increases in financial literacy and the financial leverage suffers mixed effects of several variables.

The following are presented the summary tables of statistical significance, by the levels of technological sophistication defined, by different perspectives: measurement methodologies, independent variables and dependent variables.

Companies with reduced level of technological sophistication

Table 55

Summary of statistical significance from the perspective of measurement methodologies

	Direct effect	Inverse effect	Total of effects
Sum	3	1	4
TPI	4	4	8
RPI	5	1	6
TSI	3	1	4
RSI	1	1	2
			24

Source: Own elaboration

Note: Values correspond to the number of times the effect has occurred

In the perspective of the measurement methodologies of this level of technological sophistication compared to the general analysis (Table 52), the data present similar results, the methodologies involving scales present less present less efficacy in the purpose of relating cause and effect relationships between the dependent and independent variables.

Table 56

Summary of statistical significance from the perspective of independent variables

	Direct effect	Inverse effect	Total of effects
FL	1		1
CA	9	2	11
RF	2		2
FLxCA	1	5	6
FLxRF	3	1	4
			24

Source: Own elaboration

Note: Values correspond to the number of times the effect has occurred

For this level of technological sophistication, compared to the general analysis (Table 53), the same results are not verified. Whereas in the general analysis financial literacy is the independent variable that has the largest number of statistically significant coefficients for the dependent variables, in this sub-sample is the capital availability. Except for the capital availability, it is confirmed that the interaction variables present more records with statistical significance than the independent variables alone.

Table 57

Summary of statistical significance from the perspective of dependent variables

	Direct effect	Inverse effect	Total of effects
ROA	4	2	6
ROE	1		1
Solv	5	2	7
GL	4	1	5
FL _{lev}	2	3	5
			24

Source: Own elaboration

Note: Values correspond to the number of times the effect has occurred

For this level of technological sophistication, comparing this table with the same in the general analysis (Table 54), there is a larger number of dependent variables with significant results. In general analysis the significant results are concentrated on the dependent variable Financial Leverage, at this level of taxonomy significant results are observed in all

dependent variables and a number of significant results records equivalent between the dependent variables.

Companies with medium level of technological sophistication

Table 58

Summary of statistical significance from the perspective of measurement methodologies

	Direct effect	Inverse effect	Total of effects
Sum		3	3
TPI		2	2
RPI	2	1	3
TSI			
RSI	1	1	2
			10

Source: Own elaboration

Note: Values correspond to the number of times the effect has occurred

Regarding the perspective of measurement methodologies for this level of technological sophistication compared to general analysis (Table 52), data evidence similar conclusions, the methodologies involving scales present less efficacy in the purpose of relating cause and effect relationships between dependent and independent variables, one of which does not even present statistically significant results.

Table 59

Summary of statistical significance from the perspective of independent variables

	Direct effect	Inverse effect	Total of effects
FL		4	4
CA		2	2
RF	1		1
FLxCA	2	1	3
FLxRF			
			10

Source: Own elaboration

Note: Values correspond to the number of times the effect has occurred

For this level of technological sophistication, compared to the general analysis (Table 53), it is found that financial literacy is also the independent variable that has the largest number of statistically significant coefficients for the dependent variables. However, it appears that in the interaction variables there is an inversion, contrary to what happens in the general analysis, the interaction variable between financial literacy and capital availability presents significant results, and the opposite for the interaction variable between financial literacy and resource flexibility.

Table 60

Summary of statistical significance from the perspective of dependent variables

	Direct effect	Inverse effect	Total of effects
ROA		2	2
ROE	3	2	5
Solv		1	1
GL		1	1
FLv		1	1
			10

Source: Own elaboration

Note: Values correspond to the number of times the effect has occurred

For this level of technological sophistication, compared to the general analysis (Table 54), the differences are significant, with a smaller number of statistically significant records. Regarding the effects verified in the dependent variables, for this level of technological sophistication there is a predominance of the inverse effect, in the general analysis there is a balance between the effects that the independent variables applied on the dependent variables.

Companies with high level of technological sophistication

Table 61

Summary of statistical significance from the perspective of measurement methodologies

	Direct effect	Inverse effect	Total of effects
Sum			
TPI			
RPI	1	1	2
TSI			
RSI			
			2

Source: Own elaboration

Note: Values correspond to the number of times the effect has occurred

Table 62

Summary of statistical significance from the perspective of independent variables

	Direct effect	Inverse effect	Total of effects
FL		1	1
CA	1		1
RF			
FLxCA			
FLxRF			
			2

Source: Own elaboration

Note: Values correspond to the number of times the effect has occurred

Table 63

Summary of statistical significance from the perspective of dependent variables

	Direct effect	Inverse effect	Total of effects
ROA			
ROE			
Solv			
GL	1	1	2
FLev			
			2

Source: Own elaboration

Note: Values correspond to the number of times the effect has occurred

Regarding this level of technological sophistication, the scarcity of statistically significant results reduces the relevance of any kind of supplementary analysis.

In a global analysis of summaries to the statistical significance for all defined levels of technological sophistication, it turns out that the higher the level of technological sophistication of companies, the lower the statistically significant results. Contrary to what happens in the general analysis, for the levels of technological sophistication, the dependent variable ROE presents significant results, and the medium level of technological sophistication has the highest number of results.

3.3.3. Validation of research hypotheses

After the presentation of the study results proceeded to the validation of the research hypotheses.

H1: The financial literacy generates improvement of the company financial performance, *ceteris paribus*.

Table 64

Validation of the research hypothesis 1

	Sum	TPI	RPI	TSI	RSI	Result
ROA						Without effect
ROE						Without effect
Solvency						Without effect
General liquidity	Worsens	Worsens	Worsens	Worsens	Worsens	Worsens
Financial leverage	Improves	Improves		Improves	Worsens	Improves and worsens

Source: Own elaboration

From the analysis of the effects caused by the financial literacy in the various alternative measures of performance, it can be concluded by the non-validation of the hypothesis 1, as there is no statistical evidence that financial literacy improves companies performance. In fact, of conjugation of the five dependent variables and the five measurement methodologies, it can be seen that only with respect to the performance variable Financial Leverage can we observe some of the effects foreseen in hypothesis 1, observing the absence of most effects in hypothesis 1, which constitutes evidence of rejection of that hypothesis.

H2: The positive influence of financial literacy about company financial performance is stronger the greater capital availability of company, *ceteris paribus*.

Table 65

Validation of the research hypothesis 2

	Sum	TPI	RPI	TSI	RSI	Result
ROA						Without effect
ROE						Without effect
Solvency						Without effect
General liquidity						Without effect
Financial leverage						Without effect

Source: Own elaboration

The analysis of the effects caused by the financial literacy, associated to the contribution of the capital availability, in the various alternative measures of performance, it can be concluded by the non-validation of the hypothesis 2. In fact, the combination of the five dependent variables and the five measurement methodologies can show the non-existent of the effects predicted in hypothesis 2, by the way, there is no statistically significant result, which constitutes evidence of rejection of that hypothesis.

H3: The positive influence of financial literacy about company financial performance is stronger the greater flexibility resources of company, *ceteris paribus*.

Table 66

Validation of the research hypothesis 3

	Sum	TPI	RPI	TSI	RSI	Result
ROA						Without effect
ROE						Without effect
Solvency						Improves
General liquidity						Without effect
Financial leverage	Worsens	Worsens	Improves		Improves	Improves and worsens

Source: Own elaboration

The analysis of the effects caused by the financial literacy, associated to the contribution of the flexibility resources, in the various alternative measures of performance, it can be concluded by the non-validation of the hypothesis 2. In fact, the combination of the five dependent variables and the five measurement methodologies can show, only in the performance variable Financial Leverage, the existence of some of the effects provided for in hypothesis 3, however, there are also, to the same extent, effects contrary to those provided for in hypothesis 3. The absence of the majority of effects provided for in hypothesis 3 does not allow its validation, which constitutes evidence of rejection of that hypothesis.

H4a: The financial literacy causes stronger positive effects about company performance in environments of smaller technological sophistication, *ceteris paribus*.

Due to the specificity of the hypothesis, its validation assumes different assumptions from those used in the previous situations. Each level of technological sophistication is validated in order of the effect of financial literacy.

Table 67

Validation of the research hypothesis 4a for companies with reduced level of technological sophistication

	Sum	TPI	RPI	TSI	RSI	Result
ROA						Without effect
ROE						Without effect
Solvency						Without effect
General liquidity						Without effect
Financial leverage	Improves					Improves

Source: Own elaboration

Table 68

Validation of the research hypothesis 4a for companies with medium level of technological sophistication

	Sum	TPI	RPI	TSI	RSI	Result
ROA	Worsens	Worsens				Worsens
ROE						Without effect
Solvency		Worsens				Worsens
General liquidity					Worsens	Worsens
Financial leverage						Without effect

Source: Own elaboration

Table 69

Validation of the research hypothesis 4a for companies with high level of technological sophistication

	Sum	TPI	RPI	TSI	RSI	Result
ROA						Without effect
ROE						Without effect
Solvency						Without effect
General liquidity			Worsens			Worsens
Financial leverage						Without effect

Source: Own elaboration

The analysis of the effects caused by the financial literacy, associated with the various levels of technological sophistication, in the various alternative measures of performance, it can be concluded, in general terms, by the validation of the hypothesis 4a; however, the level of sustainability of this hypothesis is much reduced. In fact, of conjugation of the five dependent variables, the five measurement methodologies and the three levels of technological sophistication, it can be seen the existence of one effect predicted in hypothesis 4a, constituting an acceptable evidence of that hypothesis. Indeed, the results evidence the absence of statistically significant coefficients with positive sign in the medium and high level of technological sophistication; there is a positive sign at the reduced level of technological sophistication and thus the validation of the hypothesis can be supported.

H4b: The capital availability causes stronger positive effects about company performance in environments of smaller technological sophistication, *ceteris paribus*.

Due to the specificity of the hypothesis, its validation assumes different assumptions from those used in the previous situations. Each level of technological sophistication is validated in order of the effect of capital availability.

Table 70

Validation of the research hypothesis 4b for companies with reduced level of technological sophistication

	Sum	TPI	RPI	TSI	RSI	Result
ROA	Improves	Improves	Improves	Improves		Improves
ROE			Improves			Improves
Solvency	Improves	Improves		Improves		Improves
General liquidity		Improves				Improves
Financial leverage			Worsens		Worsens	Worsens

Source: Own elaboration

Table 71

Validation of the research hypothesis 4b for companies with medium level of technological sophistication

	Sum	TPI	RPI	TSI	RSI	Result
ROA						Without effect
ROE			Worsens			Worsens
Solvency						Without effect
General liquidity						Without effect
Financial leverage	Worsens					Worsens

Source: Own elaboration

Table 72

Validation of the research hypothesis 4b for companies with high level of technological sophistication

	Sum	TPI	RPI	TSI	RSI	Result
ROA						Without effect
ROE						Without effect
Solvency						Without effect
General liquidity			Improves			Improves
Financial leverage						Without effect

Source: Own elaboration

The analysis of the effects caused by the capital availability, associated with the various levels of technological sophistication, in the various alternative measures of performance, it can be concluded, in general terms, by the validation of the hypothesis 4b, being elevated the level of sustainability of this hypothesis. In fact, of conjugation of the five dependent variables, the five measurement methodologies and the three levels of technological sophistication, it can be seen the existence of many effect predicted in hypothesis 4b, constituting a great evidence of that hypothesis. Indeed, in the medium and high level of technological sophistication predominates the absence of statistically significant coefficients in compared with the reduced level of technological sophistication; at the reduced level of technological sophistication most of the coefficients have a positive sign and thus the validation of the hypothesis can be supported.

H4c: The resources flexibility causes stronger positive effects about company performance in environments of smaller technological sophistication, *ceteris paribus*.

Due to the specificity of the hypothesis, its validation assumes different assumptions from those used in the previous situations. Each level of technological sophistication is validated in order of the effect of resources flexibility.

Table 73

Validation of the research hypothesis 4c for companies with reduced level of technological sophistication

	Sum	TPI	RPI	TSI	RSI	Result
ROA						Without effect
ROE						Without effect
Solvency			Improves			Improves
General liquidity			Improves			Improves
Financial leverage						Without effect

Source: Own elaboration

Table 74

Validation of the research hypothesis 4c for companies with medium level of technological sophistication

	Sum	TPI	RPI	TSI	RSI	Result
ROA						Without effect
ROE			Improves			Improves
Solvency						Without effect
General liquidity						Without effect
Financial leverage						Without effect

Source: Own elaboration

Table 75

Validation of the research hypothesis 4c for companies with high level of technological sophistication

	Sum	TPI	RPI	TSI	RSI	Result
ROA						Without effect
ROE						Without effect
Solvency						Without effect
General liquidity						Without effect
Financial leverage						Without effect

Source: Own elaboration

The analysis of the effects caused by the resources flexibility, associated with the various levels of technological sophistication, in the various alternative measures of performance, it can be concluded, in general terms, by the validation of the hypothesis 4c; however, the level of sustainability of this hypothesis is reduced. In fact, of conjugation of the five dependent variables, the five measurement methodologies and the three levels of technological sophistication, it can be seen the existence of two effects predicted in hypothesis 4c, constituting an acceptable evidence of that hypothesis. Indeed, although most of the results evidences the absence of statistically significant coefficients in the medium and high level of technological sophistication, there are some positive signs at the low technological sophistication level and thus can be supported by the validation of the hypothesis.

Approaching the theme of financial literacy in the economic and financial performance of companies may seem repetitive and without relevance, however this study corrected the absence of empirical studies on this theme in the portuguese business reality.

The literature review adds a set of analyses that made the study sustainable. The importance of financial literacy in the business context assume a relevant role when director/manager/responsible, especially in SME, assume various functions, including finance. The fact that they not have financial knowledge may have negative repercussions on company performance and may be required to use external services to remedy these lacks. Thus, the training of entrepreneurs is seen as the most appropriate and efficient way of development, sustainability and economic and financial evolution of the company; it is also considered as one of the requirements for making solid financial decisions, contributing to the competitiveness of company. Thus, financial literacy is beneficial to the performance of company, providing contributions to productivity, efficiency, cost reduction and increased employee retention.

In addition to the direct relationship between financial literacy and company performance, this relationship can be analysed from the perspective of the interaction between the financial literacy and other components such as capital availability. Companies with better financial knowledge have competitive advantages in accessing external financing, enabling the survival and development of the company, and allowing to achieve the aims of company such as growth, performance, as well as the development and innovation activities. Another interaction component is resource flexibility; it is verifiable that the implementation of flexibility mechanisms in the allocation of financial, human and physical resources, even partially, provides significant improvements in performance, being also likely that resource flexibility will enhance financial literacy and improve the relationship with company performance, so that the impact on global performance is strongly positive. Another component is the technological sophistication of companies; it is referred that the use of technology associated with financial literacy can greatly improve decision-making process, especially in SME where there is a predominance of a reduced level of technological sophistication; the implementation of technology, especially in SME, can bring a range of benefits such as break down barriers in access to financial knowledge of entrepreneurs, what intertwined with its application in operational processes can emphasize company practices and improve its performance.

Considering the objective of the study, this dissertation proposed answer the following central research question: Does financial literacy improve or not the economic and financial performance of the companies?

Posteriorly, with the support of the literature review and based on the RBV logic, the research hypotheses were elaborated, hypothesis 1: The financial literacy generates improvement of the company financial performance, *ceteris paribus*; hypothesis 2: The positive influence of financial literacy about company financial performance is stronger the greater capital availability of company, *ceteris paribus*; hypothesis 3: The positive influence of financial literacy about company financial performance is stronger the greater flexibility resources of company, *ceteris paribus*; hypothesis 4a: The financial literacy causes stronger positive effects about company performance in environments of smaller technological sophistication, *ceteris paribus*; hypothesis 4b: The capital availability causes stronger positive effects about company performance in environments of smaller technological sophistication, *ceteris paribus*; hypothesis 4c: The resources flexibility causes stronger positive effects about company performance in environments of smaller technological sophistication, *ceteris paribus*.

To validate the research hypotheses has become imperative to collect data that allowed the construction of the study variables that would frame better in the econometric model used, the linear regression model in which was applied the Sandwich estimation method. The independent variables (financial literacy, capital availability and resource flexibility) were collected by conducting a questionnaire survey. The dependent variables, a set of financial ratios (ROA, ROE, solvency, general liquidity and financial leverage) were obtained from the SABI enterprise database.

The application of a single performance variable and a single measurement methodology seemed scarce and could weaken the robustness of the results, so it was decided to apply several dependent variables and various measurement methodologies. This multiplicity can be seen as repetition, but we argue that this multiplicity has brought robustness and consistency to the results achieved, besides imprinting a differentiating and innovative character to the study.

Regarding hypothesis 1, the literature shows that there is a positive effect on the direct relationship between financial literacy and company performance, however this study contradicts such evidence and therefore rejects the hypothesis. Regarding hypothesis 2, the

absence of statistically significant results does not allow to meet what is reported in the literature, and it is not possible to validate the hypothesis. In hypothesis 3, due to the insufficiency of a majority of results that allow the hypothesis to share what is mentioned in the literature, the hypothesis is rejected. With the introduction of one more component, the levels of technological sophistication of the companies studied, it was intended to understand the effects of each of the independent variables on the company performance within its level of technological sophistication. As the literature indicates, the majority of SME are at a reduced level of technological sophistication, and that's what the following research hypotheses tried to prove. The results validate hypotheses 4a, 4b and 4c, however it is important to mention that the independent variable that obtained the most evidence was the capital availability, it can be concluded that in environments of reduced level of technological sophistication, the capital availability presents the best implications on the company performance and can promote the technological development and consequently the company performance.

Only after the investigation hypothesis validation process can the research question be answered; for the present study, the answer is that financial literacy improves the economic and financial performance of companies, however, not from a general perspective, but from a specific perspective. In a direct effect relationship financial literacy does not improve company performance; in association with capital availability and resource flexibility, the financial literacy does not improve the economic and financial performance of the company; from a specific perspective of reduced level of technological sophistication of the company, it is found that financial literacy improves the economic and financial performance of the company.

The present study brings a set of contributions to the literature; the results achieved in this study contest what is mentioned in the literature, as the implications of capital availability and resource flexibility do not positively affect the relationship and impact of financial literacy on company performance; the incorporation of the analysis of independent variables in the various levels of technological sophistication of the companies studied has opened a new ambit of analysis that must be deepened, and is also a component that reinforces the importance of financial literacy for company performance; the breadth of measurement methodologies and the dependent variables used reinforced the consistency of the data obtained and also allowed a better awareness of the best methodologies and the independent variables that best reflect the performance variables.

In the elaboration of a study there is always a set of limitations that the conditioned; the sample size was a limitation, in fact, the level of participation of companies in the survey questionnaire was an obstacle that limited the study; on the other hand, the absence of consensus on the measurement methodology of financial literacy, of capital availability and of resource flexibility was a limitation, leading to the option of using several methodologies that allow overcome this limitation.

The development of an academic study provides a set of future clues that can be explored; obtain a larger sample could reinforce the consistency of the results; explore another type of sample, namely other sectors of economic activity; deepen the study individually or together of the dependent variables and measurement methodologies that yielded the most fruitful results; further studies on the same theme for a more reliable view of financial literacy on business performance.

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Appendix A – Questionnaire survey sent to companies



Financial literacy and company performance

Your Excellency Director/Manager/Responsible,

I am a student of the Instituto Superior de Contabilidade e Administração do Porto (ISCAP) and I am developing my dissertation to obtain the Master of Business Finance degree.

The theme of my dissertation deals the influence of financial literacy on company performance, with the moderating role of capital availability and resource flexibility.

As part of the analysis of the study, it was stipulated as a sample the companies from the northern region of Portugal inserted in the secondary sector (Industry).

Therefore, I come to invite your Excellency to participate in the study by answering this questionnaire survey

The questionnaire survey is divided into four groups.

For reasons of security and truth, it is requested the introduction of email for which this questionnaire survey was sent.

The data collected will be treated confidentially and the data will never be presented individually but only at aggregate levels.

Certain that your participation will be an asset, as long thank you for your availability.

***Required**

Email address *

General information

1) Gender? *

_____ Female.

_____ Male.

2) Age? *

_____ 18.

...

_____ 100.

3) Level of education? *

_____ 1st cycle of studies.

_____ 2nd cycle of studies.

_____ 3rd cycle of studies.

_____ Secondary (scientific-humanistic aspect).

_____ Secondary (professional aspect)

_____ Baccalaureate.

_____ Graduation.

_____ Postgraduate studies.

_____ Master degree.

_____ PhD.

4) For the performance of your duties is it important to have a higher education degree? *

_____ Yes.

_____ No.

5) Years of experience in performing your duties? *

_____ <1.

_____ 1.

...

_____ 60.

_____ >60.

Financial literacy

6) After prepared the financial statements of the company, understands and interprets the same? *

___ Yes.

___ No.

7) As the company's top figure, do you understand that you are ultimately responsible for the quality and presentation of the company's financial statements to stakeholders? *

_____ Yes.

_____ No.

8) As Director/Manager/Responsible, how do you consider analysing financial statements as a supportive tool for understanding the financial situation of the company?*

	1	2	3	4	5	
Very irrelevant	_____	_____	_____	_____	_____	Very relevant

9) Admit that last year the company posted a Return on assets (ROA) of 5%. In its interpretation, the company: *

_____ Earned €1 for every €0,05 invested in assets.

_____ Earned €0,5 for every €1 invested in assets.

_____ Earned €0,05 for every €1 invested in assets.

_____ Earned €1 for every €0,5 invested in assets.

Capital availability

10) For the company's financing is easy access to capital (own and/or external)?*

_____ Yes.

_____ No.

11) Has the company ever been denied access to bank credit by a financial institution?*

_____ Yes.

_____ No.

12) In your view, with regard to ease of access to capital, which is the ease of access to capital for your company compared to your competitors?*

_____ Inferior.

_____ Equal.

_____ Superior.

Resource flexibility

13) How do you assess the company's ability in terms of structural flexibility, that is, which the adaptability of tangible fixed assets - machinery, buildings, vehicles - the new production processes?*

	1	2	3	4	5	
Very irrelevant	_____	_____	_____	_____	_____	Very relevant

14) How do you assess the company's capacity for human resource flexibility (manpower versatility, labor adaptable to different functions)?*

	1	2	3	4	5	
Very irrelevant	_____	_____	_____	_____	_____	Very relevant

15) How do you evaluate the company's capacity regarding operational flexibility (change in the production process, adaptation of production factors to the production of new products)?*

	1	2	3	4	5	
Very irrelevant	_____	_____	_____	_____	_____	Very relevant

16) How do you evaluate the company's ability to hire qualified labor?*

	1	2	3	4	5	
Very irrelevant	_____	_____	_____	_____	_____	Very relevant

17) How do you evaluate the company's ability to develop new products to adapt to market demands?*

	1	2	3	4	5	
Very irrelevant	_____	_____	_____	_____	_____	Very relevant

Appendix B – Descriptive statistics for each level of technological sophistication

With the descriptive statistics we can observe the mean, median, standard deviation, maximum and minimum of each of the variables. This appendix presents the descriptive statistics of the dependent, independent and control variables for each defined level of technological sophistication.

Companies with reduced level of technological sophistication

Dependent variables

Table B1
Descriptive statistics of dependent variables

	ROA	ROE	Solv	GL	FLev
Mean *	3,62%	11,40%	34,45%	2,11%	149,35%
Median	2,83%	10,54%	34,55%	1,09%	80,18%
Standard deviation	11,27%	28,65%	47,95%	3,03%	361,62%
Maximum	45,03%	177,03%	93,09%	25,18%	3588,79%
Minimum	-56,67%	-108,17%	-384,51%	0,03%	-186,97%

Source: Own elaboration

*: The mean shown is the trimmed mean of the five highest and lowest observations of the sample

Independent variables

Table B2

Descriptive statistics of the independent variables: Sum methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	5,62	2,70	2,70	15,91	16,20
Median	7,00	4,00	3,00	16,00	16,00
Standard deviation	2,74	3,63	2,82	24,00	20,15
Maximum	8,00	6,00	10,00	48,00	80,00
Minimum	-5,00	-6,00	-4,00	-48,00	-32,00

Source: Own elaboration

Table B3

Descriptive statistics of the independent variables: Theoretical percentage index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	70,98%	56,23%	29,22%	41,34%	22,09%
Median	87,50%	66,67%	30,00%	33,33%	20,00%
Standard deviation	32,07%	40,14%	24,68%	37,14%	22,70%
Maximum	100,00%	100,00%	100,00%	100,00%	100,00%
Minimum	0,00%	0,00%	0,00%	0,00%	0,00%

Source: Own elaboration

Table B4

Descriptive statistics of the independent variables: Real percentage index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	17,02%	27,54%	38,44%	5,14%	6,94%
Median	7,14%	16,67%	36,84%	0,00%	2,63%
Standard deviation	19,57%	30,22%	14,86%	9,46%	9,04%
Maximum	92,86%	100,00%	73,68%	57,14%	48,87%
Minimum	0,00%	0,00%	0,00%	0,00%	0,00%

Source: Own elaboration

Table B5

Descriptive statistics of the independent variables: Theoretical scale index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	3,90	3,35	1,91	13,29	7,71
Median	5,00	4,00	2,00	10,00	5,00
Standard deviation	1,44	1,65	1,03	8,68	5,38
Maximum	5,00	5,00	5,00	25,00	25,00
Minimum	1,00	1,00	1,00	1,00	1,00

Source: Own elaboration

Table B6

Descriptive statistics of the independent variables: Real scale index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	1,54	1,92	2,45	3,04	3,85
Median	1,00	1,00	2,00	2,00	3,00
Standard deviation	0,81	1,44	0,71	2,96	2,54
Maximum	5,00	5,00	4,00	15,00	15,00
Minimum	1,00	1,00	1,00	1,00	1,00

Source: Own elaboration

Control variables

Table B7

Descriptive statistics of the control variables

	Gen	Age	LE	Log TA*	LI	EASP
Mean	0,43	46,19	5,99	6,08	39,90%	1,74
Median	0,00	46,00	7,00	6,09	25,63%	2,00
Standard deviation	0,50	10,78	1,93	0,69	41,35%	0,44
Maximum	1,00	80,00	9,00	8,37	166,90%	2,00
Minimum	0,00	21,00	1,00	4,44	0,00%	1,00

Source: Own elaboration

*: Used base 10 for logarithm calculation

Companies with medium level of technological sophistication

Dependent variables

Table B8

Descriptive statistics of dependent variables

	ROA	ROE	Solv	GL	FLev
Mean *	5,94%	11,05%	33,44%	2,62%	67,56%
Median	3,51%	7,83%	34,17%	1,00%	40,94%
Standard deviation	9,00%	30,84%	39,18%	4,79%	201,65%
Maximum	37,41%	101,62%	97,22%	26,05%	736,98%
Minimum	-13,51%	-130,28%	-164,38%	-0,31%	-915,92%

Source: Own elaboration

*: The mean shown is the trimmed mean of the five highest and lowest observations of the sample

Independent variables

Table B9

Descriptive statistics of the independent variables: Sum methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	4,68	0,97	2,06	4,61	10,89
Median	5,50	0,00	2,50	0,00	8,00
Standard deviation	3,25	3,91	3,44	23,90	21,71
Maximum	8,00	6,00	10,00	48,00	80,00
Minimum	-5,00	-6,00	-9,00	-48,00	-63,00

Source: Own elaboration

Table B10

Descriptive statistics of the independent variables: Theoretical percentage index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	61,69%	35,48%	26,45%	23,32%	17,36%
Median	68,75%	0,00%	25,00%	0,00%	10,00%
Standard deviation	33,52%	40,99%	24,50%	31,98%	21,18%
Maximum	100,00%	100,00%	100,00%	100,00%	100,00%
Minimum	0,00%	0,00%	0,00%	0,00%	0,00%

Source: Own elaboration

Table B11

Descriptive statistics of the independent variables: Real percentage index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	23,73%	41,94%	41,77%	10,00%	10,37%
Median	17,86%	50,00%	39,47%	5,95%	6,20%
Standard deviation	23,19%	32,62%	18,08%	14,10%	12,09%
Maximum	92,86%	100,00%	100,00%	65,48%	54,14%
Minimum	0,00%	0,00%	0,00%	0,00%	0,00%

Source: Own elaboration

Table B12

Descriptive statistics of the independent variables: Theoretical scale index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	3,56	2,50	1,84	9,11	6,69
Median	4,00	1,00	1,50	5,00	5,00
Standard deviation	1,53	1,71	1,03	7,79	5,23
Maximum	5,00	5,00	5,00	25,00	25,00
Minimum	1,00	1,00	1,00	1,00	1,00

Source: Own elaboration

Table B13

Descriptive statistics of the independent variables: Real scale index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	1,82	2,60	2,61	4,68	4,90
Median	1,50	3,00	2,50	3,00	4,00
Standard deviation	1,07	1,59	0,89	4,21	3,76
Maximum	5,00	5,00	5,00	20,00	20,00
Minimum	1,00	1,00	1,00	1,00	1,00

Source: Own elaboration

Control variables**Table B14**

Descriptive statistics of the control variables

	Gen	Age	LE	Log TA*	LI	EASP
Mean	0,45	44,90	4,89	5,65	25,23%	3,00
Median	0,00	45,00	5,00	5,68	3,12%	3,00
Standard deviation	0,50	10,21	2,03	0,61	32,64%	0,00
Maximum	1,00	73,00	9,00	7,62	99,14%	3,00
Minimum	0,00	25,00	1,00	4,12	0,00%	3,00

Source: Own elaboration

*: Used base 10 for logarithm calculation

Companies with high level of technological sophistication

Dependent variables

Table B15

Descriptive statistics of dependent variables

	ROA	ROE	Solv	GL	FLev
Mean *	5,95%	54,81%	38,68%	2,41%	126,17%
Median	4,54%	11,62%	44,54%	1,49%	38,86%
Standard deviation	12,67%	347,88%	60,16%	2,86%	755,06%
Maximum	53,55%	3108,48%	94,69%	19,54%	6181,29%
Minimum	-55,20%	-710,37%	-573,49%	0,01%	-4233,69%

Source: Own elaboration

*: The mean shown is the trimmed mean of the five highest and lowest observations of the sample

Independent variables

Table B16

Descriptive statistics of the independent variables: Sum methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	5,42	2,58	2,61	14,82	14,60
Median	7,00	4,00	3,00	16,00	12,00
Standard deviation	2,89	3,68	2,88	24,38	19,14
Maximum	8,00	6,00	9,00	48,00	72,00
Minimum	-6,00	-6,00	-7,00	-48,00	-49,00

Source: Own elaboration

Table B17

Descriptive statistics of the independent variables: Theoretical percentage index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	68,99%	55,22%	29,39%	39,89%	20,35%
Median	87,50%	66,67%	30,00%	33,33%	15,00%
Standard deviation	32,85%	40,31%	23,17%	37,37%	20,69%
Maximum	100,00%	100,00%	90,00%	100,00%	90,00%
Minimum	0,00%	0,00%	0,00%	0,00%	0,00%

Source: Own elaboration

Table B18

Descriptive statistics of the independent variables: Real percentage index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	18,43%	28,50%	38,89%	5,75%	7,34%
Median	7,14%	16,67%	36,84%	0,00%	3,38%
Standard deviation	20,62%	30,65%	15,16%	9,73%	9,88%
Maximum	100,00%	100,00%	89,47%	50,00%	63,16%
Minimum	0,00%	0,00%	5,26%	0,00%	0,00%

Source: Own elaboration

Table B19

Descriptive statistics of the independent variables: Theoretical scale index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	3,81	3,27	1,91	12,82	7,28
Median	5,00	4,00	2,00	12,00	5,00
Standard deviation	1,44	1,67	0,98	8,70	4,96
Maximum	5,00	5,00	5,00	25,00	25,00
Minimum	1,00	1,00	1,00	1,00	1,00

Source: Own elaboration

Table B20

Descriptive statistics of the independent variables: Real scale index methodology

	FL	CA	RF	FLxCA	FLxRF
Mean	1,60	1,98	2,51	3,24	4,07
Median	1,00	1,00	2,00	2,00	3,00
Standard deviation	0,87	1,45	0,76	3,05	2,80
Maximum	5,00	5,00	5,00	15,00	20,00
Minimum	1,00	1,00	1,00	1,00	1,00

Source: Own elaboration

Control variables**Table B21**

Descriptive statistics of the control variables

	Gen	Age	LE	Log TA*	LI	EASP
Mean	0,50	44,50	6,15	5,8686228	23,29%	4,29
Median	0,00	42,00	7,00	5,8538271	7,18%	4,00
Standard deviation	0,50	10,47	1,57	0,7611308	38,98%	0,45
Maximum	1,00	72,00	10,00	8,1227353	330,66%	5,00
Minimum	0,00	22,00	1,00	3,6202402	0,00%	4,00

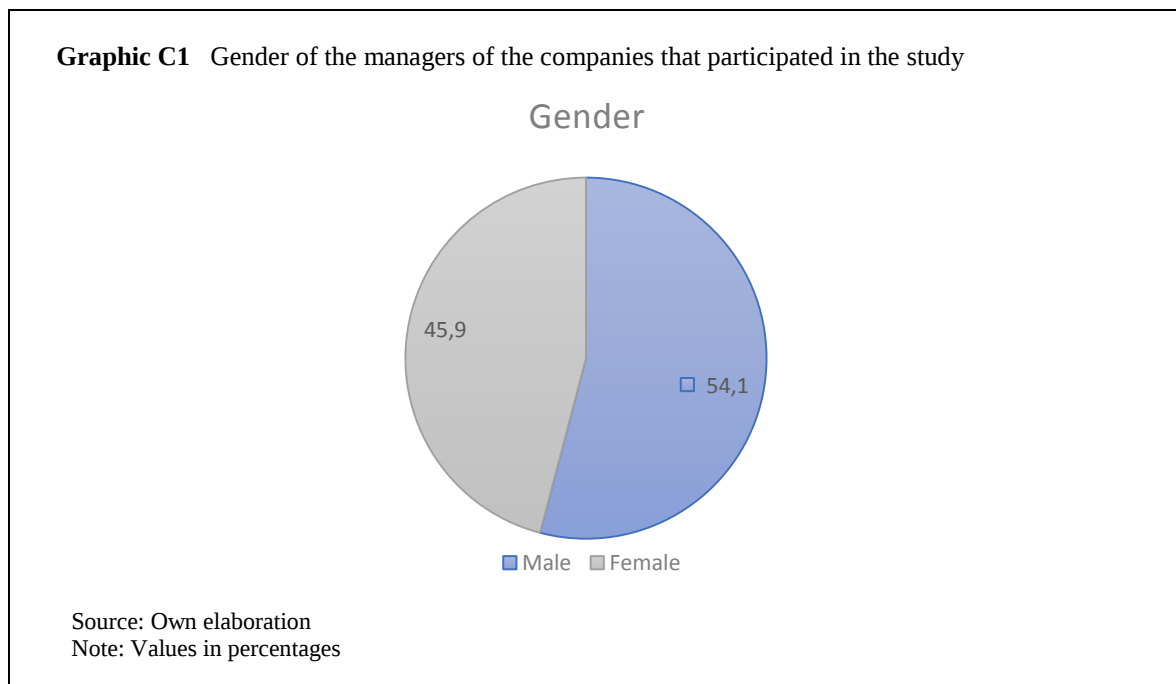
Source: Own elaboration

*: Used base 10 for logarithm calculation

Appendix C – Profile of SME director/manager/responsible of the manufacturing industry from the North Region of Portugal

The set of data collected allowed us to understand how it is structure the governing body of the companies in the sector of manufacturing industries in the North Region of Portugal.

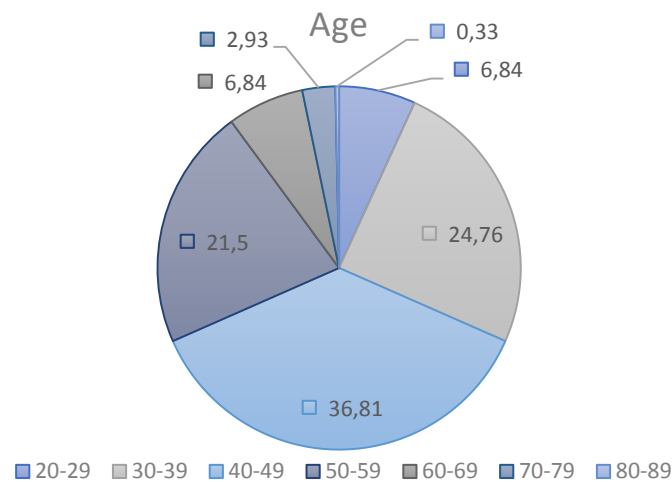
The governing body of the companies that participated in the study, in relation to their gender, is mostly male as shown in graphic C1.



According to the data obtained, the governing body of the companies that participated in the study are 54,1% male and 45,9% female.

Regarding the age of respondents, the graphic C2 shows, by age group, which percentages of respondents.

Graphic C2 Age of managers of companies participating in the study

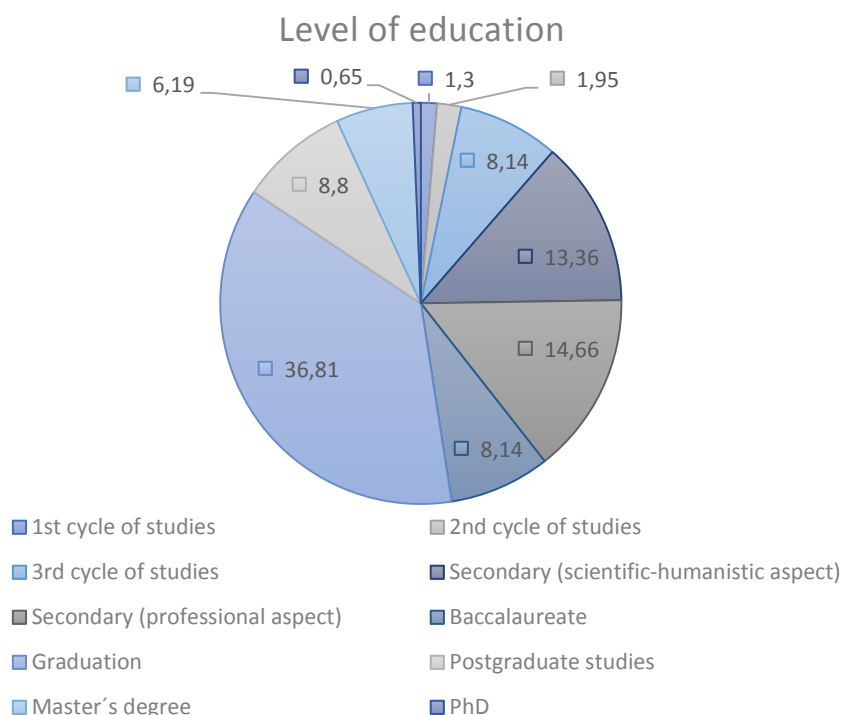


Source: Own elaboration
Note: Values in percentages

It can be seen that the majority of corporate leaders are concentrated in the 40-49 age group. Within this age group, the most predominant age (mode) is 40 years old, with 16 individuals of this age. However there are also two other relevant groups. With 24,76% there is the age group of 30-39 years old, with the most predominant age being 37 years old, with 13 individual. With 21,5% there is the age group of 50-59, with the most preponderant age being 50 years old, with 14 individuals. From the sample data, the average age is 45 years.

Regarding the level of education of respondents, the graphic C3 shows the answers obtained.

Graphic C3 Level of education of the managers of the companies that participated in the study

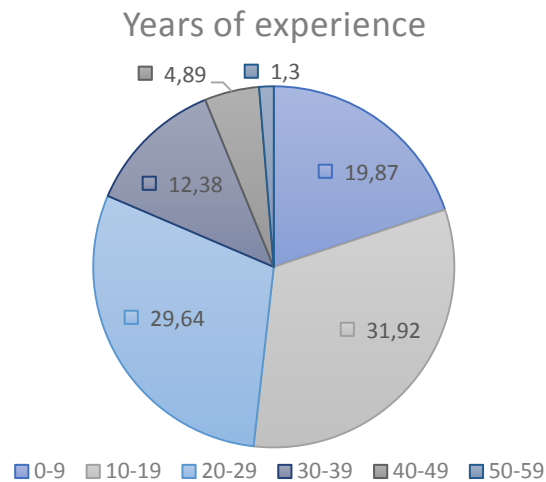


Source: Own elaboration
Note: Values in percentages

According to the data obtained, there is a level of education that stands out, a degree, with 107 individuals with this degree. To a lesser extent, there are two other levels of education that are important. With 13,36% there are 44 individuals with secondary education level (scientific-humanistic aspect). With 14,66% there are 50 individuals with secondary education level (professional aspect).

The years of experience in the performance of their duties was another important point provided by the respondents. The graphic C4 presents the answers obtained.

Graphic C4 Years of experience of company leaders who participated in the study



Source: Own elaboration
Note: Values in percentages

The collected data allowed realize that there is wide variety of years of experience in the performance of their duties. The largest group is between 10-19 years of experience, with the age most referred to as ten years of experience, with 26 individuals. The second largest group is between 20-29 years of experience, with the twenty years of experience being the most mentioned age, with 38 individuals. The third largest group is between 0-9 years of experience, with the tree years of experience being the most mentioned age, with eleven individuals. Although already mentioned, from the whole sample, the most referred years of experience are twenty years, with 38 individuals. The average of years of experience was 19,43 years of experience.