
Does the trademarking (as a marketing innovation) contribute to the financial performance of a Portuguese Low-tech industry?

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1. Abstract

Innovation is a central part of any today's day company, it allows companies to become competitive in relation to its competitors, to obtain greater sources of in-house knowledge and ideally leads companies to greater revenues.

Although innovation is a concept well known from a far away past, there are sectors and industries that did not move at the same innovation pace as other more advanced industries and because of that, today they are seen as not so much innovative and are sometimes ignored by the main political decision makers when the subject is the attribution of economic help.

We are obviously talking about the Low Tech (LT) industries, categorized by the OECD as technologic low intensive industries, with not so much funds dedicated to R&D expenditures.

In this study we will gather some important concepts about innovation and marketing innovation, at the same time as we will look to previous author's examples where a marketing innovation was crucial for this type of companies, or others.

In the empirical part we pretend to analyze our own dataset collected with INPI (Instituto Nacional da Proteção Intelectual), which is the Portuguese responsible association for brand registrations, and we will run a statistical model in order to find connections between an administrative action (the brand registration) and financial corporate results.

In the end, we hope to give one more further step in the demystification of LT industries and marketing innovation activities and provide useful insights for these type of industries by answering to the main question, does the trademarking impacts the financial performance of a company in the portugues Low-tech industries?

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Keywords: innovation, low technology, marketing innovation, brand, trademark registration

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4. Introduction

Innovation does not come up only with one shape or form, it can really manifest itself in a lot of ways and, essentially, can happen from different actions taken. For a Low-medium tech (LMT) firm, innovation has a really important role in order to keep these firms surviving and it is crucial for them to invest resources in R&D activities (van Beers & Zand, 2014).

Innovating enable firms to strive and reach for better profits (Hausman & Johnston, 2014) as it allows them to keep a robust competitive advantage (Guellec & Wunsch-Vincent, 2009).

To talk about innovation in any industry we must first mention and look closer to the taxonomy proposed by Pavitt, in 1984, that stays very relevant and updated to these days although it is a static typology. The taxonomy had the intention to be an element that could be relevant to policy analysis by predicting the actions of innovating companies and separating them by innovative behavior categories (Archibugi, 2001).

First category presented was the scale-intensive firms supposed to describe innovation patterns in the mass production industries, the second one was the specialized equipment suppliers supposed to describe the pattern on the industries that transfer their specialized machinery and installations to other, the third one was the science-based firms which are associated with in-house R&D laboratories and a big presence of knowledge, the last one was the supplier dominated firms known for having a weak in-house R&D capabilities and to outsource much of the technology they use in order to get the lowest costs possible producing its products (Heidenreich, 2009a). We can consider the supplier dominated firms as the core firms of LMT industries (Heidenreich, 2009a).

A study taken by Tor Helge Aasa and Per Egil Pedersenb (2018) with found that a company investing on service innovation (whether it's on the service sectors or in a manufacturing industry) can achieve more productivity (sales revenue per employee) than firms not investing in the same service innovations. However, in the same study, profitability did not suffer any impact from the same service innovations, whether they are made in service sectors or in manufacturing industries.

The same study above does not corroborate with a well-known comparable study, conducted by Cainelli et al. (2004), that affirms that productivity is affected by innovation

expenditure. Cainelli et al. (2004) were able to show, in their study composed by 19024 Italian firms, all in the services sector, with data taken in the Italian CIS II and in the System of Enterprise Accounts that productivity is influenced by the level of expenditures in innovation by firms.

Ike C. Ehie; Kingsley Olibe (2010), on the same line of innovation thinking, elaborated a very composed study made over 18 years and with 26 500 participating firms. The study analyzes the R&D investment–firm performance linkage in both manufacturing and service industries and how much of impact do they have to firm value. The authors added a variable and evaluated the impact that the national tragedy of 09/11 had in the R&D investment, but for this thesis we will not explore and consider this part of the study, only the pre 09/11 part that the authors evaluated.

The results admittedly show that firms who invest more in R&D are the firms that obtain a better market performance. These results have a more pronounced effect on the manufacturing industry.

The above findings can be very relevant for policy makers and even for investors to understand the potential that R&D expenditures can mean to a firm (Ike C. Ehie; Kingsley Olibe, 2010).

Organizations like the OECD and Eurostat (2013) have presented calculations to follow and with them organize industries into 4 different groups of technology intensiveness, which are: the low-tech industries (LT), medium-low-tech industries (ML), medium-high-tech industries (MH) and high-tech industries (HT). The calculation is made by measuring the sectors' average share of expenditures in R&D in relation to their global output (Kirner et al., 2009). This thesis will follow the OECD's last categorization (2013), using NACE Rev.2, that organizes firms into four main categories, namely,

By the OECD's document (2013) we have the following percentages of investment that distinguish the technology intensity of firms (Oduro, 2019):

Sectors with a R&D intensity of more than 5% are considered 'high tech' or 'high technology'.

Sectors with a R&D intensity between 3% and 5% are considered 'medium high tech' or 'complex technologies'.

Sectors with a R&D intensity between 3% and 1% are considered 'medium low tech'.

Sectors with a R&D intensity below 1% are considered 'low tech.

The introductions to the above terms lead us to the central topic of this thesis, which is the trademarking of a brand as a marketing innovation and what impact can have in a Portuguese LT firm.

Following the *European Union Intellectual Property Office*, trademarking is a legal registration/protection used by companies to differentiate their products or services from their competitors. Examples of these specific intellectual properties are: words, slogans, logos, shapes, colors and sounds.

Some of the motives to register a brand, following Flikkema, De Man, and Castaldi (2014) are: to signal important changes, appropriate the rents from innovation, increase the distinctiveness of products, build brand equity and hence customer loyalty, and gain a competitive advantage.

This thesis pretends to give a general and descriptive overview over the data collected with INPI (National Institute for the Intellectual Property) and after crossing it with a public financial database resulting in 29200 brand registrations over the period of 3 years (2017-2020).

Before the empirical analysis this thesis will approach the Portuguese innovative panorama and will analyze innovation in its manufacturing industries.

5. Innovation: what is it?

The Oslo Manual (2018) was and still is a big milestone to understand innovation, distinguishing it between marketing, process, product and organizational innovation (Suryono Efendi, Edi).

The Oslo Manual (2018) tell us that an innovation is an upgrade in any given product or service that already existed and that is available to general public to use it.

Innovation has 4 types to manifest itself in a business and can assume 4 forms: A radical form, an incremental form, a disruptive form and an architectural form.

To differentiate them, we normally see how it manifests in society and in the markets where it is aimed to flourish.

Architectural innovations are more "closed" innovations that only change relationships between them (Henderson, Rebecca M.; Clark, Kim B., March 1990, p.12).

Incremental innovations are made partially in an existent product or service, it's the improvement over the time that makes the incremental innovation (Henderson, Rebecca M.; Clark, Kim B., March 1990, p.11).

A disruptive innovation can penetrate an existing market and it is characterized for displacing established existing market-leading firms, products or business models (Ab Rahman, Airini; et al., 2017).

Radical innovations are the most “drastically” ones, normally they change a dominant and established design and create a new one (Henderson, Rebecca M.; Clark, Kim B., March 1990, p.11).

Innovation can have a big impact in a society or in an economy as it is regarded to be the engine for economies to grow and to reach a long-term economic development (Arrow 1972; Franko 2010). In the technological world that society lives in at the moment, innovation and technological innovation are crucial for any firm to strive in an even more technological and ferocious market.

Technological innovation determines a firm's performance and its survival or extinction. Manufacturing companies may implement the product differentiation strategy by product innovation and reduce manufacturing costs and shorten production cycle by process innovation

Firms concentrated in large urban areas are more likely to invest in R&D and this investment is more vital to the creation of innovations in center than in peripheral areas (Daniel Shefer*, Amnon Frenkel, 2005).

However, the main players responsible to generate innovation in a society are mainly composed by firms and consumers. This is explained by a very long and studied innovation theory that explains that all innovations compulsions come from two different ways, and they are the 'market pull' and the 'technology push' (Indriany Ameka, Wawan Dhewanto, 2013)

Market pull starts always with a market need, normally represented by a person or a group of persons who express their demand for a concrete product or service that can be used by a major group of people (Indriany Ameka, Wawan Dhewanto, 2013).

A technology push happens when exists a dissatisfaction on the research side with an old technology, product or service that leads to the desire to innovate, whether a market need exists or not (Indriany Ameka, Wawan Dhewanto, 2013).

It is not only for companies who have ambitions to enter a new market, innovation is important for firms to consolidate and create barriers on their own markets too, enabling stable profit generation in the long term (J. Hagedoorn, 1996) .

But how big of an impact can innovation have in a firm? The general literature says, in its majority, that innovation expenditures can reflect itself on the firm's performance.

6. Low-tech industries: What are they?

As it was already stated in this thesis, the classification used to classify LT, LM, MH and HT is the Nace Rev.2 classification of intensiveness on manufacturing industries which organizes firms into these last four main categories, based on R&D expenditures.

Returning to the taxonomy created by Pavitt (1984), we can associate the LT industries to the supplier dominated firms stated in the taxonomy (Heidenreich, 2009a).

Following the revision made in Bogliacino, Francesco; Pianta, Mario (2016), the supplier dominated firms are normally the ones to adopt more process innovation by acquiring more machinery to the production of their products.

These are sectors composed mainly by small firms, by traditional markets and traditional ways of work (Bogliacino, Francesco; Pianta, Mario, 2016). The demand plays an important role to the development of innovation in these sectors, being as we have already seen the process innovation the one most valued.

In the manufacturing sector, LMT refers to such industries as household appliances, the food, paper, publishing and print industries, the wood and furniture industry, and the manufacture of metal products, textiles and plastic products. (Hirsch-Kreinsen, 2015). Following the NACE Rev.2, this classification in four technological categories only make sense to manufacturing industries. To evaluate a similar indicator in the services sectors is used the “knowledge intensiveness” indicator.

Following this indicator, Hirsch-Kreinsen et al. (2006, p.5) states “Pharmaceuticals, the electronics industry, motor vehicles, the aerospace industry as well as mechanical engineering, for instance, are categorized as high-tech or medium-high-tech”.

A big question to be done on these days is: Is this indicator still up to date? Can it really be precise define the real technology on firms? For example, Kirner et al. (2009) criticize the categorization as it is done because they believe that does not take into account differences at firm level, differences like the socio-environment, the geography, the presence of competition near the firm.

In my opinion this indicator could be more developed or could have more indicators to support the attribution of categories. For instance, if a firm dedicates only 0,9% of its total investment in R&D but can be more productive than the company that invest 1,3%, why should we consider the first one as 'Low-tech' and the other as 'Low-medium-tech'?

6.1 Innovation in the low technology sector

Pavitt (1984) describes these firms as small and traditional industries that dedicate low expenditures to R&D. Only the process or product technology are normally changed and most of the innovations made come from its own suppliers

Following the study made by Heidenreich (2009), where he analyses the data gotten on the Fourth Community Innovation Survey (CIS4), is possibly to identify that the most common type of innovations made in the LMT industries are the ones related with process, organization and marketing and there is a high dependence on its own suppliers for the provision of machines, equipment and software.

According to Chen (2016), the difference in innovation strategies between industries are linked with the companies' staff, organizational competences, knowledge base and institutional environment. HT firms have more R&D activities so inevitably they are more technology oriented than LMT firms (Chen, 2016).

P. Robertson et al. (2009) go even further saying that, by definition, LMT firms are less innovative than the HT firms.

The truth is that these categories of firms can't act alone and their technology performance is highly interdependent (Kirner et al., 2009).

The low-tech industry in particular normally absorbs technologies developed in other industries and then adapt it for their own innovation goals (Reichert et al., 2016). This capacity is named 'absorptive capacity' and Hervas-Oliver et al. (2011) considers that it could be enhanced by low-tech firms with R&D activities.

In general, firms in low-technology industries do not have the same research attention as high-tech sectors have (Robertson et al., 2009b) and in my opinion this could be related with the less technological innovative profile of low-tech sectors and with the low engagement in formal R&D (Heidenreich, 2009b; Kirner et al., 2009).

We could see these two different industries diverge a lot between them. High-tech firms not only innovate and invest more in R&D activities, they are generally positioned in markets around the globe (Enjolras et al., 2019). Low-tech firms invest less in R&D activities, but that fact does not make them less important. These firms have generally a bigger representation in world economies and their capacity to be innovative contributes to the economic and social wellbeing of most societies (Robertson et al., 2009b).

Studies linking low-technology industries and innovation are not abundant (Reichert et al., 2016).

Normally this type of industry exhibit fewer radical innovations than the high-technology industry (Casper et al 2004), instead, the LMT industries produce more process innovations and not so much product and service innovations (de Jong & Vermeulen, 2006; Kirner et al., 2009). Even innovation researchers unanimously agree that process innovation are a subject of big importance to LMT industries (Heidenreich, 2009b)

We are talking about an industry that is mostly dominated by its suppliers (Hirsch-Kreinsen, 2008) and a bigger part of the companies in the industry “conduct activities of integration and adaptation to new technologies in their manufacturing processes” (Huang, 2010).

However, this does not mean that product innovation does not exist in LMT industries. According to a Heidenreich study (2009b) involving 26 member states of the EU, 18% of LMT firms focus on product innovations and a larger percentage (30%) of HT firms focus on the topic too.

Huang (2010) even explains that product innovations lead to a greater use of new technologies comparing to process innovation and most of the times technology-oriented competencies as well as R&D capacities are needed.

But how exactly can LMT industries access better and qualified knowledge? The answer may be on the open innovation concept.

A study from (Hirsch-Kreinsen, 2015) reveals that, in LMT firms, external knowledge could be more important than in-house knowledge due to its capacity to compensate the lack of R&D resources by adapting external knowledge.

Firstly, open innovation refers to the collaboration with external stakeholders, while closed innovation incurs when internal R&D expenditures and in-house research team help with all the organizational innovations” (Hauknes & Knell, 2009). 35% of companies holding innovative activities in 20 EU countries (Heidenreich, 2009b, p.489) classify this subject as something highly important.

Furthermore, deepening and broadening external collaborations can enable firms to innovate efficiently (laursen and salter). Lee et al. (2015) even propose that the open innovation model could reduce innovation-related costs and risks, could target to economies of scale and reduce product development time.

But not all collaborations mean the same for the firms or have the same ‘value’. Some can be more ‘profitable’ than others.

In the view of (Hirsch-Kreinsen, 2015), knowledge provided by suppliers can play a great role in LMT innovation, actually more than in HT innovation.

On the contrary, Un et al. (2010) undervalue the knowledge gain through suppliers explaining that both parts operate in the same industry and most of the times the knowledge passed would be the same.

Both views are relevant and effectively both stakeholders are important, but in a study held by Heidenreich (2009b, p.489) 25% of all LMT firms considered their suppliers as a “extremely important” source of information.

Despite these last views, Tsai & Wang (2009) added that customers can be a really good source of information due to their broad knowledge and their capacity to provide ideas exposing their unfulfilled needs, capacitating the firm to create new products and services or improve the existing ones.

Most of the times LMT innovation doesn’t come up from the latest scientific or technological knowledge but from the stock of knowledge that exists in-house transformed into economically useful knowledge (Bender & Laestadius, 2005)

The big propeller for innovation in this type of industries isn’t the technological knowledge but the creativity and the capabilities that enable innovation, which in a pragmatic

way are the abilities required to identify what could be relevant knowledge and apply it to the specific conditions of the firm (Bender & Laestadius, 2005).

7. Marketing Innovation strategies on LT industries

Inside of the innovation theme we have got a category that sometimes is not very exploited or studied and that is the marketing innovation. Compared with technological innovation, marketing innovation does not get the full attention that should be getting because of its undervaluation in the field of innovation (Lee et al., 2016).

But what exactly can we comprehend from what is 'marketing innovation'? Following some authors, we can define as a product design improvement or even a non-technological innovation (Naidoo, 2010, p.67), (Phillips, 1997, p.223).

Apart from this, Deshpandé et al. (1993) and Hurley and Hult (1998, p.13) defined marketing innovation as improvement in product design, placement, promotion, or pricing.

An improvement in product design, placement, promotion or pricing by Deshpandé et al. (1993, p.76) and Hurley and Hult (1998, p.14).

The main goal of this work is to understand the power that a brand registration and the brand itself has for a firm in the LT/LMT industry. For that, we need to unfold the definition and meaning of what exactly is a brand.

For the American Marketing Association (AMA, n.d.), a brand can be either a name or a design, or a symbol that is capable to identify a seller's good or service.

Soon as we see or think about a product, or a service or any other company's activity we associate that to some image/idea or even a feeling and that is also considered a brand, not just the physical or tangible part of it but what comes up emotionally through the person's mind (Marion, 2021).

Once the brand passes through the registration process, we say that is a 'trademark' and trademark is a concept already known through the years. A consensual definition of trademark can be :

On these days businesses are confronted with constant situations of pressure, competitiveness and interrelations. We can admit that the more number of brands are registered and created, the more will be the impact to the local and world economy.

Contrasting with that, research in topics about the relationship between trademarking and firm performance are still scarce (Agostini et al., 2016).

Due to its intangibility, it still exists a lack of consensus defining a general model that explains brand value and its growth (Ökten et al., 2019).

A big part of the authors divide brand equity measures in three categories: 1. customer mindset, 2. product market and 3. financial outcomes (Füller et al., 2013).

This study will focus itself on evaluating the impact of the brand looking through the financial side and will try to understand if the brand represents a really financial impact for a company that just trademarked it.

There are some works evaluating the effects of a portfolio of trademarks in a company. Ökten et al (2019) showed that non-manufacturing firms, inside a sample of Australian firms, take advantage whenever they got a bigger trademark intensity, but when the whole sample is considered this positive effect gets faded away.

Rogers & Greenhalgh (2006a) affirmed that disparities between sectors in the market valuation of trademarking may exist and this was confirmed using UK intellectual property statistics where they found a market premium in the services sector with trademark intensity apart from transport, communication, utilities and manufacturing sectors.

The same Greenhalgh & Rogers (2006) concluded, in another work made, that an intensity in trademarking applications has a positive effect on market valuation of technological sectors. Information intensive does not include itself on this statement due to the fact that it had a negative effect.

In addition, (Agostini et al., 2016) found a positive relation between trademark and firm sales, contradicting the relation between sales and product marks that was proven to be poor and small.

In general, a lot of studies presented, concerning the relationship found between market valuation, sales performance and trademarks' portfolios have contradicting results leaving a hole in the literature to investigate better if that really exists any relationship between the trademark registration and the financial performance of LMT firms.

7.1 Trademarking

Eventually, the filing of new trademarks is obviously related with new offers to the market, whether that offer is a new product or a service. Commercially speaking, the

trademark has the goal to suit the client's need that our competitors can't (Mendonça et al., 2004). So, we can take the number of trademarks as a measure to calculate innovation too. The more trademarks being registered, the more is the capability to innovate. Greenhalgh & Rogers (2012) go further and argue that trademarks may even be a more "comprehensive indicator of innovation than patents" (p. 52).

In turn, producers are able to differentiate their products against the competitors' and to establish brand reputation, leading, at best, to brand loyalty.

But who are exactly the firms that trademark? We can take examples from various studies made in this area, but the conclusions are not exactly the absolute same.

Filippetti et al. (2019) in his document where he analyzes the trademark filing by EU regions concludes that regions that do more trademark than patent registration and design rights are regions specialized in services innovation, and when the opposite happens (more patents than trademarks) are normally regions specialized in technological innovations.

Castaldi (2018) corroborates the previous finding and states that the lack of trademarking is evidenced in sectors with less technological innovations. Crass & Peters (2014), Greenhalgh et al. (2011) have a different result in their studies and stress that larger firms use trademarks more often and specially the manufacturing and the high-tech manufacturing firms.

Following the literature, we see that trademarking has been more taken into account over the years and, normally, industries specialized in the services and in the customer are the ones more concerned about this topic. In my view, it is important to be conscious that exists a lot of variables associated with the trademark registration and it is not possible to have an absolute "firm type" that trademarks more than the others.

Variables like the socio-political environment, the incentives to trademark, the bureaucracies needed to trademark are some of the variables that should be held accountable in the trademark moment and vary from country to country.

Block et al. (2015) refer that the main general motivation would be to strengthen the firm's position comparing with its competitors.

So, authenticity and the right to use and commercialize that authenticity can be provided by trademarking whatever our company is planning to trademark, whether that is a logo, a sound, a name or just a word.

Before we go to the empirical study of this thesis, it is important to refer that we are investigating an area that has been studied throughout the years and we can support some of our results in the results that were already achieved in similar studies.

Some examples of results proved in previous studies are:

Block et al. (2015) uses a regression correlation to correlate a dataset of trademark activity between 1999 to 2012 (in 47 Japanese prefectures) and variables such as population density, income levels, number of universities or entrepreneurship rates. It's important to say that all the variables referred before correlate positively with the dataset.

Flikkema et al. (2014) established an empirical relation between trademarks and innovation activities in a study developed in the Benelux area, with more than 600 new trademarks filled by SMEs.

A study taken by Crass (2020) involving more than 5000 German firms found a link between firm size and the firm's tendency to trademark. The descriptive statistics of the study permitted to see that research-intensive manufacturing companies trademark more than the knowledge-intensive services, other manufacturing and services.

A study taken by Godinho (2003) surveyed 724 resident firms in 2003 and in that survey we were able to see that only 39% of business firms claim to have any knowledge of INPI's activities (trademarking registration related topics). In the study was possible to link the trademarking with the company size too and the patent registration was tie-handed with the trademarking, which demonstrates that trademarking can be an indicator of innovation too.

Mendonça et al. (2004) in its article reviewing and analyzing the study taken in Godinho (2003) notes the trademarking differences between sectors and mentions the technology factor as an important variable to be acknowledge. Having the OCDE technological intensity classification in mind too, the author affirms that "higher-tech" sectors tend to care more about trademarks in the course of their business life cycle than "lower-tech" sectors.

7.2 Branding

We have already seen that a trademark consists in the legal protection of an intellectual property and now we should dig deeper on the intellectual property itself, more specifically the brand, which is the object of study on this dissertation.

A brand is mainly a commercial signature that is created by firms to reinforce in a number of marketing activities to the firm (Mendonça et al., 2004, p. 1388).

Brands can assume any kind of name, it is up to the firm's responsible personnel to give a name to their business. Some examples used by firms are the attribution of the firm's founder name (Bugatti, Ralph Lauren, Ferrari), the name of the product line (Coca-Cola, Post-It, Tupperware) or even words that do not exist, like neologisms (Google, Spotify, Skype).

It is a natural action of the human being to trademark and proclaim the right over something that belongs him. Actually, the trademark dates back to the Roman Empire where bricks were being stamped with a mark of the manufacturer, the production date and its location. We saw the same happening during the Middle Age where corporations of craftsmen started to identify their work with a mark with the purpose to identify the origin of their products and merchandise. After the industrial era the first laws of trademarking started to appear in Europe (around 1860) and in the United States (around 1870) (Mendonça et al., 2004).

Brands are everywhere and they became part of our life and our habits, they unconsciously have a meaning to us and we develop a feeling around the ones we most enjoy and use.

By branding we can understand as the elaboration of a brand identity, through various activities, under the use of a brand, a logo, a slogan and eventually a mission and a vision.

Branding is important to differentiate the company's products from its competitors and showing all the qualities and the meaning of their own product (Belleflamme & Peitz, 2010).

The idea that a brand leaves in the head of the consumer is what we call "Brand Equity". Brand Equity is the additional value that a brand, only by itself is capable to add to the product or service that sells. It is the subjective and intangible evaluation that a customer mentally and unconsciously makes in relation to a certain brand.

Once it is an intangible asset, there are some subjective ways to calculate it too and does not exist an absolute way to measure it. We can only rely on mechanisms used before.

A study employed by Greenhalgh & Rogers (2006) over the U.K. intellectual property statistics shows that the use of trademarks in services results in a higher valuation in the financial markets and that the same does not happen in industries like transport, communication, utilities, and manufacturing sectors where the impact that financial markets employ to the trademarking is not statistically significant.

But even though we talk a lot about how to add value to a brand, calculating that value is something that is not consensual between marketing specialists.

Two main perspectives arise, and they are the customer-based view and the financial-based view (Buil et al., 2013). These two perspectives consist in two ways of measurement, the customer-based view gives a higher importance to the customer reviews and opinions about the brand and normally requires a solid participation from a group of clients in order to attribute a numeric value to certain factors that will determine the value of the brand. The financial perspective looks to the assets detained by the firm responsible for the brand and takes the financial map of the company as drivers to reach the final brand value.

Normally companies that choose one perspective lack in considering the other one and the reached brand value is never with the two views contemplated. The perspective chosen depends over the availability of information services, whether a company has more ability to follow its clients or if it is easier to the company to calculate its assets and to opt over the financial perspective (Ambler et al., 2002).

8. Portugal: An innovation perspective

It can be said that in the Portuguese territory innovation is enhanced year after year and it is taken into account by the political figures, but is the Portuguese effort on this topic enough?

Looking to the evolution of the investment done by the successive Portuguese governments, we deduce that a lot more could be allocated to the innovation topic. Following the information in [table*](#), conceded by PORTDATA (a certified database about Portuguese society topics), we can see that portuguese investment in Innovation and Development (I&D) is stagnated since the years 2009 & 2010, with the same percentage of GDP being invested in the year 2021 and year 2009 (aprox.).

Figure 1 - I&D investment in Portugal, by PORTDATA

Year	1999	2001	2003	2005	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
I&D investment (% of GDP)	0,7	0,8	0,7	0,8	1,1	1,4	1,6	1,5	1,5	1,4	1,3	1,3	1,2	1,3	1,3	1,3	1,4	1,6	1,7

Of course we are talking about the relative perspective, speaking in absolute terms the investment was higher as the GDP also increased during the years.

Figure 2 - Absolute I&D investment in Portugal, by PORDATA

Year	1999	2001	2003	2005	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
I&D investment (K€)	814746,7	1038432	1019581	1201112	1972733	2585075	2771600	2757555	2566450	2320133	2258471	2232249	2234370	2388467	2585100	2769072	2991864	3236212	3609191

Although the investment made in portuguese I&D left an impression that the country could be applying more funds to it, people working directly in I&D are growing substantially in the country, as we can see in the following table. We then individualized the number of investigators working in I&D activities, people that are highly qualified and specialized in several research areas.

Figure 3 - People and investigators in R&D activities, by PORDATA

Year	1999	2001	2003	2005	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
People working in I&D activities	20806	22970	25529	25728	35334	47882	47097	47616	49599	47554	46711	46878	47999	50406	54995	58154	61455	66044	69769
Investigators in I&D activities	15752	17725	20242	21126	28176	40408	39834	41523	44056	42498	37813	38155	38672	41349	44938	47652	50167	53174	56366

The numbers speak for themselves, since the year 1999 to the year 2021 we have seen an increase of roughly 350% in the number of people working in I&D activities. Having this number in mind and remembering the investment done in the country on this topic, we can conclude that the authorities responsible by the Portuguese innovation should be doing more and should be allocating more funds to these type of activities.

ANI (“Agência Nacional de Inovação”) is the association mandated by the Portuguese State responsible for the support and development of activities related to innovation within Portugal.

In 2018, was created a national strategy, by the government, to implement for the upcoming 12 years after the release and it was nicknamed as Technological and Business Innovation Strategy 2018-2030. It is a strategy with a set number of innovation goals that should be accomplished by working under 8 fundamental principles:

- Increased investment in research and development;
- Entrepreneurship;
- Valorization and transfer of technology;
- Internationalization;
- Better European funds application;
- Reinforcement of the Interface Centers;
- Promotion of valuing innovation;
- Monitorization.

Following the last European Innovation **Scoreboard (2021)**, Portugal was considered a moderate innovator and in the years 2019 and 2020 surpassed the innovation average in the EU.

Figure 4 – Portuguese I&D expenditure in 2020

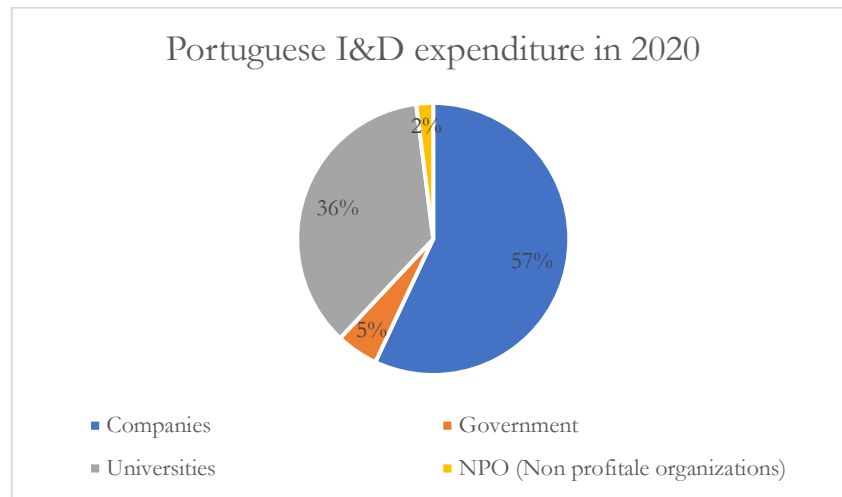
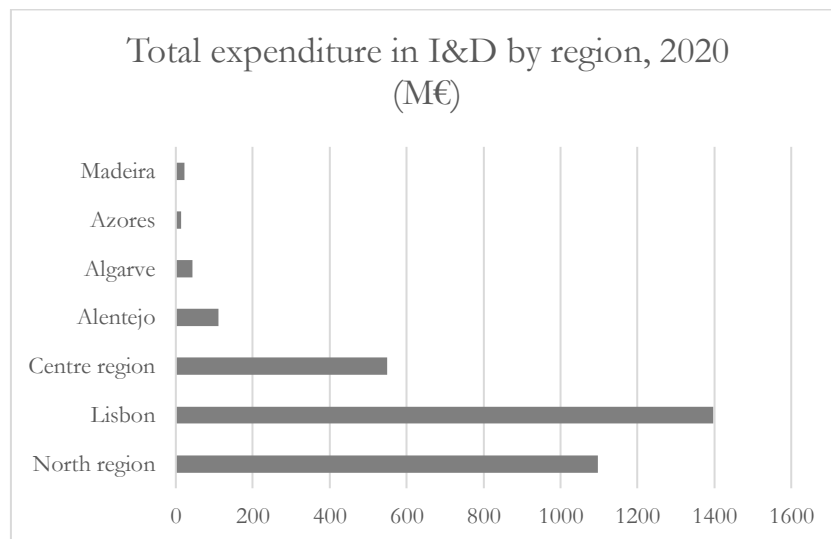


Figure 5 – Expenditure by region in 2020, DGEEC



In the year 2020, Portugal divided its total expenditure in I&D mostly throughout the universities and the private sector (companies), as we can see in the Survey of Scientific Potential **and National Technology** 2020 (Figure 1).

As a first view, we deduce that private companies and universities are making the most efforts to push the national innovation panorama forward and that the Portuguese

government could be doing more efforts regarding this topic, namely economic funds to I&D, technological help and support and creation of infrastructures to enhance the creation of technological knowledge (Borrás & Edquist, 2013).

Regions with a higher number of population density are, generally, the ones who invest the most in I&D and with more technological advances (Hakeem, Mohammad Abbas, 2017). We can see in Table 2 that the Portuguese capital, Lisbon, is the urban area with the most carried out activities in I&D, meaning that it has the highest volume of investment in I&D. Right after it comes the northern region, mainly composed by innovations that take place in a big city pole too, Porto.

It is evident how disproportionated is the distribution of I&D expenditures in Portuguese regions and for people who ambition to start their businesses in regions like Algarve or Alentejo are normally discouraged or not motivated to do it due to the lack of investment in these areas.

Focusing all the innovation politics, subsidies and government help to these bigger urban centers and to the bigger companies, which are the companies that have higher levels of R&D can leave the smaller companies forgotten (like LT for example) and result in their bankruptcy. Normally societies associate the idea of innovation to bigger companies and forget about the heterogeneity of its players (Hansen).

This is an evolving problem in the country and it is fundamentally a political problem, normally countries deal with this topic of how to develop their Centre regions.

8.1 Manufacturing industries in Portugal: an overview.

Portugal is a country mainly composed by small businesses and focused on the services sector (consult Table 1), in fact, following the referred table, only 9% of all the firms in 2020 belonged to any transformative or extractive industry, the rest was dedicated to service activities.

The industry sector used to be very relevant to the Portuguese economy, with the manufacturing industry contributing to 35% of the national GDP (World Atlas, 2018)

In the late 1980's, industries like the chemical industry, the sugar industry and the steel goods industry were the most prominent but the country went through a shift and in the 1990's the plastic goods industry, the automobile industry, the electronics industry and the furniture industry started to be the most relevant ones to the economy.

Like in other countries, Portugal today has been through a process of transformation in its manufacturing industry. The high level of foreign investment and the global competitiveness forced a change in the industry with sectors like the information technology, biotechnology and pharmaceutical products the actual emerging industries in the country.

In Portugal, in the year 2020, the manufacturing industry was responsible for employing 17% of the working personnel and for 22,5% of the GVA (Gross Value Added)(INE, Inquerito **Produção industrial**).

The GVA have decreased from year 2019 to year 2020. A lot of this decrease can be explained by the Covid-19 pandemic (INE, Inquerito **Produção industrial**).

The investment made in manufacturing industries have decreased too in 2020 year, being 1,8 p.p. less than the last year. The sales value of manufacturing products and services decreased 10,6% comparing with the previous year, registering a total of 82 billion euros (€)(INE, Inquerito **Produção industrial**).

The food products industry was one of the manufacturing industries (characterized by number 10 in the CAE division) that stood still and did not lose any considerable amount of revenue. The textile production and the furniture industry saw a lost in their revenue of 7% comparing with year 2019. (Estatísticas da **produção industrial** 2020, INE)

The CIS 2020 (Community Innovation Survey) states that 48% of Portuguese companies had innovation activities, comparing with 32,4% of the previous 2018 CIS.

Of all the companies that had innovation activities, 22,3% were product innovations, 42,7% were process innovations and 46% were product and/or process innovations.

For this study, it is important to look at the data and understand how can we relate these statistics with the LT industries, for example. We know that most of the LT innovations are made of process innovations, as the literature already stated, and we also know that marketing innovations are generally related with product innovations (trademarks, branding).

It is important to reflect about the number of companies that do not have any innovative activities within the firm (52%). The Portuguese government and the institutions encharged to enhance innovative activities in the country shall be focused on reduce this number and to motivate national companies to innovate like the attribution of monetary funds and helping them to access information to innovation topics.

Table 1 – Companies per section, NACE Rev.2, <https://bpstat.bportugal.pt/conteudos/quadros/1598>)

Nº companies per section NACE Rev.2	2020
A Agriculture & Fishing	19800
B Extractive industries	860
C Manufacturing industries	43551
D Electricity and gas	1281
E Water and residuals	1110
F Construction	51833
G Wholesale and retail trade	111778
H Transportation & storage	24567
I Accomodation and food service activities	49624
J Information & Communication	15151
L Real estate activities	45569
M Professional, scientific & technical activities	51329
N Administrative and support service activities	18215
P Education	6398
Q Human health & social work activities	26892
R Arts, entertainment and recreation	9817
S Other service activities	11404

(

Table 2 - NACE Rev.2 manufacturing industries

NACE Rev. 2 Manufacturing industries	Nº	Technology intensity
Food industry	8883	LT
Manufacture of textile	3463	LT
Manufacture of wearing apparel	8480	LT
Leather and related products	2856	LT
Wood and products of wood	4892	LT
Reproduction of recorded media	2287	LT
Manufacture of other non-metallic mineral products	3650	ML
Manufacture of fabricated metals products, excepts machinery and equipment	11741	ML
Manufacture of furniture	4366	LT
Repair and installation of machinery and equipment	4330	ML
Manufacture of paper and paper products	557	LT
Manufacture of coke and refined petroleum products	17	ML
Manufacture of chemicals and chemical products	835	MH
Manufacture of basic pharmaceutical products and pharmaceutical preparations	186	HT
Manufacture of rubber and plastic products	1103	ML
Manufacture of fabricated metals products	298	ML
Manufacture of computer, electronic and optical products	306	HT
Manufacture of electrical equipment	556	MH
Manufacture of machinery and equipment n.e.c.	1489	MH
Manufacture of motor vehicles, trailers and semi-trailers	948	MH
Other manufacturing	3253	LT
Beverages & tobacco products	1973	LT

8.2 Low tech industries in Portuguese sector activities

The CAE Rev.3 is the official Portuguese classification for economic activities within the country. This classification is harmonized with the European classification NACE Rev.2 and it is the one to be adopted in the country since 2008.

For this thesis we will follow the NACE Rev.2 technology classification which attributes a technology intensity for every manufacturing industry classified and gives a knowledge intensiveness to the service sectors.

As we see in Table 2, industries within the manufacturing section are labeled as LT, ML, MH and HT, following the NACE Rev.2 classification.

We gathered the number of firms by industry (Table 2) on year 2020, which is the year that will be analyzed on this work and we organized industries by its technology intensiveness.

The most consensual opinion across the literature about this subject is that LT industries have an enormous potential and sometimes can be overlooked because of its traditional nature (Hirsch-Kreinsen, 2008b), (Zawislak et al, 2018).

Hirsch-Kreinsen (2008b) points out the importance of the LT sectors to developed economies and warns for the idea implemented in society that only innovation based in high-tech will ensure the safety of future jobs and economies.

Ultimately, LT industry innovations have the same goal as the innovations made in the HT sectors, all firms have the ultimate goal to increase profits and to mark their position among their competitors. But once LT tend to not have such technological innovations, the innovations made in these industries are normally incremental (Hansen, 2010)

Fernando Galindo-Rueda, Fabien Verger (2016) in their revision provide a new taxonomy classification, based on ISIC previous classifications, regarding the level of R&D intensity (ratio of R&D to value added within an industry). The classification clustered industries into 5 groups (high, medium-high, medium, medium-low, and low R&D intensity industries) . It is important to be aware of new classifications that come out publicly and to know that a continuous work is being done in this matter, but for reasons of synergies and information available online, we will classify all the empirical data of this thesis following the 4 technology intensiveness groups suggested in NACE Rev.2.

Table 3 - Empirical examples by other authors

Author	Article	Reference date	Number of companies	Sector of companies	Country	Empirical method	Results
Francisco Luna, Adriano Baessa, Patrick Franco Alves (2007)	Impacto das marcas e patentes no desempenho económico das firmas	1997-2000	-	-	Brazil	Panel & Probit	+/-
Nuriye Zeynep Öktena, Elif Yolbulan Okanb, Ünal Arslanc, Mustafa Özgür Güngör (2019)	The effect of brand value on economic growth: A multinational analysis.	2008-2017	-	Based on economies	-	ARDL	+
Krasnikov A, Mishra S, Orozco D. (2009)	Evaluating the Financial Impact of Branding Using Trademarks: A Framework and Empirical Evidence	1995-2005	108	50% manufacturing companies & 50% service companies	USA	Panel (random coefficients model)	+
Brem, Nylund, & Hitchen (2017)	Open innovation and intellectual property rights: How do SMEs benefit from patents, industrial designs, trademarks and copyrights?	2008-2013	2873	Manufacturing & services	Spain	Panel (Random Effects)	+/-

9. Materials and methods

9.1 Materials – The database

Starting our empirical analysis, we have a dataset provided by INPI (Instituto Nacional de Propriedade Industrial) which shows the brands that were conceded over the years 2017, 2018, 2019 and 2020.

Looking first to our dataset, in the year 2017 was conceded 6437 brands by the INPI, in year 2018 was conceded 5230 brands, in year 2019 was conceded 5752 and finally in year 2020 was conceded 4612.

These results are over the concessions and not the requests. Firstly, to register your brand you need to pass through an analyze by the INPI to make sure that everything is well considered and if you can advance with your registration, then INPI registers or not the brand.

To look at requests over these 3 years, we consulted the annually report that INPI shares with the public with some statistics about the requests received and the concessions conceded.

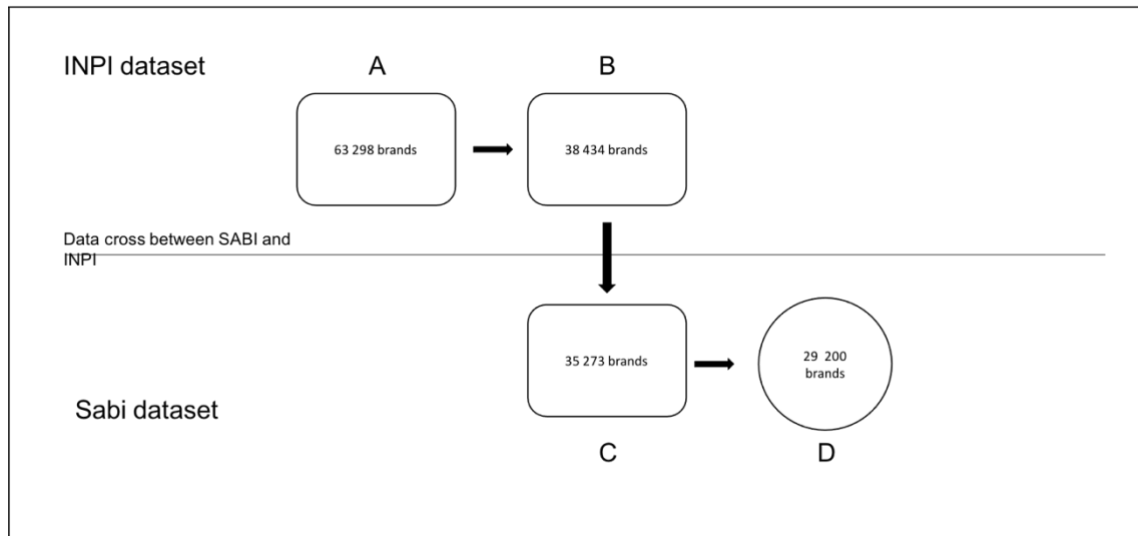
We can see in the 2020 report the previous requests made in previous years. In 2017 INPI had 22523, in 2018 was 22856, in 2019 received 21556 requests and in 2020 were made 21502.

We sure can see a big disparity between the requests and the concessions, but we should bear in mind that the report provide the requests data considering brands and “other distinctive market signs” like logos, slogans, origin denominations...

But, even with that info, we see again as expected that year 2020 was a year with less requests than other years.

9.2 Data selection process

Figure 6 - The data selection process



The work present in this thesis is a combination of two sets of data. The first set is an agglomeration of all the brands registered/conceded between the years 2017 and 2020 and the other dataset is a combination of financial variables in a specific year, in this case we selected the last year of the brands registration dataset (2020) to analyze the financial performance of companies. With the variables selected in Sabi, the database retrieved around 650 000 companies to match the companies present in the INPI dataset.

Going through the filtering process, step by step following the table above, we did:

INPI provided me a dataset with all brands and other market signs registrations made between 2017 and 2020, from companies and individual persons. Excluding the other market signs we have 63 298 brand registrations.

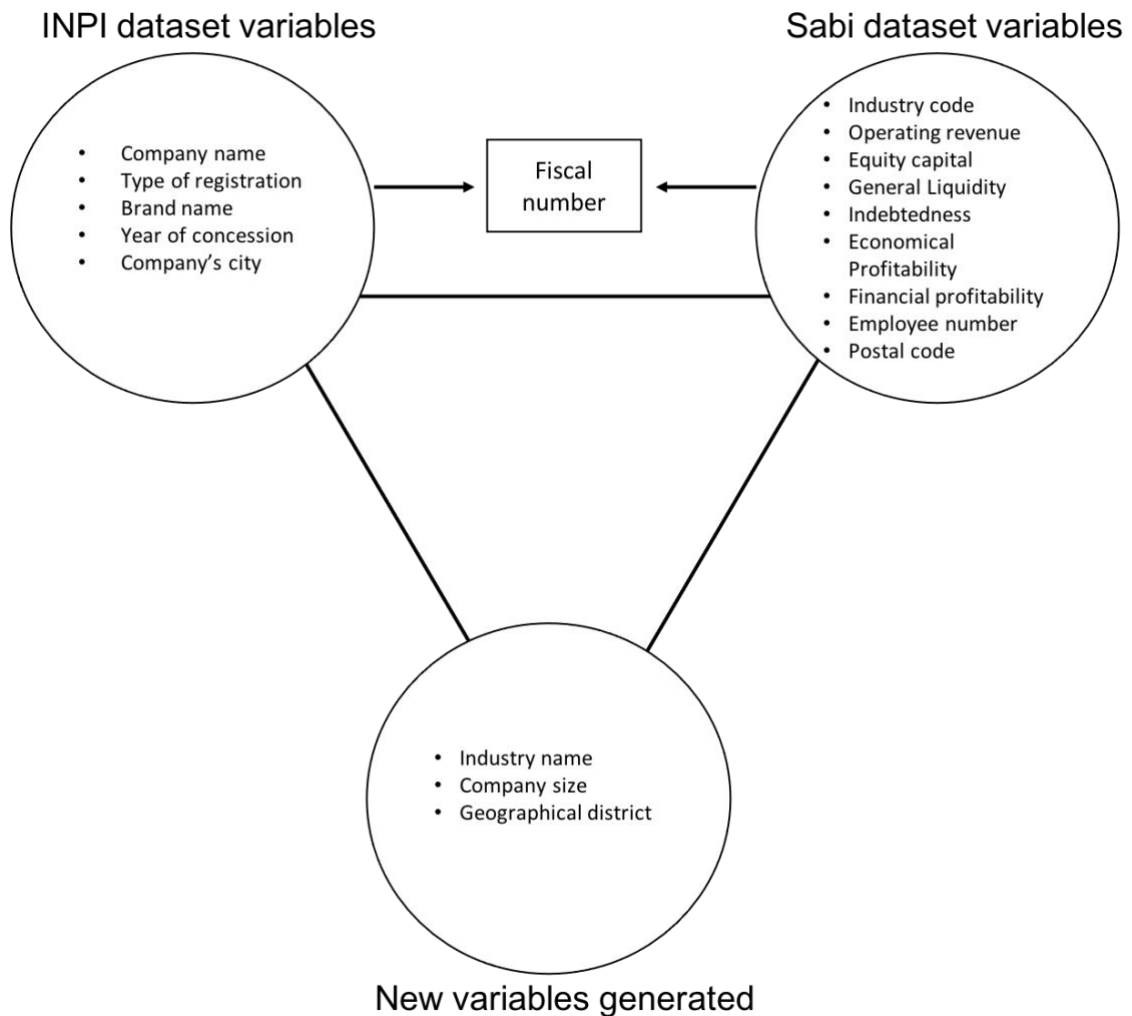
Then, we wanted the dataset to only show brands that were registered by collective persons (firms), so we filtered by the fiscal number and only showed numbers starting by the number “5” (meaning that is a collective person). At this point we have 38 434.

Now is time to cross our dataset with other relevant variables given by Sabi. Sabi is an international database with various companies’s informations, mainly financial. Proclaims that has information of 900 000 portuguese companies.

Stage “D” is our last stage in the dataset progress, is where we crossed all the INPI data with Sabi’s financial data through a variable in common, the fiscal number of the company. At this point we filtered the dataset from stage “C” to give us only the companies with all

financial variables occupied, without any “null” values. Our final dataset has 29 200 brand registrations.

Figure 7 - New variables generated



Speaking about the variables, we wanted to collect the main financial variables that Sabi can provide, it was possible to extract one or other information variables too, we ended up with these variables provided by Sabi:

Industry code – In Portugal we call it the CAE code and by it we are capable to identify the industry that the firm works in.

- Operating revenue
- Equity capital
- General Liquidity

- Indebtedness
- Economical profitability
- Financial profitability
- Number of employees
- Postal code

From these variables, we generated more three variables, and the process to find them was:

Industry name – By the CAE code we were capable to identify the main industry where the firm operates. We guided ourselves by the second layer of the code, where it says more specifically what division of industry is inside the main letter code.

Company size – With the number of employees that Sabi provided us, we categorized the firms between Micro Enterprise (fewer than 10 employees or equal), Small Enterprise (between 11 and 50 employees), Medium Enterprise (Between 51 and 250 employees) and Large Enterprise (bigger than 250 employees).

Geographical district – Once we had access to the Postal Code of each firm, provided by Sabi, we consulted the database of CTT where was possible to deduce the regional district by the first algorithms. For Postal Codes positioned on the board of two districts we consulted the second set of algorithms in a more exhaustive way.

9.3 The data

Table 4 - Descriptive statistics of general dataset

	Brand registrations	Operational revenue (M€)	Equity capital (M€)	General liquidity (%)	Indebtedness (%)	Economic profitability (%)	Financial profitability (%)	Employees
Mean	1,585491665	4897,921323	3096,05408	14,32505457	5167,712079	-1131,128864	-65,5931346	28,7749905
Standard Error	0,019165952	582,9051289	588,7020095	2,18798544	4293,556701	780,3490273	47,48221653	2,415401767
Median	1	243	72	1,75	71,85	1,04	12,09	4
Mode	1	0	1	1,21	87,91	0	0	1
Standard Deviation	2,600996887	79105,61671	79892,30703	296,9298592	582675,3513	105900,5797	6443,7759	327,7923574
Sample Variance	6,765184805	6257698596	6382780722	88167,34131	3,39511E+11	11214932779	41522247,86	107447,8296
Kurtosis	453,9840062	3735,506861	8266,91504	3242,571347	18073,54189	12390,64528	16026,77405	4211,118416
Skewness	17,35073638	55,63517642	80,1977244	52,462046	133,8761642	-108,4786983	-123,4734385	58,00530487
Range	91	6512847	10551790	23519,31	78703503,11	12820016,12	868207,51	26327

Minimum	1	-20546	-1778677	-333,08	-3,11	-12817884,62	-844127,22	0
Maximum	92	6492301	8773113	23186,23	78703500	2131,5	24080,29	26327
Sum	29200	90205017	57020028	263824,53	95173753,35	-20832000,29	-1208028,76	529949
Count	18417	18417	18417	18417	18417	18417	18417	18417
Confidence Level(95,0%)	0,037567044	1142,548151	1153,910575	4,288654533	8415,769613	1529,556517	93,06955117	4,734411633

Table 5 - Regression over financial data

	Brands registered				
	Multiple R	R Square	Adjusted R Square	Standard Error	Observations
Employees	0,271516961	0,07372146	0,073672061	323,8788018	18753
Operating revenue	0,241857509	0,058495055	0,058444873	79419,97968	18764
Equity Capital	0,174139145	0,030324442	0,030272759	115268,1204	18764
General Liquidity	0,004013231	1,6106E-05	-3,81819E-05	2,968953078	18422
Indebtness	0,000857974	7,3612E-07	-5,35527E-05	5826,118739	18422
Economic profitability	0,001137957	1,29495E-06	-5,29938E-05	1058,890134	18422
Financial profitability	0,00285139	8,13043E-06	-4,53766E-05	64,52584	18691

Table 6 - Financial variables correlation - general dataset

	Correlation "r"
Employees	0,27
Operating revenue	0,24
Equity Capitals	0,17
General Liquidity	-0,004
Indebtness	0,001
Economic profitability	0,001
Financial profitability	0,003

Table 7 - Descriptive statistics of financial variables - LT dataset

	Brand registrations	Operational revenue (M€)	Equity capital (M€)	General liquidity (%)	Indebtedness (%)	Economic profitability (%)	Financial profitability (%)	Employees
Mean	2,268170426	6528,328321	3595,238095	11,1562594	87,96532581	5,501585213	1,218182957	41,30513784
Standard Error	0,102235797	639,2061631	410,0686137	6,483031731	5,182880798	1,037878501	14,12673151	2,552991033
Median	1	757	338,5	1,755	67,535	0,94	6,615	13
Mode	1	0	15	0,95	71,5	0,34	0	1
Standard Deviation	4,084316901	25536,26622	16382,22829	258,9969148	207,0559257	41,46321362	564,3624817	101,9919119

Sample Variance	16,68164455	652100892,3	268377403,6	67079,40187	42872,15638	1719,198084	318505,0107	10402,35009
Kurtosis	158,4262509	213,9076955	249,339126	1532,108986	505,7319837	123,9990637	407,3218489	68,0554534
Skewness	9,851624639	12,00039573	13,39709123	38,80409872	20,28100176	8,920654381	13,82719636	7,025087884
Range	89	597640	420846	10579,38	5908,06	935,87	21877,67	1533
Minimum	1	-352	-27070	-333,08	0,01	-787,05	-13402,46	0
Maximum	90	597288	393776	10246,3	5908,07	148,82	8475,21	1533
Sum	3620	10419212	5738000	17805,39	140392,66	-8780,53	-1944,22	65923
Count	1596	1596	1596	1596	1596	1596	1596	1596
Confidence Level(95,0 %)	0,200530651	1253,77247	804,3300714	12,71615823	10,16597404	2,035749288	27,70891159	5,00757042

Table 8 - Regression over financial variables - LT dataset

	Brands registered				
	Multiple R	R Square	Adjusted R Square	Standard Error	Observations
Employees	0,004184997	1,7514E-05	-0,0006098	564,534537	1596
Operating revenue	0,241072282	0,05811584	0,05752495	24790,902	1596
Equity Capitals	0,183337175	0,03361252	0,03300625	16109,6018	1596
General Liquidity	0,009368879	8,7776E-05	-0,0005395	259,066773	1596
Indebtness	0,034723583	0,00120573	0,00057913	206,995961	1596
Economic profitability	0,037116148	0,00137761	0,00075112	41,4476388	1596
Financial profitability	0,004184997	1,7514E-05	-0,0006098	564,534537	1596

Table 9 - Financial variables correlation - LT dataset

	Correlation "r"
Employees	0,004
Operating revenue	0,24
Equity Capitals	0,18
General Liquidity	-0,01
Indebtness	-0,03
Economic profitability	0,04
Financial profitability	0,004

With a first view over the descriptive data and the correlation data, we can already deduce some differences between both datasets.

The first data that pops to our eyes is the main object of study of this work, the brand registrations. We can see that the average brand registration in all industries was less than the average in LT industries, 1,5 brands (all data) versus 2,2 brands (LT).

Financially speaking, LT industries live a completely different scenario comparing with all the industries data. Indicators like operational revenue, equity capital, indebtedness, economic profitability and financial profitability are all more “positively” stated than in the general dataset containing more technological advanced industries and services.

We can’t forget one big detail over this data, the financial data is relative to the year 2020, the year when the Covid-19 pandemic started and where all the services sectors/tertiary sector were very affected. It is rational to say that LT industries like the textile, the furniture or the food industry were not so impacted.

The statistical model chosen was the Pearson correlation test. It was analyzed the dependence between a independent variable X (the brand registration) and a dependent variable Y (operating revenue; equity capital; general liquidity; indebtedness; economic profitability; financial profitability and the number of employees).

Figure 8 - Representation of Pearson equation model

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$$

In both datasets, the operating revenue and the equity capital presented a positive correlation of around 0.2, which indicates that both variables change in the same direction. It is not a strong correlation, but comparing with all the correlations approached in the study these two are the ones that the registration of a brand in a firm can impact by somehow. In this particular case, the addition of one more brand can mean a 20% grow either in equity capital or in the operating revenue.

In the LT dataset we can also see the negative correlation between brand registration and indebtedness and general liquidity.

In the general dataset, the variable “employees” presented a positive correlation too with the variable “brands registred” of around 0.3.

9.4 Findings/ Results

In this section we explore more in detail each variable and cross the data in order to have a more lucid and detail view of the companies that registered a brand in Portugal between the years 2017 and 2020. We then took aside the LT' companies and made an individual dataset which we will call it LT dataset.

It is important to have in mind that this thesis has to concentrate its main question around the LT industries and understand if the reality to these companies is any different than for the rest of the data set. To the global dataset we will give it the term “general dataset”.

So, the analysis is composed by 2 datasets:

- General dataset – Without LT' segregation and its main goal is to show the general reality of the companies that registered brands between the years 2017 and 2020
- LT dataset – Segregated data only with companies that correspond to a CAE belonging to the manufacturing industry. Once again, this segregation followed the NACE Rev.2 classification of LT industries inside the division “Manufacturing industries”

Table 10 - Number of brands registered - general dataset

Districts	Number of brands registered
Lisboa	12264
Porto	6429
Braga	2343
Aveiro	2008
Setúbal	1678
Faro	1410
Leiria	1410
Viseu	1092
Santarém	1082
Coimbra	1068
Évora	828
Madeira	675
Viana do Castelo	575
Vila Real	540
Açores	415
Beja	366
Castelo Branco	342
Guarda	284
Bragança	262
Portalegre	202

Table 11 - Number of brands registered - LT dataset

Districts (LT)	Number of brands registered
Porto	621
Lisboa	552
Braga	363
Aveiro	323
Santarém	219
Évora	209
Viseu	208
Vila Real	173
Leiria	139
Coimbra	127
Setúbal	123
Açores	87
Portalegre	74
Viana do Castelo	73
Guarda	72
Bragança	60
Madeira	58
Beja	55
Castelo Branco	48
Faro	36

Figure 9 - Firms by company size - general dataset

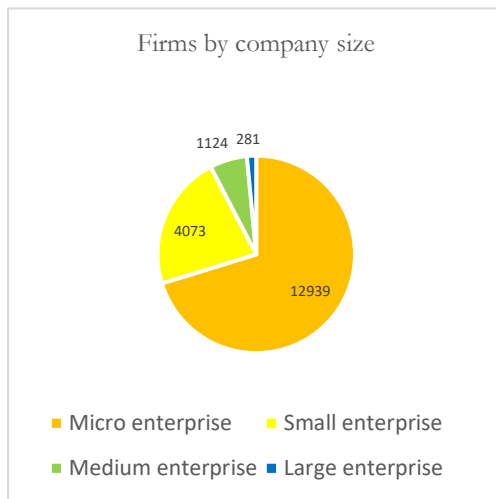


Figure 10 - Firms by company size - LT dataset

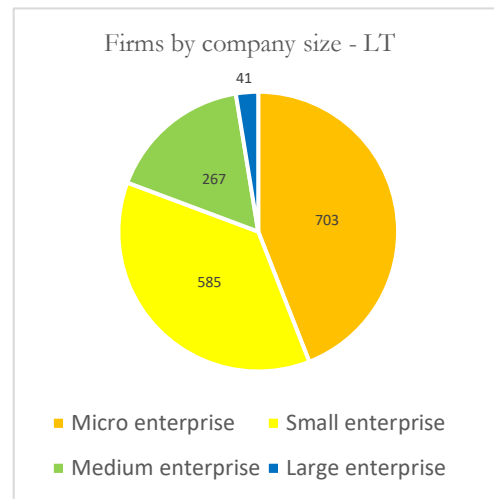


Figure 11 - Brands by company size - general dataset

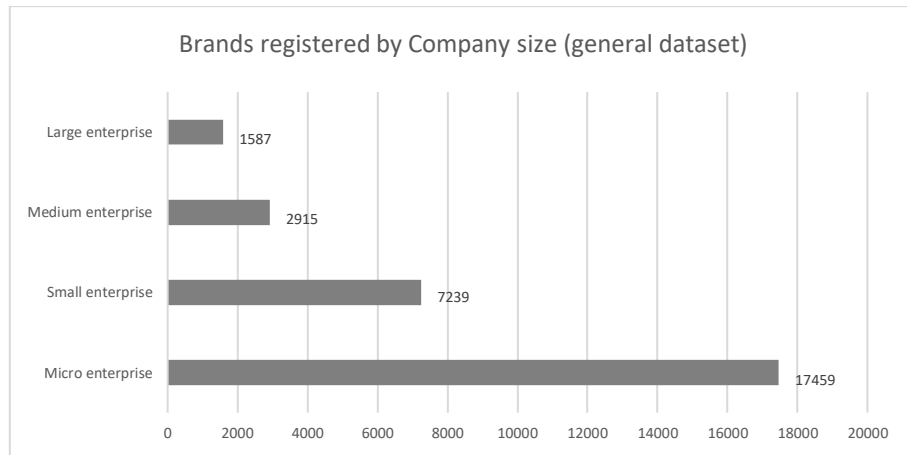


Figure 12 - Brands by company size - LT dataset



The data above show us 2 clear and obvious insights, the companies that register brands in Portugal are companies mainly composed by micro and small companies. In the LT dataset graph we can see a slight difference with the distribution of the companies having more medium companies in it. This fact can be explained by the need that these type of industries have in requiring bigger workforces and having bigger work forces.

It is important to state that 4 relevant districts have the majority of registrations. The country is divided by 2 big poles Lisboa and Porto, which are cities with a bigger population density and then we see Braga and Aveiro in the top 4 district registrations.

The Centre region and the Alentejo districts are the ones in a bigger disadvantage, registering much lesser brands than in other regions.

In both realities, micro and small companies are the companies that registered more brands in the country and with a relevant difference in relation to bigger companies.

Table 12 - Firms & brands by CAE - LT dataset

CAE Rev.3 LT	Firms n°	Brands registered
Food industry	481	921
Beverages	398	1777
Manufacture of wearing apparel	147	169
Manufacture of furniture	107	138
Manufacture of textile	102	128
Leather and related products	90	107
Wood and products of wood	88	121
Other manufacturing industries	83	122
Reproduction of recorded media	69	89
Manufacture of paper and paper products	29	38
Tobacco	2	10
Total	1596	3620

By selecting the industries in LT dataset, we see which ones have more companies and which ones register more brands.

The food industry and the beverages industry are the ones isolated on the top but we see that the beverages industry is more active in the brand registration process. With almost the same number of companies register the double of the brands registered by the food industry.

Industries like the tobacco industry and the manufacturing of paper products are the ones that do not register so many brands. They are old and traditional industries and the marketing innovation tend to be **more** discarded in these situations.

Now we will focus our attention to insights made geographically. Understand the differences between regions is surely important to understand our corporate sector and by doing it the state decisors can bring more value to them.

The next data gives us industries by NUT II regions and their registered brands. We first start by the LT dataset:

Table 13 - CAE North region – LT dataset

CAE Rev.3 LT	Firms number (North)	Brands registered (North)
Beverages	134	555
Manufacture of wearing apparel	121	139
Food industry	114	206
Manufacture of textile	72	95
Manufacture of furniture	71	86
Leather and related products	53	68
Other manufacturing industries	35	52
Reproduction of recorded media	30	36
Wood and products of wood	29	33
Manufacture of paper and paper products	16	20
Total	675	1290

Table 14 - CAE Centre region – LT dataset

CAE Rev.3 LT	Firms number (Centre)	Brands registered (Centre)
Food industry	142	251
Beverages	101	428
Wood and products of wood	45	73
Leather and related products	31	33
Manufacture of furniture	25	39
Manufacture of textile	21	24
Other manufacturing industries	18	25
Manufacture of wearing apparel	14	18
Reproduction of recorded media	13	14
Manufacture of paper and paper products	9	12
Total	419	917

Table 15 - CAE M.A.Lisbon region – LT dataset

CAE Rev.3	Firms number (Metropolitan area of Lisbon)	Brands registered (Metropolitan area of Lisbon)
Food industry	104	200
Beverages	68	379
Other manufacturing industries	23	36
Reproduction of recorded media	19	22
Manufacture of furniture	9	11
Manufacture of wearing apparel	9	9
Wood and products of wood	6	6
Manufacture of textile	5	5
Manufacture of paper and paper products	3	5
Leather and related products	2	2
Total	248	675

Table 16 - CAE M.A.Lisbon region – LT dataset

CAE Rev.3	Firms number (Alentejo)	Brands registered (Alentejo)
Food industry	85	202
Beverages	75	333
Wood and products of wood	6	7
Leather and related products	3	3
Other manufacturing industries	3	4
Reproduction of recorded media	3	3
Manufacture of wearing apparel	2	2
Manufacture of furniture	1	1
Manufacture of paper and paper products	1	1
Manufacture of textile	1	1
Total	180	557

Table 17 - CAE Algarve region – LT dataset

CAE Rev.3	Firms number (Algarve)	Brands registered (Algarve)
Beverages	9	15
Food industry	7	7
Manufacture of textile	3	3
Reproduction of recorded media	2	5
Other manufacturing industries	2	3
Manufacture of furniture	1	1
Wood and products of wood	1	1
Manufacture of wearing apparel	1	1
Total	26	36

Table 18 - CAE Algarve region – LT dataset

CAE Rev.3	Firms number (Açores)	Brands registered (Açores)
Food industry	16	34
Beverages	6	35
Reproduction of recorded media	2	9
Wood and products of wood	1	1
Tobacco	1	8
Total	26	87

Table 19 - CAE Madeira region – LT dataset

CAE Rev.3	Firms number (Madeira)	Brands registered (Madeira)
Food industry	13	21
Beverages	5	32
Other manufacturing industries	2	2
Tobacco	1	2
Leather and related products	1	1
Total	22	58

Table 20 - CAE North region – general dataset

CAE Rev.3	Firms number (North)	Brands registered (North)
Wholesale trade (include commission trade), except of motor vehicles and motorcycles)	777	1259
Retail trade, except of motor vehicles and motorcycles	685	1101
Restauration and similars	366	469
Real estate activities	317	430
Accommodation	246	355
Human health activities	224	281
Activities of head offices; management consultancy activities	206	332
Wholesale and retail trade and repair of motor vehicles and motorcycles	178	202
Computer programming, consultancy and related activities	174	228
Architectural and engineering activities; technical testing and analysis	146	174
(...)		
Total	5774	8714

Table 21 - CAE North region – general dataset

CAE Rev.3	Firms number (Centre)	Brands registered (Centre)
Activities of head offices; management consultancy activities	146	83
Architectural and engineering activities; technical testing and analysis	91	68
Activities auxiliary to financial services and insurance activities	30	27
Publishing activities	29	17
Rental and leasing activities	19	16
Motion picture, video and television programme production, sound recording and music publishing activities	13	12
Libraries, archives, museums and other cultural activities	7	3
Social work activities without accommodation	7	7
Social work activities with accommodation	6	6
Activities of membership organisations	2	1
Total	5234	3298

Table 22 - CAE M.A.Lisbon region – general dataset

CAE Rev.3	Firms number (Metropolitan region of Lisbon)	Brands registered (Metropolita n region of Lisbon)
Wholesale trade (include commission trade), except of motor vehicles and motorcycles)	715	1615
Retail trade, except of motor vehicles and motorcycles	682	936
Restauration and similars	648	940
Real estate activities	570	779
Activities of head offices; management consultancy activities	399	755
Accommodation	321	523
Human health activities	259	336
Computer programming, consultancy and related activities	232	337
Education	199	261
Sports activities and amusement and recreation activities	197	274
(...)		
Total	6858	11334

Table 23 - CAE M.A.Lisbon region – general dataset

CAE Rev.3	Firms number (Alentejo)	Brands registere d (Alentejo)
Beverages industry	333	75
Wholesale trade (include commission trade), except of motor vehicles and motorcycles)	301	135
Food industry	202	85
Retail trade, except of motor vehicles and motorcycles	136	102
Accommodation	103	77
Restauration and similars	68	55
Activities of head offices; management consultancy activities	45	34
Real estate activities	44	35
Sports activities and amusement and recreation activities	43	30
Wholesale and retail trade and repair of motor vehicles and motorcycles	34	31
Total	1734	993

Table 24 - CAE Algarve region – general dataset

CAE Rev.3	Firms number (Algarve)	Brands registered (Algarve)
Restauration and similars	112	147
Accommodation	100	146
Real estate activities	105	131
Retail trade, except of motor vehicles and motorcycles	95	127
Wholesale trade (include commission trade), except of motor vehicles and motorcycles)	54	92
Sports activities and amusement and recreation activities	43	56
Development of building projects	41	56
Travel agency, tour operator, reservation service and related activities	34	45
Human health activities	33	43
Activities of head offices; management consultancy activities	22	27
Total	896	1208

Table 25 - CAE Algarve region – general dataset

CAE Rev.3	Firms number (Açores)	Brands registered (Açores)
Accommodation	49	66
Retail trade, except of motor vehicles and motorcycles	29	37
Wholesale trade (include commission trade), except of motor vehicles and motorcycles)	25	41
Food industry	16	34
Restauration and similars	10	10
Travel agency, tour operator, reservation service and related activities	8	9
Sports activities and amusement and recreation activities	7	7
Real estate activities	7	8
Beverages industry	6	35
Rental and leasing activities	5	16
Total	218	373

Table 26 - CAE North region – general dataset

CAE Rev.3	Firms number (Madeira)	Brands registered (Madeira)
Accommodation	46	99
Retail trade, except of motor vehicles and motorcycles	40	56
Restauration and similars	33	43
Real estate activities	31	36
Wholesale trade (include commission trade), except of motor vehicles and motorcycles)	25	53
Sports activities and amusement and recreation activities	16	21
Activities of head offices; management consultancy activities	15	16
Wholesale and retail trade and repair of motor vehicles and motorcycles	15	19
Computer programming, consultancy and related activities	14	22
Human health activities	13	16
Total Geral	380	603

The interesting insight of this data is to understand that Portugal has its own regional differences very well settled.

In the south region and islands (Algarve; Açores; Madeira) services and sectors related with tourism take place and are the ones that require a bigger brand registration work. We talk about sectors like: Accommodation, Restauration and Real Estate activities. When we go through regions in the northern area and centre we start to see industries like: Wholesale trade, textile, furniture.

Portugal south part has a deep relation with the services sector and with tertiary activities more than manufacturing industries. The opposite happens in the north region where industries are installed. This fact can be explained historically and by natural cluster formed in these areas.

Once this work is about the relationship of brand registering activities and financial corporate insights, is important to look deeper for the financial side and understand Portuguese corporate state and how the main decisors can help it and improve it.

Firstly 2 tables are and they give us the average of each financial indicator (including the “Employees” variable) within both datasets, by district.

Table 27 - Avg financial variables by district - general dataset

Distri ct	Avg. Employ ees per firm	Avg. Indebtedn ess	Avg. Equit y Capit al (M€)	Avg. Gener al liquidi ty	Avg. Economi c profitabili ty	Avg. Financial profitabili ty	Avg. brand registratio ns	Avg. Operati ng revenue (M€)
Açores	38,0	96%	3051,6	12%	2%	-6%	1,7	5937,3
Aveiro	22,3	86%	2491,0	4%	-9%	-33%	1,5	3814,8
Beja	10,8	102%	861,5	7%	-7%	-61%	1,7	1900,7
Braga	20,9	98%	1225,2	14%	-12%	2%	1,4	2603,9
Bragança	9,4	78%	875,3	4%	-6%	18%	1,5	1228,7
Castelo Branco	10,6	105%	1241,6	17%	-55%	-207%	1,5	1286,0
Coimbra	23,4	346%	1640,8	24%	-83%	-8%	1,5	3934,8
Évora	17,4	102%	1341,6	18%	-11%	-26%	2,1	1935,3
Faro	19,8	383%	697,0	11%	-53%	-197%	1,3	1411,9
Guarda	10,6	176%	2364,7	7%	-145%	-2%	1,6	2315,8
Leiria	17,7	80%	1308,8	6%	-6%	-26%	1,5	2549,6
Lisboa	41,1	1621%	4783,7	20%	-217%	-1%	1,7	7881,1
Madeira	20,4	207337%	3390,2	10%	-16978%	-38%	1,6	2169,9
Portalegre	17,5	103%	1628,2	4%	-12%	-28%	1,7	3022,9
Porto Santarém	32,9	1489%	3678,2	15%	-3575%	-254%	1,5	5193,1
Setúbal	19,8	124%	1276,8	5%	-9%	22%	1,6	2738,0
Viana do Castelo	14,6	357%	2713,8	6%	-23%	-9%	1,4	3946,5
Vila Real	11,8	118%	833,3	5%	-11%	43%	1,6	1735,8
Viseu	8,3	85%	755,5	12%	-6%	22%	1,9	894,5
	19,3	84%	3057,4	30%	-4%	-15%	2,1	2971,5
Total	28,8	5168%	3096,1	14%	-1131%	-66%	1,6	4897,9

Table 28 - Avg financial variables by district - LT dataset

District (LT)	Avg. Employees per firm	Avg. Indebtedness	Avg. Equity Capital (M€)	Avg. General liquidity	Avg. Economic profitability	Avg. Financial profitability	Avg. brand registrations	Avg. Operating revenue (M€)
Açores	96,0	66%	11,3	4%	-2%	37%	3,3	22,5
Aveiro	46,0	76%	3,7	3%	-8%	16%	2,0	7,0
Beja	12,0	96%	0,95	-7%	-6%	36%	1,8	1,6
Braga	46,4	80%	1,7	5%	-1%	-44%	1,5	4,0
Bragança	15,4	65%	1,3	5%	0%	3%	2,4	2,1
Castelo Branco	22,6	66%	2,4	3%	-10%	47%	1,7	3,5
Coimbra	71,5	65%	3,9	182%	2%	12%	2,2	10,7
Évora	22,1	89%	3,4	17%	-7%	14%	4,4	3,8
Faro	16,0	249%	1,5	3%	-6%	19%	1,4	2,2
Guarda	17,2	60%	1,8	3%	0%	-16%	2,3	3,0
Leiria	28,0	80%	1,5	3%	-9%	-8%	1,8	3,6
Lisboa	54,4	106%	4,8	3%	-13%	20%	2,8	11,2
Madeira	31,2	339%	3,3	4%	-16%	16%	2,6	2,7
Portalegre	19,0	101%	1,6	3%	-14%	-112%	2,2	2,7
Porto	47,6	78%	5,4	8%	-4%	-4%	1,9	6,9
Santarém	36,9	77%	3,3	3%	-3%	-17%	3,2	9,5
Setúbal	24,1	101%	3,5	5%	-13%	18%	2,3	3,9
Viana do Castelo	20,1	65%	1,9	8%	0%	17%	2,7	2,9
Vila Real	14,5	63%	1,9	6%	4%	31%	3,2	2,1
Viseu	39,3	85%	4,0	3%	-5%	16%	3,1	9,2
Total	26,1	79%	2,9	3%	-5%	16%	2,3	3,7

Looking for the main theme that brought us to this thesis is the brand registration per firm, by district. Surprisingly, these regions are the ones registering more brands per any given firm. In bigger district we have more companies registering, but in less volume.

The Açores district is a region with very positive indicators, but looking deep in its own data, we see that exist 2 or 3 companies that influence the region a lot and can blur the region's reality.

The generality of sectors that register brands are indebted, in high levels.

The same exercise can be done for the **selected LT** industries (table below). To make this exercise for all the sectors in the general dataset would not be productive and could have been confusing due to the amount of data.

Table 29 - Avg financial variables by LT industries- LT dataset

LT industries	Avg. Employees per firm	Avg. Indebtedness	Avg. Equity Capital (M€)	Avg. General liquidity	Avg. Economic profitability	Avg. Financial profitability	Avg. brand registrations	Avg. Operating revenue (M€)
Beverages	23,4	77%	4,30	7%	-3%	-1%	4,5	4,50
Reproduction of recorded media	29,6	68%	2,20	4%	-1%	33%	1,3	2,60
Manufacture of wearing apparel	41,9	114%	1,30	4%	-4%	-80%	1,1	3,20
Food industry	52,7	90%	4,90	26%	-12%	28%	1,9	11,30
Wood and products of wood	46,1	73%	4,50	2%	-2%	7%	1,4	9,20
Manufacture of furniture	30,6	71%	0,87	3%	-2%	17%	1,3	1,70
Leather and related products	48,9	145%	1,00	3%	-7%	-9%	1,2	2,50
Manufacture of textile	75,0	74%	4,30	3%	3%	7%	1,3	7,00
Manufacture of paper and paper products	49,2	86%	3,00	2%	1%	3%	1,3	6,80
Tobacco	85,5	35%	24,30	2%	6%	9%	5,0	42,60
Other manufacturing industries	25,2	95%	1,10	4%	-6%	-92%	1,5	2,80
Total	46,1	77%	3,0	3%	-2%	7%	1,3	4,5

Executing the same averages to the LT industries we see some relevant differences too.

Probably the most relevant indicator of this thesis is the average brand registrations and in this indicator we can see that the Tobacco industry and the Beverages industry are the ones with more brands per company.

Wearing apparel and leather related products industry are industries that did not registered so many brands per firm in the selected period.

For practicality reasons and to transform the data more readable, we gathered the data in intervals, in order to analyze financial indicators.

Analyzing now every financial indicator for each dataset and putting them side by side, we have:

Figure 13 – Firms by Operating revenue

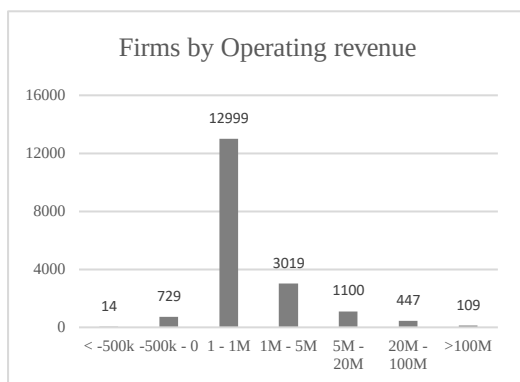


Figure 14 – Firms by Operating revenue, LT dataset

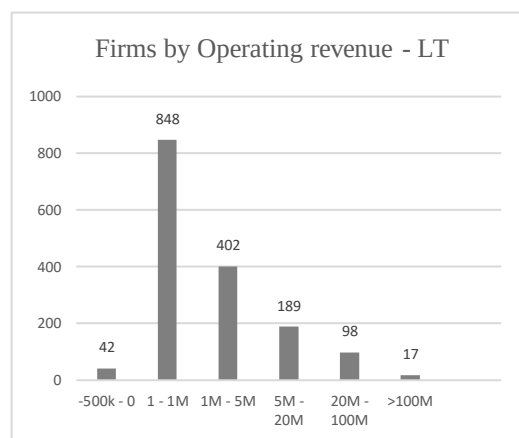


Figure 15 – Firms by EC

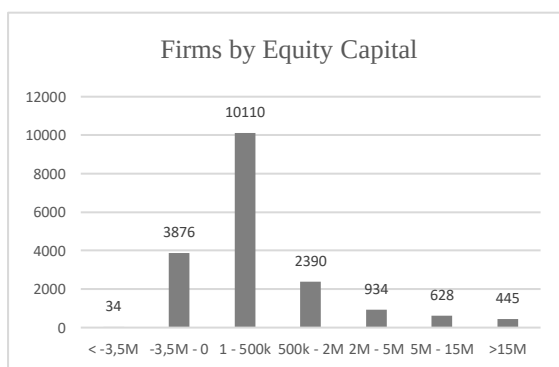


Figure 16 - Firms by EC, LT dataset

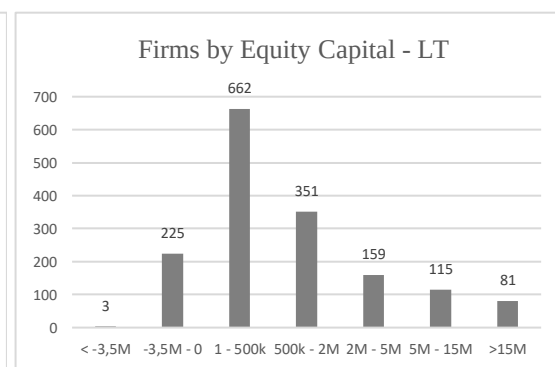


Figure 17 - Firms by GL

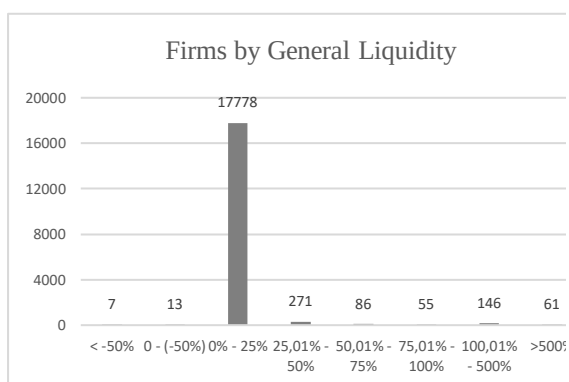


Figure 18 - Firms by GL

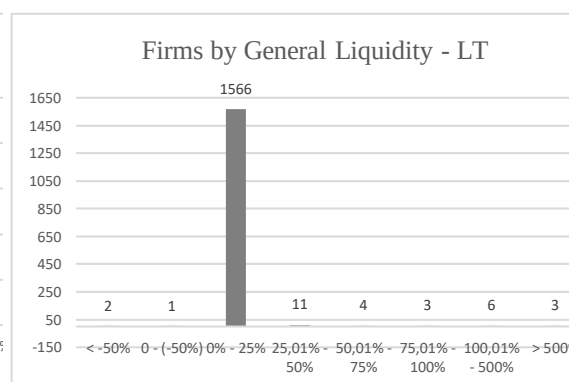


Figure 19 - Firms by Indebtedness



Figure 20 - Firms by Indebtedness

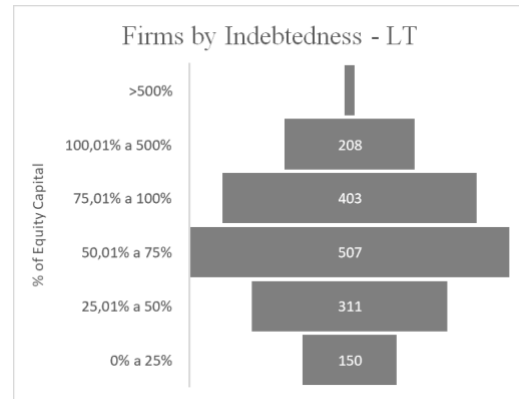


Figure 21- Firms by EP

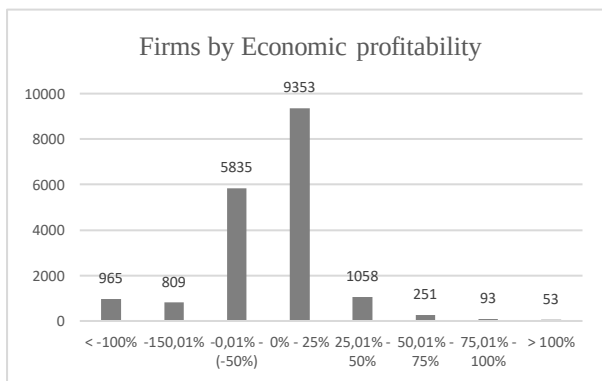


Figure 22 - Firms by EP

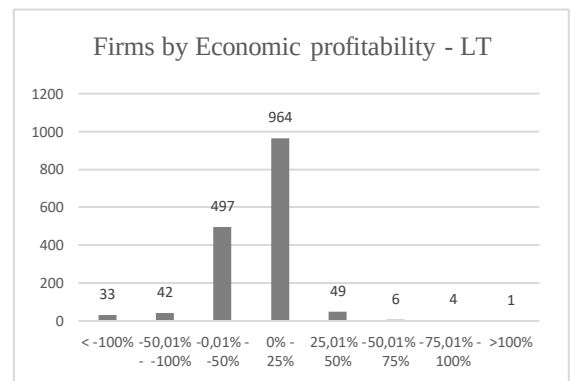


Figure 23 - Firms by FP

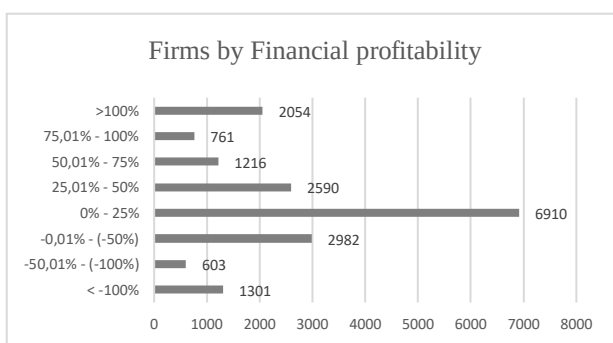


Figure 24 -Firms by FP, LT dataset

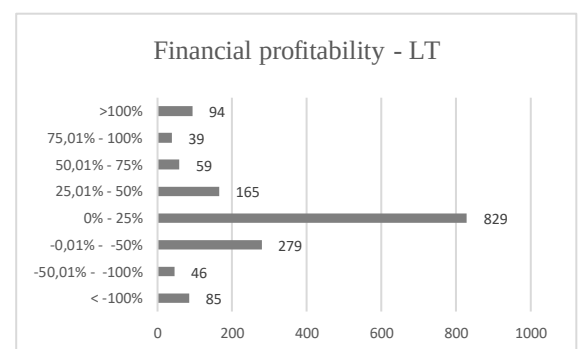
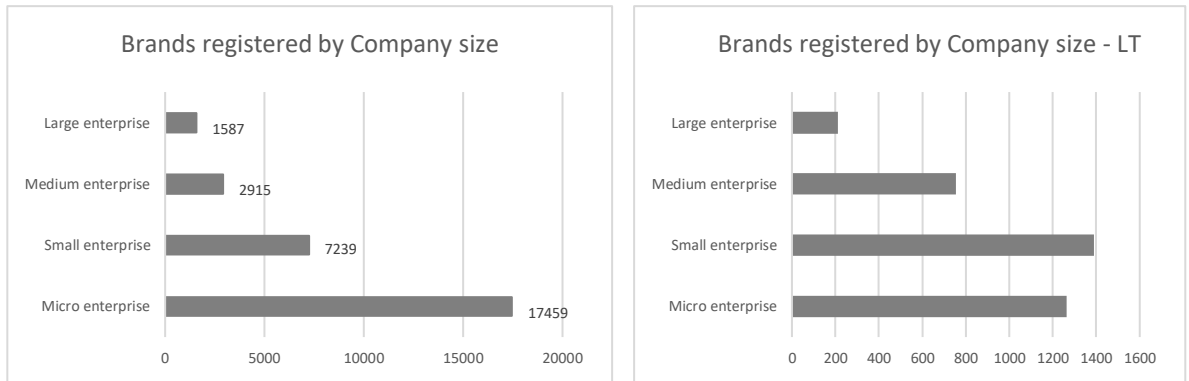


Figure 25 - Brands by CS Figure 26 - Brands by CS, LT dataset



Seeing by number of employees, the companies that registered more brands were micro enterprises, which in this study are considered the companies that operate with 10 employees or less.

In other hand, the biggest companies are clearly the ones that registered less brands.

How to explain this fact? First, we have to look to the commercial environment that exists in the country. Portugal is mainly composed by micro and small businesses, around 95% of the companies operating here are considered either a micro or a small business.

Not surprisingly, LT industries have less micro companies registering brands and are composed for more traditional firms with greater in number work forces.

An interesting fact is that LT industries when segregated from the general dataset are less indebted. As we seen in other tables, exists regions in Portugal that can be very indebted and that is not a good indicator for firms in these kind of areas. As we seen before in the correlation analysis, indebtedness has a negative relation with brand registration and companies indebted tend to not prioritize marketing innovations. It is important for LT industries to maintain.

10. Conclusions and recommendations

10.1 Concluding remarks

This thesis pretended to analyze and contribute to answer the central question “Does the trademarking (as a marketing innovation) contribute to the financial performance of a company in Low-medium tech Portuguese sectors?”.

This work was unique in some way due to the fact that crossed two datasets from two different worlds and tried to explain one of them with the other. It’s important to continue with works like this one where we are able to explore the impact that administrative actions can cause in financial indicators.

It was possible to see that the Portuguese corporate environment, based by the database collected with INPI during 3 years, is a very dynamic and different environment within itself.

Portugal has 2 major city poles, Lisboa and Porto, that concentrate the most of brand registrations. In the opposite, interior regions do not register so many brands.

With the dataset arranged, was possible to state that most of the companies registering brands are micro or small companies, which reflect the Portuguese economy as a whole. A lot of SMEs and concentrated in the tertiary sector, with a deep connection to the services sectors.

The situation changes dramatically the more north we go, with the manufacturing industry appearing in the brand registration scenario.

By correlating the variable Brands registration with all the different financial variables we stated that a positive relationship between the Operating revenue, the Equity capital and the Employees variable exists, in both datasets.

On the LT dataset even exists a negative relationship between the level of Indebtedness and the Brand registration variable, meaning that these two go in opposite directions when correlated. So, the more brands we register lesser is the level of indebtedness.

It is important to chase this insight of the indebtedness and contribute in the creation of a corporate environment that is as healthy as possible.

So at the end of the day we can affirm that the registration of a brand, in the LT industries goes hand to hand with more operating revenue and with bigger equity capitals. It

is important to acknowledge that more brands registered mean a healthier financial situation and less debt for LT companies.

10.2 Limitations & further analysis

The work obviously have some limitations although it was a great step in the data containment, did not explore with a thorough view.

In the future, in order to get clearer answers and get more detailed causes and answers it would be positive to use more elaborated statistical models for a finer refinement.

The study did not contemplate an elaborated analysis sector by sector, but in the future that can give us more detailed insights and will change the “grouped” view that this work elaborated on and will pass to the individual view, searching for specific industry problems.

10.3 Policy insights

Some of the solutions that could help the Portuguese sector and the LT industries in particular always pass through the main decision makers, the political ones.

Facilitate the trademark registration process, particularly the bureaucratic process. Some business people are discouraged to register a brand, mostly because of the process of opening the company first. It takes a lot of registration time and can be expensive.

Support the most forgotten companies in the interior. As we seen in the data collected, companies in the interior do not register brands in a big volume, they actually register more brands per firm but they are not incentivized to continuously create and to undertake.

Other of the solutions related with this last problem can be the decentralization, or part of it, of the big double poles that Portugal has, Lisbon and Porto. It is important to support the interior companies and to mobilize and encourage people to integrate these type of companies.

And lastly but surely not least, state financial support. It is the most important measure in a country with such a reality of debt and innovation. Not only the financial help but the guidance help, in a country with such a high aging rate and with a lot of small companies, helping to spread information through various channels in order to get the financial help o its destiny is very important.

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