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THE ROLE OF BUSINESS AND INNOVATION STRATEGIES IN COMPANY COMPETITIVE PERFORMANCE IN AN UNCERTAIN CONTEXT

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Abstract

Strategy can be defined and understood in different ways depending on the author and the context. A common trait is that strategy is often associated with value creation, and innovation strategies are said to be an adjustment mechanism in uncertain contexts so that competitive advantage may be achieved. Innovation strategies play a critical role in companies' survival and might be a distinctive factor in unforeseeable times.

At a time when economic scenarios are increasingly unpredictable, understanding how business and innovation strategies can be a mechanism for adapting to changes can play a critical role in companies' survival during major global economic crises. As such, this study seeks not only to understand the role of business and innovation strategies in the company's competitive landscape but also to grasp how investing in innovation and research and development influences competitive performance in times of uncertainty.

A thorough review of literature grounded the formulation of three main hypotheses about companies' business and innovation strategies, as well as competitive performance. To assess the formulated hypotheses, cluster and correlation analyses were undertaken with detailed information on 68 Portuguese companies in various economic sectors.

It was found that investment in innovation is positively correlated with not only research and development expenditure but also with exports share, this being closely linked to companies' competitive performance, as productivity, export share and growth rate indicators demonstrate. Moreover, research and development expenditure and investment in innovation appear to be triggered by uncertainty. We believe that the findings of the present work are of great potential value for companies interested in understanding how to cope with uncertainty, whilst attaining competitive advantage through innovation.

Keywords: business strategies, innovation strategies, competitive performance, uncertainty.

Resumo

Estratégia pode ser definida e compreendida de diferentes formas, dependendo do autor e do contexto, no entanto uma característica comum é que estratégia está frequentemente associada com criação de valor, e estratégias de inovação são tidas como mecanismos de adaptação em contextos incertos, para que vantagem competitiva possa ser alcançada. As estratégias de inovação têm um papel importante na sobrevivência das empresas e podem ser um fator distintivo em contextos imprevisíveis.

Numa altura em que a realidade económica é cada vez mais imprevisível, compreender como é que estratégias e inovação fulcral crítico na sobrevivência das empresas em grandes crises económicas mundiais. Como tal, este estudo procura não só compreender a importância que estratégias de negócio e de inovação têm na competitividade da empresa, mas também compreender como é que investir em desenvolvimento e inovação influencia o desempenho competitivo das mesmas em tempos de incerteza.

Uma revisão bibliográfica minuciosa fundamentou a formulação de três hipóteses principais sobre as estratégias de negócio e de inovação das empresas, bem como o seu desempenho competitivo. Para a análise das hipóteses formuladas, uma análise de clusters e correlações foi feita com informação detalhada de 68 empresas portuguesas, com atuação em diversos setores económicos.

Verificou-se que o investimento em inovação está positivamente correlacionado com despesas de pesquisa e desenvolvimento e com exportações, o que está relacionado com o desempenho competitivo das empresas, conforme demonstrado em indicadores como produtividade, exportações e taxa de crescimento. Adicionalmente, foi concluído que despesas de pesquisa e desenvolvimento e investimento em inovação são despoletados pelo clima de incerteza. Consideramos que os resultados do presente trabalho são de grande valor potencial para empresas interessadas em entender como lidar com a incerteza enquanto obtêm vantagem competitiva, através da inovação.

Palavras-chave: estratégias de negócio, estratégias de inovação, desempenho competitivo, incerteza.

1. Introduction

Strategy is often associated with the creation of a distinctive set of value (Michael E. Porter, 1996), unarguably critical in a company's structure (Balsam, Fernando, & Tripathy, 2011), and it is gaining importance in the more competitive and dynamic markets (Srinivasan, Srivastava, & Iyer, 2020). Moreover, Strategy is focused on decisions (Michael E. Porter, 1985) and it has been used by organizations as a way to cope with change, by presenting and assessing a new "combination of circumstances" ((Anwar, Shah, & Hasnu, 2016), p.99).

Many studies have been conducted over several decades with the purpose of understanding the link between strategy and performance (White, 1986). Additionally, since the last century, studies have been carried out with the purpose of understanding the responsiveness of companies to global competition, as well as which role technology played in its outcome (Zahra & Covin, 1993). Equally important is to denote the importance of innovation in providing companies with a fruitful way of taking advantage of market opportunities (Bessant & Tidd, 2013).

Innovation strategies can be defined as the "set of decisions with regard to the development and renewal of a firm's offer" ((Onufrey & Bergek, 2020), p.3). They must be "tailored to the nature of innovation and degree of uncertainties present." ((Lynn & Akgün, 1998), p.12). They have also been proven to be used as a mechanism to help companies in several ways, particularly in providing additional contributions to performance as to lead the competition (Bowonder, Dambal, Kumar, & Shirodkar, 2010). They are also seen as a way to achieve competitive advantages (Hilman & Kaliappen, 2015) associated with achieving and maintaining top-tier performance (Narver & Slater, 1990; Stanley F. Slater & Narver, 1995). Furthermore, the existence of a relevant positive association of innovation strategies with a company's performance has been shown (Chang & Singh, 2000; Hilman & Kaliappen, 2015).

Literature on innovation strategies has suggested that the key difference between "regular" business strategies and innovation strategies lies in the uncertainty factor (Dodgson, Gann, & Salter, 2008). Multiple studies have been conducted with the purpose of understanding the role of business and innovation strategies in the firm, namely as a response to transformation (Onufrey & Bergek, 2020) and due to the acknowledged importance of innovation in the company's longevity and performance (M. E. Porter, 1990; Sánchez, Lago, Ferràs, & Ribera, 2011).

Previous work has also suggested that there is a relationship between innovation and productivity, and their role in attaining competitiveness (Bobillo, Sanz, & Gaite, 2006). Moreover, there is also an implicit relationship with value creation (Medhora, 2017) and with growth (Dietzenbacher & Los, 2002). On the one hand, the ability of an organization to innovate has been proven to be one of the main preponderant factors to its growth and profitability (Dobni, 2010), which might explain the enormous focus and effort on innovation since the beginning of the century (Sánchez et al., 2011). On the other hand, the adoption of an innovation strategy(ies) by a firm can increase the company's business, therefore influencing its growth and sustainability (Blanchard, 2020). Nevertheless, bridging the gap between innovation and strategy has been considered as one of the biggest challenges in the management of technology-based organisations (Euchner, 2010).

The relationship between Strategy and Performance has also been the object of several studies (Anwar et al., 2016; von Gelderen, Frese, & Thurik, 2000). Performance, further than helping providing focus, leads to continuously improving performance itself (Mills & Bourne, 2002). The positive impact of a firm's structure and corporate strategy on its performance has also been demonstrated (Cetindamar & Kilitcioglu, 2013). Interestingly enough, not only strategy has been used as a mechanism to cope with change (Anwar et al., 2016), but also performance management is crucial during uncertain environments (Aguinis & Burgi-Tian, 2020). Additionally, it has also been suggested that performance measurement and respective analysis, as well as control systems, are instruments to ensure that not only the strategy is executed but also that the necessary adjustments are conducted successfully (Stanley F Slater, Olson, & Reddy, 1997).

Competitiveness is said to be a "(…) capability and its potential has to be realized in a firm's everyday operations" ((Cetindamar & Kilitcioglu, 2013), p. 7). Assessing competitiveness in companies with strategic purposes is said to entail a challenge (Cetindamar & Kilitcioglu, 2013). " Competitiveness is synonymous with a firm's long-run profit performance (…)" ((P. Buckley, Pass, & Prescott, 1988), p.176). Many have been the factors that have contributed to a significant change in companies' competitiveness, namely globalization (Bobillo et al., 2006). However, we believe that the current uncertain environment, that has been worsening over the decades, has greatly contributed to this change in the firm's competitive abilities.

The process of adjusting to change and uncertainty is extremely complex (Miles, Snow, Meyer, & Coleman, 1978; Sánchez et al., 2011). Furthermore, "Future performance depends

on today's efforts to sustain and create competitive advantage (Day, 1990; Reichheld, 1996)" ((Doyle & Wong, 1998),p. 518), and understanding that has been very relevant (Barney, 1991). Under normal circumstances, the market has been characterized as an environment of "Increased competition, change and uncertainty (…)" ((Lynn & Akgün, 1998), p.12). Hence, it is only logical to conclude that events that may disturb the normal dynamics of companies can be devastating and challenging (Barbosa & Romero, 2013) for the business environment, which already bears a high degree of uncertainty (Teece, Peteraf, & Leih, 2016). As such, it becomes pertinent to understand which company characteristics overcome the difficulties in adapting to uncertainty through business innovation strategies.

The 1973 Oil Crisis impacted most economies across the globe, during the Dot-com Crash, technological innovation was seen as a major drive to "keep the market economy in motion" ((Wang, 2007), p.1), and the Global Financial Crisis has accelerated a number of structural transformations (Claessens & Van Horen, 2015). These events all have in common their world-wide dimension, their drastic impact in economies and societies, and their constantly changing reality – a fallout characterized by extreme uncertainty (Gurkov, 2010). More recently, the Coronavirus (COVID-19) pandemic has been raising unprecedented levels of uncertainty and volatility, endangering economic growth and affecting the financial markets (Hu & Zhang, 2021). The timeline of the past major crises and respective impact propagation can fairly demonstrate that those crises are less and less widely spaced, increasingly uncertain, and more and more destructive. As mentioned above, the crisis demonstrate that change and uncertainty are two key words that can be used to characterize the current business environment (Lynn & Akgün, 1998).

The processes of decision-making and planning under a context of uncertainty are extremely complex though essential (Dong, 2021). Previous studies have acknowledged that it is important that organizations are able to have the "ability to identify valuable opportunities" and "the ability to adapt to the marketplace changes" ((Amram & Kulatilaka, 1999), p.1), in order to be competitive. Finally, and as it has been stated above, there are no guarantees or certainties regarding uncertainty scenarios, potential outcomes, and what will be the best strategy to deal with them (Sharma, Leung, Kingshott, Davcik, & Cardinali, 2020). As such, we believe that it is necessary and pertinent, based on empirical evidence, to try to understand which business and innovation strategies have been working best for the business environment in Portugal over the years and through the recent crises.

2. Revision of Literature on Business Strategies and Innovation Strategies in Company Competitive Performance in Uncertain Contexts

In this chapter, we will address studies considered relevant to the present work, as well as important definitions on the topic of study. In addition, we will highlight some core theories that will be used as the basis for the work. Lastly, we will discuss similar and complementary studies that we view as an essential support for its development and outcome.

2.1. Business Strategies and Innovation Strategies

Over the past decades, several studies were undertaken to better understand Business and Innovation Strategies. Strategy has been defined differently depending on the authors. Some authors have considered strategy as a way to "achieve competitive advantage" ((Hax & Majluf, 1988), p.100), while others as "integrated decisions, actions or plans" made to carry out the firms' plans (Chrisman, Hofer, & Boulton, 1988). In the end, and as pointed out in McKeown's book, strategy revolves around the decision-making process, considering the firm's goals, timeline, motivation (Mckeown, 2019), and resources (Srinivasan et al., 2020). In a more straightforward way of wording it, strategy is a mean to achieve an end (Kazmi & Kazmi, 1992). A more recent work narrows strategy down to two types of choices: one related with exploration and the other related with exploitation (Miller, Bierly, & Daly, 2007), which will be addressed later. Nonetheless, it is critical to understand that strategy is a very subject field (Johnson, Whittington, Scholes, Angwin, & Regnér, 2011).

Business Strategies can be defined as a group of directions that a company follows to provide guidance in the decision-making process (Watkins, 2007). *Innovation Strategies* are said to be the "successful implementation of creative ideas within organizations which deliver values to customers (Hurley & Hult, 1998)" ((Prajogo, 2016), p.242). Although innovation and strategy play different roles with respect to companies' ability to adapt to changes (Barbosa & Romero, 2016), they are complementary elements when it comes to an organization becoming innovative (Dobni, 2010). At a management level, innovations have been looked at as an adjustment mechanism to cope with change because of the position it takes throughout the different layers and functions of an organization (Ferguson, 2019).

A better understanding of the possible relationship between the adopted strategy and the competitive performance of companies has been broadly discussed and studied over the decades (Farjoun, 2002). The understanding of a company's efficiency and adequacy for

implementing strategies has been identified as a prospect demand for researchers (Goold, Campbell, & Alexander, 1998). Moreover, previous empirical studies have aimed at understanding the relationship between strategy, organization and performance (White, 1986). As a result of an unceasingly changing business environment, with a particular emphasis in recent years, companies' strategies need to undergo a constant assessment to be able to face current circumstantial challenges(Doyle & Wong, 1998).

Business Strategies

Considering the constant need to have the objectives, structures and management processes of organizations in line with the current market and economic situation (Miles et al., 1978), it becomes pertinent to realize which role strategies play in coping with changes. Previous studies distinguish between business strategy, which "deals with the ways in which a single-business firm or an individual business unit of a larger firm competes within a particular industry or market" ((Bowman & Helfat, 2001), p.1), and answer to the question of *"How we should compete in this business"* ((Snow & Hambrick, 1980), p.528), and corporate strategy, which is "the overall plan for a diversified company" making the "(…) whole add up to more than the sum of its business unit parts (…)" ((Michael E. Porter, 1989), p.234), and is designed to answer to *"What businesses should we be in?"* ((Snow & Hambrick, 1980), p.528).

To the best of our knowledge, two of the most commonly known strategy classifications are the ones created by Porter and Miles et al. (Anwar et al., 2016). Kaliappen and Hilman (2017), on a revision on Porter's (1980) competitive strategies, have pointed out that the author defends the idea that for a company to sustain a competitive advantage it is necessary that it creates value for its stakeholders. Michael Porter introduced in 1985 the concept of *Generic Strategies,* in order to help determine a company's relative position within its respective industry (Michael E. Porter, 1985). The author distinguished between three types of Strategy to achieve Competitive Advantage: *Low-Cost Strategies*; *Differentiation Strategies*; *Focus Strategies*. The Cost Leadership Strategies and the Differentiation Strategies are designed to a broader target when it comes to the competitive scope. On the other hand, the Focus Strategies (whether Cost Focus or Differentiation Focus) seek to create competitive advantage in a narrow target. This framework argues and assumes that companies need to select both the source of competitive advantage and the competitive scope in order to survive competition (Michael E. Porter, 1996). A different take on strategic typologies is the well-known Miles and Snow (1978) and widely corroborated framework (Anwar & Hasnu, 2016; DeSarbo,

Anthony Di Benedetto, Song, & Sinha, 2005), which focuses on four types of organizations (Miles et al., 1978), the first one being *The Defenders*, which lay emphasis on how to defend and maintain a percentage of the market share in order to create a stable position. They seek to create a stable domain by only providing with a limited product offer, and they defend their position through, for example, competitive pricing, high-quality products or market penetration. These organizations' end-goal is to create and then maintain a small niche, and they tend to invest in developing cost-efficient technology, though their primary risk is ineffectiveness. *The Prospectors* present a consistent approach to problems and are characterized for being innovative and exploring opportunities. They seek to have a broad and continuously developing domain. These organizations are characterized for being very aware of the current environmental conditions and trends, very flexible especially when technologically concerned, investing in new technologies and growing through product development. *The Analysers* typology is a combination of the two prior types of companies. These companies try to minimize the potential risks while maximizing profit opportunities. They tend to adopt an adaptative approach of equilibrium and to analyse the viability of new products and markets - they follow the lead of the prospectors while focusing on efficiency, and they grow from market penetration and product and market development. As such, they search for a duality in technology: stability and flexibility. Lastly, come the *Reactors:* they tend to be inconsistent and unstable and are characterized to have a poor performance and to lack structure. They do not have an articulated strategy. A very thorough and comprehensive work reviewing most of the empirical studies conducted concluded, based on Smith et al. (1988, 1989), that *Analysers* and *Prospectors* tend to be more competitive than *Reactors* (Anwar et al., 2016).

Another work based on empirical evidence, focused on classifying business strategies in order to ascertain the different behaviours and the performance associated with different strategies, has concluded that there are four general business strategies: *Domestic, product specialization strategy; Exporting, high quality offerings strategy; International, product innovation strategy; Quasi-global, combination strategy* (Morrison & Roth, 1992).

A very interesting and complex approach focuses on how to measure different dimensions of strategy (Venkatraman, 1989), rather than focusing on strategy classifications (Morgan & Strong, 1998). Venkatraman (1989) proposed six dimensions of strategic orientation: *Aggressiveness, Analysis, Defensiveness, Futurity, Proactiveness,* and *Riskiness*. This work's main aim

was to "develop and validate a set of operational measures for a particular conceptualization of strategy." ((Venkatraman, 1989), p.942), as well as to identify the differences between each classification. This study was conducted on a sample of 201 companies and concluded that there are indeed relationships between some of the strategic dimensions, with a particular emphasis on proactiveness, futurity and defensiveness (Venkatraman, 1989).

Through the analysis of several models and studies, one can conclude that, regardless of the methodology used, the characteristics of each of the groups influence the predisposition of companies to take on certain strategic approaches, which in turn influence their performance and ability to innovate. Based on the concluded above, we hypothesize:

> *H1: Companies' strategic dimensions are intrinsically related to each other, as well as the firms' performance and ability to undertake innovation and change processes.*

Innovation Strategies

Innovation can be defined as "a new or improved product or process (or a combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)" ((OECD & Eurostat, 2018), p.20). Innovation can also be a way of "(…) opening up new markets (…)" or of offering "(…) new ways of serving established and mature ones." ((Bessant & Tidd, 2013), p.4). Furthermore, it has been proven to be effective as a way to attain and sustain competitiveness (Karlsson & Tavassoli, 2016), to positively affect business performance (Igartua, Garrigós, & Hervas-Oliver, 2010; Prajogo, 2016), and to ensure compelling market adaptability and performance (Edeh, Obodoechi, & Ramos-Hidalgo, 2020), and growth (Dietzenbacher & Los, 2002). In nearly all economic sectors, technological innovation is a critical instigator of a company's prosperity (Bahl, Lahiri, & Mukherjee, 2021; Schilling, 2013), but it is also a critical element that has enabled companies to maintain their leadership and margins (Bowonder et al., 2010). Additionally, literature on market orientation has suggested innovation process is crucial to a company's survival (Stanley F. Slater & Narver, 1998), especially in unpredictable contexts (Ramus, La Cara, Vaccaro, & Brusoni, 2018). It should be noted that while in some industries innovation may be critical, in others this may depend on a strict cost structure to get through (Koller, Goedhart, & Wessels, 2010).

The *Oslo Manual* is an international and comprehensive guide for collecting and interpreting data on innovation, with its first publication in 1992. A previous version of the manual

(Organisation for Economic Co-operation and Development & Statistical Office of the European Communities, 2005) listed four types of innovations: product, process, organisational and marketing, this being acknowledged by several authors (Karlsson & Tavassoli, 2016). Based on the most recent version of this manual, we can define *Product Innovation* as "(…) a new or improved good or service that differs significantly from the firm's previous goods or services and that has been introduced on the market." ((OECD & Eurostat, 2018), p.21), comprehending both goods and services. And *Business Process Innovation* "(…) is a new or improved business process for one or more business functions that differs significantly from the firm's previous business processes and that has been brought into use by the firm." ((OECD & Eurostat, 2018), p.21).

Several innovation strategies have emerged over time (Lynn & Akgün, 1998). Lynn and Akgün (1998) have listed six types of innovation strategies: process-based, speed-based, learning-based, market-based, technology-based and quantitative-based (also known as "innovation by the numbers"). A different approach has been taken by Hilman & Kaliappen (2015). The authors have classified innovation strategies as process innovation and service innovation. Process Innovation has been defined as a way of "creating valuable modifications in the process of generating the offerings" and service innovation as a way of "creating useful modifications in the service" used ((Kaliappen & Hilman, 2017),p. 258).

Literature review on Innovation Strategies has allowed us to better comprehend their full extent, including how they affect a company. It is understood that Innovation Strategies are to assist firms in three different dimensions: exciting the customers, outperforming competitors, and building a new product portfolio (Bowonder et al., 2010). A 2010 study included a comprehensive review of the current innovation strategies and presented a conceptual model encompassing four main questions that aimed to bridge both the objectives of innovation and its contents ((Stankevice & Jucevicius, 2010), p.27): "What to innovate?"; "What is the speed and scope of the innovation?"; "How to enable innovation?" – based on level of openness and level of uncertainty; "How to bring innovations to customers?". A different take argues that a sound and consistent innovation strategy must contribute to a company's direction while improving and contributing to the firm's already existing competitive position (Schilling, 2013).

In 1984, a study was conducted with the purpose of better understanding what creates the success of different innovation efforts and corresponding strategies, gathering information

from a total of 122 firms (Cooper, 1984). The authors have clustered the obtained results in order to build five clear strategy scenarios. Each of these five scenarios was described based on their strategy dimensions, company and industry characteristics and performance results: *Technologically Driven* companies have high sales values, but low market research skills, salesforce and promotion strengths, and a very low market potential size and growth, as well as low market competitiveness; *Balanced* companies have high financial and Research and Development (R&D) skills. They have very high technological sophistication, orientation, and innovativeness, as well as market potential, but very low market competitiveness; *Technologically Deficient* companies have little R&D skills and resources, but are able to maintain a highly competitive dominance; *Low-Budget, Conservative* companies are known for having little financial resources as well as low technological sophistication and competitive dominance, a very low R&D spending, yet high market competitiveness; *High-Budget, Diverse* companies are characterised for having low corporate sales, yet very high spending in R&D and market competitiveness. They have low technological sophistication, orientation and innovativeness (Cooper, 1984). After analysing this robust study and by looking at the characteristics of the different clusters, one could infer that there is in fact a correlation between the company's competitive performance and its ability to invest in R&D.

A framework presented in 2008, distinguished four types of innovation strategies: *Proactive Strategies, Active Strategies, Reactive Strategies and Passive Strategies.* Companies adopting *Proactive Strategies* aim to be the market leaders and extremely technological, with a strong orientation to innovation. The ones opting for *Active Strategies* seek to be quickly prepared to respond right after the new technologies are tested. Firms choosing *Reactive Strategies* can be described as not being very responsive to the need for innovation. Lastly, companies adopting *Passive Strategies* are focused on customers, hence innovation is only triggered by their demand (Dodgson et al., 2008). In terms of both *"range and depth of resources and innovative capabilities required"* and *"complexity and complicatedness of innovation process required"* ((Dodgson et al., 2008), p.106), *Passive* firms are the least complex, followed by *Reactive* ones, and *Proactive* companies are the most, right after *Active* firms.

The two strategies that market-leading companies tend to adopt - "proactive" and "active" - are those that invest the most in R&D, as well as in education and training (Dodgson et al., 2008). Moreover, R&D spending appears to be a common factor amongst companies that turn out not only to perform better, but also have the highest ability to innovate (Cooper,

1984). Several studies aimed at understanding how R&D affects innovation (Karlsson & Tavassoli, 2016) since there is a positive correlation between innovation and performance (Igartua et al., 2010; Prajogo, 2016). The positive association between R&D expenditure and the company's performance has also been questioned, since the correlation appears to be neutral in other studies (Gobble, 2012).

Based on the rationale and conclusions above, we want to test the following hypothesis:

> *H1a: The expenditure in Innovation and R&D is positively correlated with the company's competitive performance.*

Research has shown that an effective framework for studying business and innovation strategies would take into account two different perspectives on the strategies, encompassing both the competitive position and the resource position (*Figure 1)*, both positions being linked with business and innovation strategies (Onufrey & Bergek, 2020).

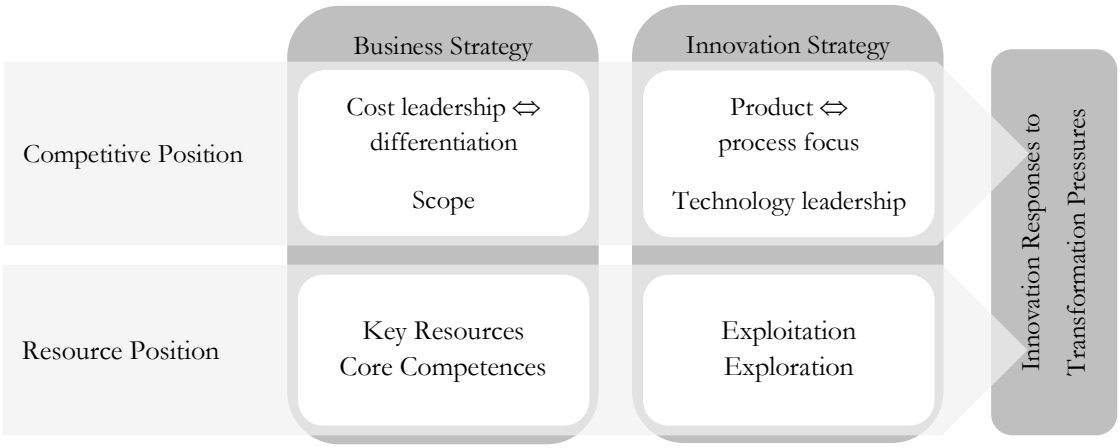

Figure 1 - Analytical Framework on Business and Innovation Strategies[1]

Innovation strategy has been shown to be connected with innovation processes, capabilities and resources (Dodgson et al., 2008), and literature on market orientation has supported the idea that the innovation process is crucial to a company's survival (Stanley F. Slater & Narver, 1998). As for business strategies, the competitive position perspective is related to the company's ability to provide goods and services (Onufrey & Bergek, 2020). Here the authors have based most of their arguments on Porter's work on Generic Strategies. Additionally, the company's strategy is also addressed with the perspective of the resource position. Regarding exploitation and exploration, it should be pointed out that the first has been found

[1] Source: Onufrey and Bergek (2020), p.5.

to be more frequent amongst public institutions whereas the second in private ones (Gao, Hsu, & Li, 2018). The main difference between these two approaches lies in the source of competencies – exploitation resorts to already subsisting knowledge, whereas exploration seeks to acquire new knowledge (Debenham & Wilkinson, 2006).

Strategic decisions made in a volatile context have to take into account multiple factors. Previous studies have highlighted two types of trade-offs that need to be thoroughly analysed: which scenario is best to allocate the companies' resources, and whether to act on after the crisis or to tackle the issues early on (Wernerfelt & Karnani, 1987). Moreover, it is imperative to achieve robustness within the corporation as to rapidly respond to uncertain environments (Gurkov, 2010). Further than focusing on strategies, more recent studies have been also focusing on how the company reacts to a changing business environment, since adjustments have been needed more and more often (Parnell, 2006).

2.2. Company's Competitive Performance

Performance management is crucial during uncertain environments (Aguinis & Burgi-Tian, 2020) and its understanding is key (Doan, Le, & Tran, 2020) to both strategic management (Anwar et al., 2016) and analysis (Guérard, Langley, & Seidl, 2013), as well as to company's accountability (Star, Russ-Eft, Braverman, & Levine, 2016). Managing performance has nonetheless been acknowledged as a rather complex task in a firm (Añón Higón, Gómez, & Vargas, 2017; Chong, Zey, & Bessler, 2010; DeSarbo et al., 2005). It is not uncommon during times of crisis that the measurement of an organization's performance is simply neglected, this including company's competitiveness performance (Aguinis & Burgi-Tian, 2020). Literature on this subject has listed a few challenges related to measuring performance during a crisis scenario: adjustment to the performance assessment, under economic changes; adjustment of the tasks to the immediate needs, which also complicates the assessment; there may be some implied changes to be done in the so-far used measurements; lastly, it may be the case that such measurement ceases to be adequate or that even the old objectives are no longer feasible (Aguinis & Burgi-Tian, 2020). Therefore, it is expected for organisations to resort to strategy to cope with eventful and stressful environments (Anwar et al., 2016). Aguinis and Burgi-Tian (2020) argue that not only performance measurement is important during a crisis, but also it is important to take the time to collect valuable information and data and to provide feedback to all the parties involved. For many years companies have

focused on financial measures to assess their performance, but more recently they have resorted to other indicators such as innovation and flexibility (Moxham, 2009).

A review of studies conducted to analyse firms' performance has identified that improved competitive performance may lead to creating or increasing competitiveness (Ambastha & Momaya, 2003). This review also identified a number of indicators to measure performance on a firm-level: *Productivity, Finance, Market Share, Differentiation, Profitability, Price, Cost, Variety, Product Range, Efficiency, Value Creation, Customer Satisfaction, New Product Development*.

The topic of competitiveness becomes increasingly important in years of crisis since firms tend to perform worst on both national and international markets, further aggravating the existing situation arising from the economic context (Grupp, 1997). Companies' ability to innovate refers to their ability to "adopt or implement new ideas, processes, or products successfully" ((Hurley & Hult, 1998), p.44). On the other hand, "Competitiveness is rooted most importantly in a nation's microeconomic fundamentals, contained in the sophistication of a company operations, the quality of the microeconomic business environment and the strength of the clusters (Porter, 1990)" ((Cetindamar & Kilitcioglu, 2013), p.8). It can also be observed that "a capability and its potential has to be realized in a firm's everyday positions" ((Cetindamar & Kilitcioglu, 2013), p.7).

Competitiveness has been said to be related to the company's ability to survive and succeed, particularly under uncertain contexts, and to compete (Ambastha & Momaya, 2003), as such it is crucial to understand what entails competitive advantage. Competitive advantage is based on "implementing a value creating strategy not simultaneously being implemented by any current or potential competitors" ((Barney, 1991), p.102). Competitiveness has been defined differently (Ambastha & Momaya, 2003; Csath, 2007) according to its scope of application, since it can refer to individual firms, groups of firms, economic sectors, or even geographically based activities, and it has been challenged by innovation (Csath, 2007; M. Porter & Stern, 2001). Competition globally has been increasing (Tidd, 2006) and has been prompted by constant changes in the markets (Nakayama, 2018).

The Aldington Report (*Report from the Select Committee on Overseas Trade : session 1984-85. Vol.3, Written evidence*, 1985) states that " Competitiveness is synonymous with a firm's long-run profit performance (…)" ((P. Buckley et al., 1988), p.176). As for a national level, competition is related with a firm's "(…) ability to generate the resources required to meet the national needs" (Aldington Report 1985)" ((P. Buckley et al., 1988), p.176). Regardless of the formal

definition, competitiveness has been said to be propelled by innovation (Denton, 1999). Additionally, it is suggested that a firm's international performance can be measured by some of the following indicators: *Export Market Share, Export Growth and Profitability* (P. Buckley et al., 1988). Strategic performance has also been measured through the quantitative indicators *Return on Investment (ROI)* and *Market Share* (Anderson & Zeithaml, 1984).

A relationship between *Market Share* and *Profitability* has also been argued (Wernerfelt, 1986), making these two indicators relevant to the analysis of a company's performance. Another positive association that has been made in past studies is the relationship between innovation and exports (Altomonte, Aquilante, Békés, Ottaviano, & Manacorda, 2013; Tavassoli, 2018). In fact, *Growth, Export,* and *Value-added & Profit* have been used as outcome indicators in firms' competitiveness assessment (Cetindamar & Kilitcioglu, 2013). The European Commission has presented a report that defines competitiveness and its measurement indicators at three levels: firm, sector and total economy (Blandinières et al., 2017). The report presents a simple framework on how competitiveness can be measured on three different dimensions within the company (*Figure 2*).

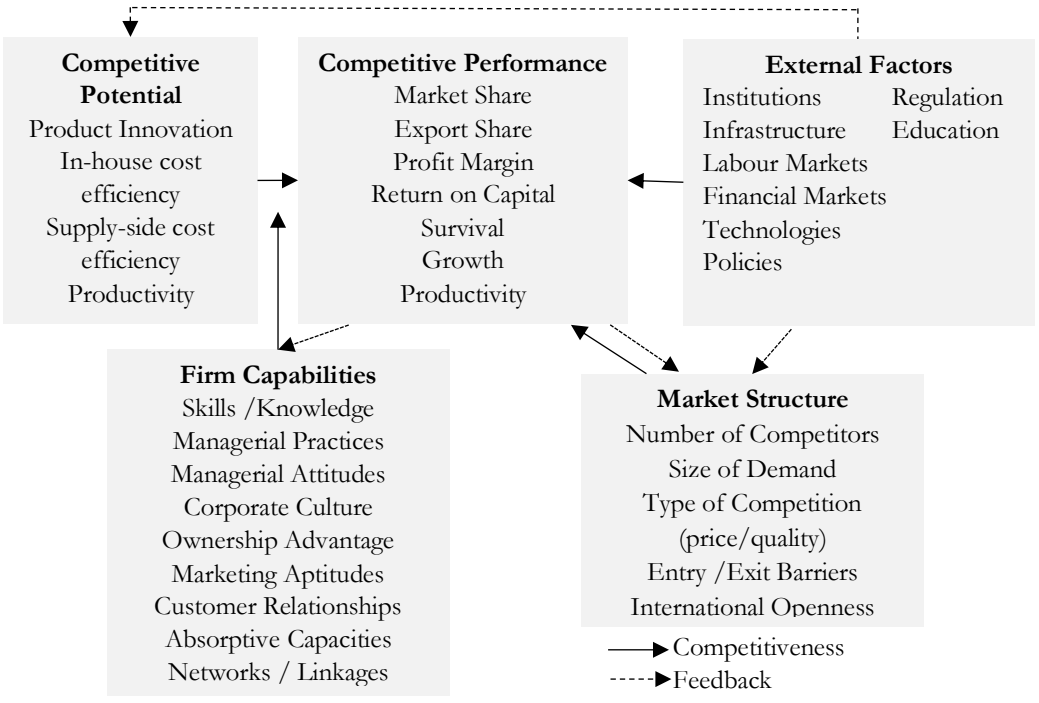

Figure 2 - A conceptual model of firm competitiveness[2]

[2] Source: Blandinières et al. (2017), p.11.

To summarize, providing the possible different interpretations of competitiveness (Ambastha & Momaya, 2003), the companies' competitive prosperity is grounded on the companies' ability to have competitive advantage over contender firms (P. J. Buckley, 1995). Moreover, studies have shown that there is a relationship between innovation and performance (Rosenbusch, Brinckmann, & Bausch, 2011).

Based on the rationale and conclusion above we hypothesize:

> *H2: To achieve a positive impact in companies' competitive performance, further than having a defined innovation strategy it is important to actively invest in innovation.*

International Competitiveness and Innovation Indexes and Scoreboards

A public report of relevance is the annual European Innovation Scoreboard (Hollanders, Es-Sadki, Merkelbach, & Khalilova, 2020), which delivers a comparative assessment on innovation and research and development. In this report one of the assessments provided is the performance of innovation systems, this being by using a framework built on four key types of activities, comprising a total of 27 indicators (Hollanders et al., 2020). An annex of the report was elaborated with the purpose of explaining the basis for the construction of each indicator (Hollanders & Es-Sadki, 2020). Since the object of the present work is companies operating in Portugal, it is important to highlight a few of those indicators. The first one is *"R&D expenditure in the business as a percentage of GDP*[3]*"* ((Hollanders & Es-Sadki, 2020), p.14) since it is one of the indicators where Portugal performed below the European Union average. We trust it is relevant to highlight this indicator, considering the studies that have been carried out on the impact of investments in R&D on the success of companies (Dietzenbacher & Los, 2002). *"SMEs introducing product or process innovations as a percentage of SMEs"* ((Hollanders & Es-Sadki, 2020), p.17) is an indicator in which Portugal not only performed above the European Union Average, but also presented the highest score of the study, indicating that more than 50% of Portuguese SMEs have presented an innovation, whether product or process. Lastly, we would like to mention "*Exports of medium and high technology products as a share of total product exports"* ((Hollanders & Es-Sadki, 2020), p.28), an indicator in which Portugal has shown significant improvements, with a performance increase well above the European Union's average. We consider that it is important to study and further comprehend the link between companies' competitiveness and countries'

[3] Gross Domestic Product.

competitiveness since, although on a different scale, this is linked with economic complexity (Hausmann et al., 2013)[4].

2.3. Uncertainty and Strategy

Uncertainty can be defined as "the conditional volatility of a disturbance that is unforecastable from the perspective of economic agents" ((Jurado, Ludvigson, & Ng, 2015), p. 1178). To a certain extent, and transposing what has been advised for governments in these situations, when making decisions or defining strategies, companies must be aware of uncertainty and the potential risks associated with it (Bergamaschi, Mabey, Born, & White, 2019). It has also been found that serious uncertainty is linked with fast technological change (Teece et al., 2016). And also that, due to potential financial constraints caused by a crisis, the firms' investment policies are most likely to not achieve their optimal level (Chen, Chou, & Lu, 2018). Thus, it becomes pertinent to understand how innovation can be boosted in a crisis context, since it is one of the key determinant strands for development under economic stress (Barbosa & Romero, 2013).

For many institutions, the necessary procedure related to a change or even to an adjustment coming from an uncertain scenario or an unexpected event is extremely intricate (Miles et al., 1978). Over the past five decades, we have witnessed major events that have strongly affected the main world economies. Two of those events have occurred in the last two decades, and we are currently in the middle of one. In 1973 the world witnessed the devastating Oil Crisis. Relevant studies suggested that even five years after the event, its consequences were still being experienced to several extents (Issawi, 1978). Similar events have been responsible for recessions, significant inflations in some economies, stagflations in others, negative changes in productivity, changes in policies – namely monetary – readjustments in the labour market and speculation (Kilian, 2014). Another was the Dot-com bubble, which triggered what would be one of the periods when equity market valuation was most popular and consequently the 2000s Dot-com crash (Morris & Alam, 2012). More recently, we had the Global Financial Crisis (2007-2009) that started out as a consequence of the burst of the United States' Housing sector bubble (Subbarao, 2020). Many were the consequences all over the world. Economies shrank, spikes in unemployment rates emerged, debt increased, exports reduced – as a result of import decreases – withdrawals of private

[4] "(...) the complexity of an economy is related to the multiplicity of useful knowledge embedded in it" ((Hausmann et al., 2013), p. 18).

capital flows, crashes in commodity prices, political instabilities across nations, among others (Drezner, 2010). Finally, the current global disruptive event is the COVID-19 pandemic that has caused an extremely uncertain environment, throughout all economic sectors (Hu & Zhang, 2021). All these unexpected events had in common their unprecedented dimension, which changed the way the markets worked and to which companies had to adapt, resorting to innovative strategies to survive the crisis. Macroeconomic uncertainties are said to be a relevant source of business cycle fluctuations (Shen, 2020).

This work will focus on events of great uncertainty that were felt in Portugal, home country of the companies addressed in this study. To this end, and in order to identify those periods, we resorted to the Portuguese database PORDATA, a platform that compiles data on various areas of Portuguese society and Europe (PORDATA, 2020a). The data displayed by this platform is organized in 19 general themes and 123 subthemes, comprising over 1400 indicators.

The Portuguese *Real GDP growth rate* analysis since 1961 (*Figure A1, Annex A*) shows that there have been several periods of negative growth of GDP, consistently with unpredictability and uncertainty (PORDATA, 2020b). Moreover, in the past two decades alone, there have been three moments of negative growth, each one of them being drastically worse than the one before (*Figure A1, Annex A*). It is time to recall that Drucker (2002) presents seven Sources of Innovation, four of those resulting from searching for opportunities to innovate and the other three resulting from overlapping different elements. One of those is *Unexpected Occurrences*, which entails one of the sources for innovation opportunities. Here, both successes and failures are seen as productive sources of innovation (Drucker, 2002). Hippel has identified four sources of innovation (Hippel, 1988): the customers, the suppliers, third parties (Philipson, 2020) and manufacturers. In a different approach to innovation sources, a study has presented two sources of innovation – internal and external – each with different inner sources (Bommer & Jalajas, 2004). As such, it is only logical to suspect that innovation may be motivated by uncertainty, since it has been already acknowledged that most development occasions are caused by unpredictability (Amram & Kulatilaka, 1999) and it has been deemed as an essential element in uncertain scenarios (Lynn & Akgün, 1998). Moreover, literature on strategy during uncertain periods has presented frameworks that indeed connect strategy and uncertainty with the company's performance (Blumentritt & Danis, 2006; von Gelderen et al., 2000).

Work focusing on the different types of uncertainty suggests four different sources of uncertainty: *demand uncertainty, supply uncertainty, competitors* and *externalities* (Wernerfelt & Karnani, 1987). Yet, there is still no model that is comprehensive enough to incorporate all the possible factors and outcomes derived from different uncertainties (Sharma et al., 2020), even though uncertainty is a forever present element that companies must be aware of (Korsgaard, Berglund, Thrane, & Blenker, 2010; Magnani & Zucchella, 2019), and very important in the decision-making process (Liesch, Welch, & Buckley, 2011; Magnani & Zucchella, 2019).

Is also important to consider *Trade Account as a % of GDP* (PORDATA, 2020c) (*Figure A2, Annex A*). We will mainly focus on the behaviour of the Exports as a percentage of the trade account, considering its positive relation with innovation (Love & Roper, 2013). As described in the dataset metadata, "Exports of goods and services consist of transactions in goods and services (sales, barter and gifts) from residents to non-residents." ((PORDATA, 2020c), metadata). This indicator becomes highly relevant for the present work since several studies have identified that innovation is an export driver (Tavassoli, 2018).

Besides the positive correlation between innovation and exports (Love & Roper, 2013; Tavassoli, 2018), there is also a beneficial link between exports and a companies' growth (Lu & Beamish, 2006) or its competitive advantage (Piercy, Kaleka, & Katsikeas, 1998). Furthermore, the countries' innovation and knowledge-related exports are also accounted for in the *European Innovation Scoreboard* (Hollanders & Es-Sadki, 2020), demonstrating its impact on overall competitiveness. It is important however to acknowledge the degree of uncertainty that comes with the relationship between exports and innovation, and also that such pattern or behaviour is associated with more productive firms (Cassiman, Golovko, & Martínez-Ros, 2010). Another indicator associated with exports is the companies' R&D expenditure, which has been shown to positively influence exports (Hirsch & Bijaoui, 1985).

According to the PORDATA database, R&D is "all systematically performed creative work aimed at expanding knowledge, including the knowledge of humankind, culture, and society, as well as the use of this stock of knowledge in new applications. (metadata – INE)" ((PORDATA, 2019), metadata). As *Figure 3* clearly portrays, not only has expenditure in R&D been increasing its weight on the Portuguese GDP over the past few decades, but also its peaks have been positively correlated with negative growth of GDP, which is

understandable given that uncertainty and unstable environments instigate innovation as evidenced in literature (Anwar et al., 2016; Dodgson et al., 2008; Onufrey & Bergek, 2020).

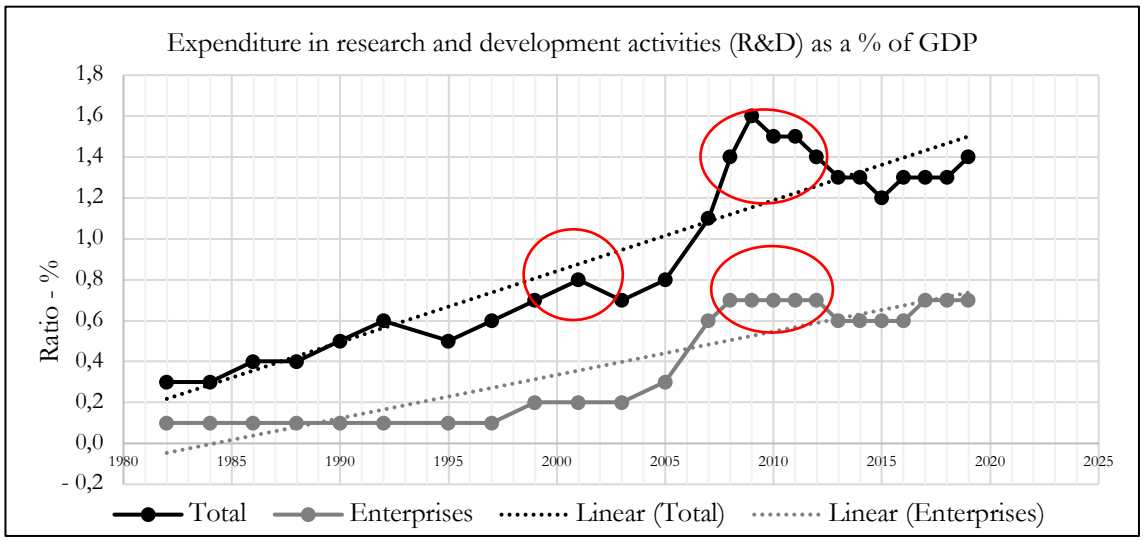

Figure 3 - Expenditure in research and development activities (R&D) as a % of GDP[5]

To summarize, the irregular growth of the GDP is consistent with a specific pattern of behaviour both in investment in R&D and in the behaviour of the country's exports. Through the analysis of "*Expenditure in R&D as a % of GDP*", we can verify that R&D intensity peaks have occurred during and after two major world crises: the 2000 Dot-com bubble crash and the 2008 Financial crisis. Moreover, following the great crisis of 2008, exports grew to reach unprecedented trade account percentage, making it positive for the first time in the last decades.

Based on the rationale and conclusions above we hypothesize:

> *H3: Innovation is triggered by economic downturns and uncertainty periods, being crucial to companies' ability to survive under these conditions.*

[5] Data source: PORDATA (2019).

3. Methodological Considerations

It has been shown that innovation has become a key factor in economic growth and sustainability agendas as stated by Edwards-Schachter (2018), and many after. Furthermore, the critical importance of innovation in uncertain markets has been demonstrated (Lynn & Akgün, 1998). Following a comprehensive literature review, the approach taken in this study included an initial phase of formulation of hypotheses based on what had been learned from the literature *(Figure 4)*. Then, the work progressed to the data collection phase, where we were able to collect both qualitative and quantitative data on the respondents' perception of uncertainty, strategy and competitive performance. Lastly, the findings were discussed, and the conclusions were presented.

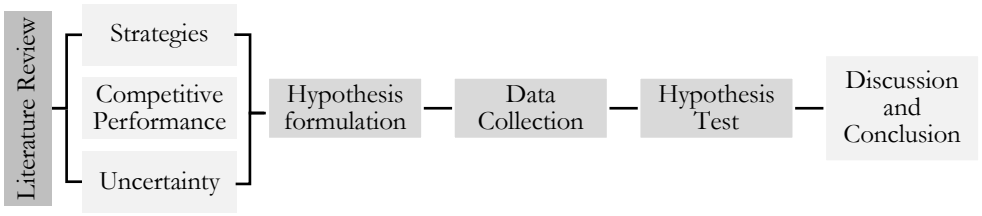

Figure 4 – Study's research model

3.1. Main Hypothesis to be Tested

Literature suggests that failure on implementing the proper strategy leads to poor performance (Hilman & Kaliappen, 2015). Additionally, literature tells us that decisions regarding innovations are said to be some of the most strategically important to firms (Karlsson & Tavassoli, 2016). As such, we believe that the results of the present study may bring important insights for the companies that took part in it, since the performance of those companies when facing difficulties in recent years will be analysed. Moreover, an in-depth analysis of the companies' strategies, as well as their competitive performance will be undertaken.

Three fundamental hypotheses are to be tested. The first hypothesis is related to the strategic approach adopted by the company, in alignment with some studies we have addressed and their conclusions. The second hypothesis focuses on the company's ability to maintain a strong competitive position, as well as to achieve a satisfactory performance. The third and last hypothesis is related to the ability of the companies to both adapt and change in contexts

of uncertainty and to leverage innovation to survive hardship. The three premises we intend to test in this work are the following:

> *H1: Companies' strategic dimensions are intrinsically related to each other, as well as the firms' performance and ability to undertake innovation and change processes.*
>
> > *H1a: The expenditure in Innovation and R&D is positively correlated with the company's competitive performance.*
>
> *H2: To achieve a positive impact in companies' competitive performance, further than having a defined innovation strategy it is important to actively invest in innovation.*
>
> *H3: Innovation is triggered by economic downturns and uncertainty periods, being crucial to companies' ability to survive under these conditions.*

We believe that, by testing these hypotheses, it will be possible to gather relevant information on the role of business and innovation strategies on companies' competitive performance in uncertain times. To the best of our knowledge, not many studies address the relationship and correlation of different dimensions of strategy with company performance and competitiveness and no study was found taking also into account the uncertainty dimension. This indeed has encouraged us to work along this line, looking for insights that may be of value for Portuguese companies.

3.2. Research Design

The core of the present work is the analysis of data collected through an independent study aimed at understanding the relationship between companies' strategies and performance, as well as their innovative behaviour.

The instrument used to gather information from the companies' responses with a structure of a questionnaire was *Google Forms (Annex B)*. To ensure the respondents were able to clearly understand any question, several forms of communication were offered, complementing a brief description of the study's scope and purpose, as well as a brief introduction of all sections.

Since the purpose was to inquire only one person per organization, the first question in the form was to collect the institution's name, with the sole intention of ensuring that there was no company duplicate. Moreover, it was stipulated that in the case of any duplicate answer, the answer of the respondent with the higher rank within the company would be the sample

used. For such selection, we have also presented a question that would allow the respondents to select the best representation of their position within the company among the following: *Executive/ Board Member; Senior Management; Middle Management; Collaborator*.

In the elaboration of the questionnaire presented to the inquired companies[6] several models were used as inspiration, as it will be further detailed below. The form was organised into three main groups, comprising a total of nine sections:

1. *Company's and respondent's information*: as mentioned above, one of the first concerns when the questionnaire was designed was to ensure that the sample was not biased by containing more than one response per company. To ensure that there were no duplicates of inquired companies, each respondent was asked to indicate the company they represented, as well as their position in the company. Additionally, and to have a more insightful perspective of the sample at hand, the respondent was asked to state whether the company is *Public* or *Private*, as well as whether it is a *Small and Medium Enterprise (SME)* or not.

2. *Company's information regarding uncertainty*: the concept of uncertainty certainly varies from industry to industry, as well as from company to company. Having in mind that it would be extremely important to understand the performance pattern of companies, in the second section companies were asked to classify the company's performance from the year 2005 to 2020 in one of the following options: *Bad, Below average, Average, Above Average* and *Good*. However, and because it is understood that companies are only legally bound to keep financial records for the last ten years, another option (*N/A*) was also added for those who no longer had this type of information or for the respondents that did not have access to it. In addition to this question and consider it a variable that may greatly affect the company's performance, companies were also asked to state if they had received any governmental support over the past 15 years and how did they perceive the importance of these funds for the company's performance.

3. *Company's Strategic Dimensions:* in the elaboration of this section, a framework designed by Venkatraman (1989) was used. It is a complex approach that seeks to measure different strategic dimensions developed by the author (Venkatraman, 1989). The study breaks down each of the strategic dimensions into a varied number of statements, which

[6] For the full questionnaire please refer to *Annex B*.

respondents had to rate from 1 ("strongly disagree") to 7 ("strongly agree"), according to the policies and strategies adopted by the company (*Table 1*).

Venkatraman's Strategic Orientation of Business Enterprises (STROBE) (1989)		
	Characteristics	**Statements**
Aggressiveness Dimension	Refers to the position regarding resources allocation when it comes to assess how rapidly its market position is improved.	4
Analysis Dimension	Assess the firm's ability and posture when it comes to overcome problems. Additionally, it refers to the company's consistency in allocating resources given the firm's objectives.	6
Defensiveness Dimension	Assesses a firm's ability in reducing costs and being efficient.	4
Futurity Dimension	Assesses the firm's orientation and consideration of longer-term focus.	5
Proactiveness Dimension	The notion is associated with the firm's search for opportunities, whether on a market level or on a trend level.	5
Riskiness Dimension	Refers to the proneness of the company to engage in risky decisions on either resource allocation or products and markets decisions.	5

Table 1 - Venkatraman's Strategic Orientation of Business Enterprises (STROBE)[7]

4. *Company's Performance:* regarding business competitive performance various publications and empirical studies were used as foundation and reference for the questionnaire, and the respondents were asked to classify a number of performance indicators (*Table 2*).

Variable	Description	Similar Approaches
Export Share	as a % of 2019 sales	(Blandinières et al., 2017; P. Buckley et al., 1988; Cetindamar & Kilitcioglu, 2013; Doyle & Wong, 1998; World Bank, 2021)
Debt	as a % of 2019 sales	(Blandinières et al., 2017)
Profit Margin	as a %, in 2019	(Ambastha & Momaya, 2003; Blandinières et al., 2017; P. Buckley et al., 1988; Cetindamar & Kilitcioglu, 2013; Srinivasan et al., 2020)
Return on Capital	as a %, in 2019	(Blandinières et al., 2017)
Growth Rate	as a %, in 2019	(Blandinières et al., 2017; P. Buckley et al., 1988; Cetindamar & Kilitcioglu, 2013; Doyle & Wong, 1998; Jennings, Rajaratnam, & Lawrence, 2003; Kotha & Vadlamani, 1995; World Bank, 2021)
Productivity	as a %, in 2019	(Ambastha & Momaya, 2003; Blandinières et al., 2017)
Market Share	as a %, in 2019	(Ambastha & Momaya, 2003; Blandinières et al., 2017; P. Buckley et al., 1988; Kotha & Vadlamani, 1995; Nakayama, 2018)
R&D Expenditure	as a % of 2019 sales	(Balsam et al., 2011; Chong et al., 2010; Cooper, 1984; Hambrick, 1983; Thietart & Vivas, 1984)
Investment in Innovation	as a % of 2019 sales	(Kotha & Vadlamani, 1995; Thietart & Vivas, 1984)

Table 2 – Competitive Performance Indicators Construction Sources

[7] Adapted from Venkatraman (1989).

Scales and Measurements

As mentioned above, in the development of the questionnaire, following the analysis of the structure of other questionnaires, we have resorted to some empirical studies. We have identified two main types of scales used for this purpose: one from 1 to 5 (1 – "strongly disagree"; 5 – "strongly agree") (Nakayama, 2018), and 1 to 7 (1 – "strongly disagree"; 7 – "strongly agree")(Blumentritt & Danis, 2006; Morrison & Roth, 1992).

We understand that the design of the survey is extensive and quite thorough, which makes it impossible to answer for many companies that do not have this type of analysis or information available internally. As such, the number of responses we expected was lower than what we believe we would have had in case we did not seek such detailed analysis. Due to the lower anticipated number of answers we tried to look for as much detail as possible within the companies, we have therefore chosen to scale our answers from 1 to 7 (1 – "strongly disagree"; 7 – "strongly agree").

3.3. Sample and Data Collection

The questionnaire requires a certain level of complex information, since the information asked is not available in detail internally in all companies. We, therefore, expected the sample to be polarized towards more competitive companies, with greater capacity for innovation than the average of Portuguese companies. To reach out to companies and build the above-referred sample, three approaches were taken: via personal relationships with the respondents, via LinkedIn and via industry associations[8] and institutional partners[9].

Out of the 69 respondents, one company was duplicated. As previously mentioned, through the elimination criteria based on the respondent's position in the company, the answer whose person is *Executive/ Board Member* was considered. As such, the sample size considered will be 68 companies (n=68).

The information provided by the first section of the questionnaire, allowed us to characterize our sample as shown in *Table 3*. Previous work has suggested that the study of and the attempt to strategy measurement could be of great value if conducted through a sample

[8] AIMMAP – *Associação dos Industriais Metalúrgicos, Metalomecânicos e Afins de Portugal*; APICCAPS – *Associação Portuguesa dos Industriais de Calçado, Componentes, Artigos de Pele e seus Sucedâneos*; CITEVE – *Centro Tecnológico, Têxtil e Vestuário.*

[9] POOLNET – *Polo de Competitividade e Tecnologia Engineering e Tooling*; INESC TEC - TEC 4 Industry.

including companies of a variety of economic activities (Snow & Hambrick, 1980). However, the sample has a strong presence of *Industry (Table E1, Annex E)*, due to the nature of the institutions and business associations referred to before.

Sample's Economic Activity[10] Breakdown		
	Frequency	**Percentage**
Agriculture, forestry, and fishing	7	10%
Industry	35	51%
Energy, water supply and sewerage	4	6%
Construction	1	1%
Wholesale and retail trade, repair of motor vehicles and motorcycles, accommodation, and food service activities	1	1%
Transportation and storage, information, and communication	6	9%
Financial, insurance and real estate activities	1	1%
Other service activities	13	19%

Table 3 - Sample's Economic Activities Breakdown

Whenever possible, we have looked for the collection of data by respondents who were either Executive/Board Members or someone belonging to the management team (*Table 4*). This would ensure that the respondent would have better knowledge of the company's strategic decisions and objectives, as well as the quantitative information requested.

Respondent's Rank Breakdown (n=68)		
	Frequency	%
Executive/ Board Member	42	62%
Senior Management	15	22%
Middle Management	9	13%
Collaborator	2	3%

Table 4 - Respondent's Position in the Company Breakdown

The analysis of *Table 5* can be done in two separate parts: one considers the type of company whether it is *Public* or *Private*. With this analysis, we seek to find out if there is any relationship between the type of aids that a public or private company has access to and how this is reflected in its strategic dimensions, and how the performance of both types of companies has fluctuated over the years, as well as their performance indicators results.

Companies' type of ownership breakdown			**Companies' Size breakdown**		
	Frequency	%		Frequency	%
Public	8	12%	SME	38	56%
Private	60	88%	Non – SME	30	44%

Table 5 - Sample characteristics

[10] According to the NACE Rev.2 – Statistical Classification of Economic Activities (EUROSTAT, 2008).

The second part of the analysis concerns the size of the company. Here we aim to look for any relationship between the size of the company and the percentage of sales allocated to Investment in Innovation and R&D Expenditure. Additionally, we seek to identify some type of pattern of strategic decisions that can be associated with the size of the companies.

3.4. Methodology and Relevant Considerations

After exporting the survey results to *Microsoft Excel*, an initial processing of the data was carried out, in order to enable a more objective and timely analysis. Three initial steps were undertaken, which are worth mentioning:

1. With regard to the data collected on the 9 performance indicators, two groups were formed based on the scales used in the respective questions (*Table B3, Annex B*). The first group of indicators includes: *Export Share*[11], *Debt*[11], *Profit Margin*[12], *Return on Capital*[12], *Growth Rate*[12], *Productivity*[12] and *Market Share*[12]. The second group comprises *R&D Expenditure*[11] and *Investment in Innovation*[11]. The rationale for this split lies in the scale used for data collection (*Table 6).* Next, we moved on to the conversion of the described intervals into a numeric scale in order to facilitate data analysis, this being kept in the correlation and clustering analyses.

Group 1 - Scales and Conversions[13]		Group 2 - Scales and Conversions	
< 0%	0	0-5%	1
0-10%	1	6-10%	2
11-20%	2	11-20%	3
21-30%	3	21-50%	4
31-40%	4	>50%	5
41-50%	5		
51-60%	6		
61-70%	7		
71-80%	8		
81-90%	9		
91-100%	10		
>100%	11		

Table 6 – Performance Indicators Conversion Scale

2. Regarding the strategic dimensions, 5 of the 29 strategy questions were flagged by the model's author as being of reverse analysis (Venkatraman, 1989). As such, we proceeded

[11] As a percentage of the year 2019 Sales.

[12] As a percentage for the year 2019.

[13] For the *Export Share* and *Debt* Indicators, neither the option "<0%" nor ">100%" was available, providing its meaning.

to reverse the answers given by the respondents, in order to facilitate data analysis, correlations and cluster identification. This has been done in the following way: answers whose number had been 1 (minimum scale value) were converted to number 7 (maximum scale value). In turn, the answers whose assigned number had been a 7 were converted to a value of 1. All values in between were mirrored.

3. Since we consider it to be an extremely insightful and very useful way for presenting and showing our conclusions, we decided to resort to a cluster analysis. It should be noted that clustering is a widely used model in the analysis of collected data for the classification of strategies (Anwar & Hasnu, 2016) which has been used in numerous studies (Blackmore & Nesbitt, 2013; DeSarbo et al., 2005; Gimenez, 1999). Moreover, many studies were conducted resorting to a cluster-based analysis, since it is a useful approach to take on when there are no specific linkages known (Hoen, 2002). Even though we acknowledge it is not an imperative step, we normalized the results obtained in the study, since it is a well-known approach (Dudek & Walesiak, 2020), and it has been noted for reducing variations (Hicks & Irizarry, 2015) in cluster analysis.

The first step in the process of normalizing the sample is to calculate the mean and standard deviation for each strategic dimension indicator (*Table 9*). Since it is common knowledge that there is no *a priori* correct number of clusters, and also that generally the greater the number of clusters the smaller the sum of distances from each cluster element to the centre of each cluster, several clustering scenarios were made resorting to *Microsoft Excel*'s "Solver" tool. We have selected random cluster centres for each of the three clustering scenarios. Then we added the distance of each element to its cluster centre and used the "Solver" function to minimize the *Residual Sum of Squares (RSS)* or *Sum of Squared Estimate of Errors (SSE)*, the results being shown in *Table 7*.

	5 Clusters	**4 Clusters**	**3 Clusters**
Aggressiveness Dimension	100,78	**117,09**	126,59
Analysis Dimension	188,88	**269,47**	243,08
Defensiveness Dimension	105,01	**116,85**	130,87
Futurity Dimension	155,19	**178,10**	202,37
Proactiveness Dimension	171,55	**195,78**	218,89
Riskiness Dimension	204,35	**238,14**	256,54

Table 7 – SSE Values for Different Clustering Scenarios

We consider that the best choice for the number of clusters as to support our analysis is made by comparing all the *SSE* values in different cluster scenarios with the information shown in *Table 8*, which allows us to observe the dispersion of the clusters.

	5 Clusters					**4 Clusters**				**3 Clusters**		
	1	2	3	4	5	**1**	**2**	**3**	**4**	1	2	3
Aggressiveness Dimension	14	8	9	9	28	**19**	**26**	**8**	**15**	32	17	19
Analysis Dimension	9	20	17	19	3	**30**	**4**	**9**	**25**	19	23	26
Defensiveness Dimension	6	20	26	7	9	**18**	**4**	**23**	**23**	33	24	11
Futurity Dimension	11	11	13	23	10	**26**	**16**	**9**	**17**	30	24	14
Proactiveness Dimension	15	10	14	17	12	**15**	**6**	**26**	**21**	11	30	27
Riskiness Dimension	14	10	9	24	11	**12**	**17**	**17**	**22**	29	15	24

Table 8 – Cluster Element Count for Different Clustering Scenarios

For each of the strategic dimensions 5, 4 and 3-cluster based analyses have been conducted. As the numbers in *Table 8* suggest, a 5-Cluster analysis ends up with a non-significant number of samples in many clusters. On the other hand, and taking into account the small number of participating companies, the 3-Cluster analysis turns out to be very non-discriminatory, probably grouping too different companies. Such analysis ends up omitting the small strategic and performance variations that we consider to be crucial for potential improvements and thorough interpretation of results. Given that the ultimate goal of this study is to actively contribute to companies' performance and to provide valuable and constructive feedback to them, we believe that the most adequate choice is a 4-Cluster analysis.

Relevant Functions Description

A very detailed and robust analysis was conducted in order to be able to answer our research questions as well as the formulated hypotheses. The analysis of the 68 responses collected was prepared in *Microsoft Excel*, and the main functions used for our cluster and correlation analysis are described in *Table 9*, as well as their specific purpose in our study.

Main Formulae	**Function**
=STANDARDIZE	This function returns a normalized value of a distribution.
=SUMXMY2	This function gives us sum of squares of differences of corresponding values in two tables - the companies' strategic dimensions' values and the cluster centres.
=MIN	This function returns the smallest value in a range – the smallest sum of squares, to identify the belonging cluster.
=MATCH	This function looks for a specific value in a specific range. Here returned the cluster number associated with the smallest sum of squares value.
Solver - Evolutionary Engine	"For problems that are non-smooth", by minimizing the sum of all points' "SUMXMY2" value.

Table 9 – Support Functions Used in Cluster and Correlation Analysis

4. Data Analysis and Results

Our proposal is that the analysis of the data collected through the questionnaire and the respective results should be structured into eight groups: one for each of the six Venkatraman's (1989) strategic dimensions, one for the analysis of the overall strategic dimensions and the last one for the company's uncertainty environment.

In parallel and in order to break down the behaviour of the participating companies in further detail, survey respondents were grouped into clusters, this being determined not only by the responses to each of the factors in each strategic dimension, but also within each aggregated dimension. As shown in *Chapter 3.4.*, many authors have resorted to this method in their studies (Blackmore & Nesbitt, 2013; DeSarbo et al., 2005; Gimenez, 1999) and we also know that it is a widely accepted form of strategic analysis (Anwar & Hasnu, 2016). Following the rationale elaborated in *Chapter 3*, a 4-Cluster analysis was carried out for each strategic dimension. For a more insightful analysis and a better comparative perspective, *Figures 5* and *6* show the average value of all dimensions and indicators analysed.

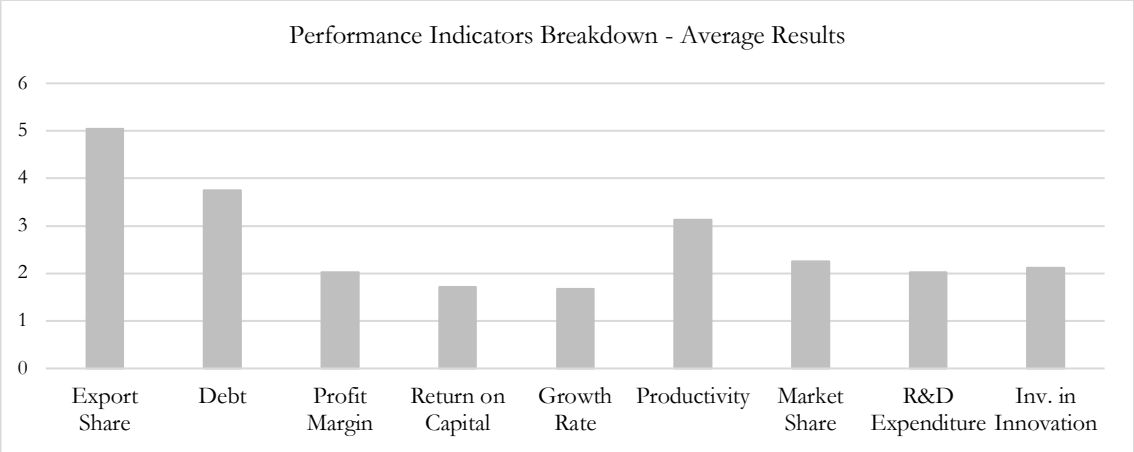

Figure 5 - Respondents Average Answer per Performance Indicator - Breakdown[14]

As elaborated in *Chapter 3.2.* and *Table 2,* the rationale used in the choice of the indicators used in the questionnaire was built following a detailed reading of similar studies. As such,

[14] Please consider the conversion scales as follows: *Export Share, Debt, Profit Margin, Return on Capital, Growth Rate, Productivity* and *Market Share*: 0 - <0%; 1 – 0-10%; 2 – 11-20%; 3 – 21-30%; 4 – 31-40%; 5 – 41-50%; 6 – 51-60%; 7 – 61-70%; 8 – 71-80%; 9 – 81-90%; 10 – 91-100%; 11 - >100%.

R&D Expenditure and Investment in Innovation: 1 – 0-5%; 2 – 6-10%; 3 – 11-20%; 4 – 21-50%; 5 - >50%.

- as a % of sales for the year 2019: *Export Share, Debt, R&D Expenditure and Investment in Innovation.*

- as a % for the year 2019: *Profit Margin, Return on Capital, Growth Rate, Productivity* and *Market Share.*

and to illustrate *Figure's 5* interpretation, the 68 companies surveyed have an average *Export Share* score of 5, meaning that, on average, the responses lie within the 41-50% *(Table 7)* threshold of 2019 sales being exported. This appears to be in line with previous studies that show a positive link between exports, innovation, and competitive capacity (Love & Roper, 2013; M. E. Porter, 1990; Sánchez et al., 2011; Tavassoli, 2018). Similar analyses may be undertaken for the other indicators.

In *Figure 6*, the scores presented for each questionnaire statement *(Table 10)*, grouped according to the respective strategic dimension, express the average level of agreement of the 68 respondents with the referred questionnaire statements.

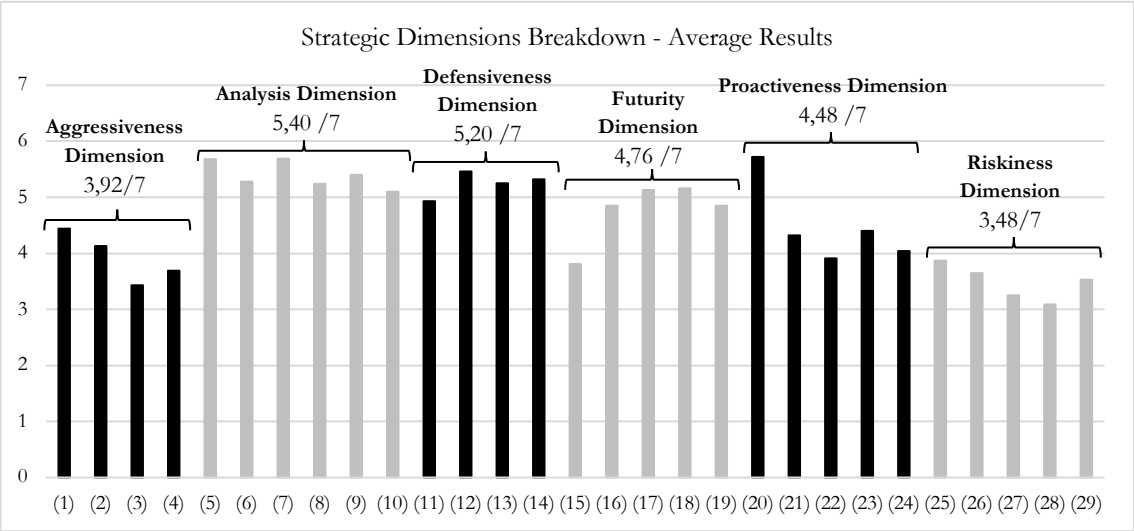

Figure 6 - Respondents Average Answer per Strategic Dimension – Breakdown

The average of each of the strategic dimensions gives us an indicative trend of the companies' positioning or attitude, as more analytical (5,40/7) and defensive (5,20/7) than aggressive (3,92/7) or risk-prone (3,48/7). Moreover, proactive companies appear to be "constantly seeking new opportunities related to present operations" *((20), Table 10)*, as they averaged a 5,72/7 score. However, as for the remaining statements, the companies appear to be quite proactive neutral *((21), (22), (23), (24), Table 10)*.

The information presented in *Figure 6* enables us to interpret the average results collected for each strategic dimension, as well as the average results for each of the individual statements of the questionnaire.

Venkatraman's (1989) Strategic Dimensions Statements
(1) We often sacrifice profitability to gain market share.
(2) We often cut prices to increase market share.
(3) We often set prices below competition.
(4) We often seek market share position at the expense of cash flow and profitability.
(5) We emphasize effective coordination among different functional areas.
(6) Our information systems provide support for decision-making.
(7) When confronted with a major decision, we usually try to develop through analysis.
(8) We use several planning techniques.
(9) We use the outputs of management information and control systems.
(10) We commonly use manpower planning and performance appraisal of senior managers.
(11) We occasionally conduct significant modifications to manufacturing technology.
(12) We often use cost control systems for monitoring performance.
(13) We often use production management techniques.
(14) We often emphasize product quality through the use of quality circles.
(15) Our criteria for resource allocation generally reflect short-term considerations
(16) We emphasize basic research to provide us with future competitive edge.
(17) Forecasting key indicators of operations is common.
(18) Formal tracking of significant general trends is common.
(19) We often conduct "what if" analyses of critical issues.
(20) We are constantly seeking new opportunities related to present operations.
(21) We are usually the first ones to introduce new brands or products on the market.
(22) We are constantly on the lookout for businesses that can be acquired.
(23) Competitors generally pre-empt us by expanding capacity ahead of them.
(24) Operations in later stages of the life cycle are strategically eliminated.
(25) Our operations can be characterized as high-risk.
(26) We seem to adopt a rather conservative view when making major decisions.
(27) New projects are approved on a "stage by stage" basis rather than with blanket approval.
(28) We have a tendency to support projects where the expected returns are certain.
(29) Our operations have generally followed the "tried and true" paths.

Table 10 - Strategic Dimensions Statements

Aggressiveness Dimension

The first strategic trait we propose to analyse is the *Aggressiveness Dimension.* This dimension refers to the company's position when allocating resources for the purpose of having a more competitive market position (Venkatraman, 1989). A predominance of this trait may be more common in companies that seek to be first-movers (Morgan & Strong, 1998).

This analysis will rely on the clustering that has been presented in *Chapter 3*. *Cluster 1* is composed of 19 companies, *Cluster 2* of 26 companies, *Cluster 3* comprises 8 companies and *Cluster 4* comprises 15 companies *(Table 8)*. Based on the overall company distribution within clusters, we believe that it is wise to consider *Cluster 3* as a group of outliers, since the small number of companies will weaken any conclusions.

There are a few key features in each cluster that deserve to be highlighted *(Figure 7)*. *Clusters 1, 2* and *4* all scored an *Investment in Innovation* (I) above 2, which means that on average the companies in those clusters invested more than 6-10% of their 2019 sales in innovation. This

is very encouraging, considering that innovation is a way to avail market opportunities (Bessant & Tidd, 2013) and firms' investment is connected to their ability to enhance their performance (Du, Luan, & Lu, 2020). Additionally, companies in *Cluster 1* appear to show higher *Return on Capital (ROC)* (D) and *Growth Rate* (F) than companies in the other clusters. This cluster presents a behaviour consistent with many studies that point out the value of innovation for a company's performance (M. E. Porter, 1990; Sánchez et al., 2011). Furthermore, *Cluster 4* companies' *Export* Share (A) is considerably smaller when compared to that of the total sample, which might be considered a limitation in company performance (Piercy et al., 1998). Lower than average *Growth Rate* (E) and *Productivity* (F), show alignment with several studies on the three indicators correlations (Cassiman et al., 2010; Lu & Beamish, 2006).

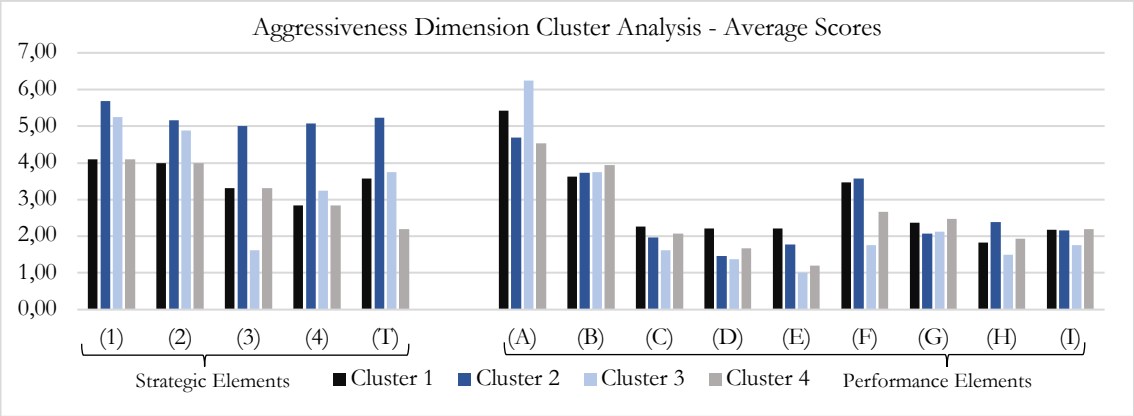

Figure 7 - Aggressiveness Dimension Clustering [15]

We believe that an analysis of the correlation between the factors of this strategic dimension and the performance indicators used in this study is crucial for gaining insights supporting constructive feedback for companies. Such analysis is supported by the correlation matrix in *Annex C (Table C1)*. By looking at the matrix, we would point out that the strong negative correlation between "sacrificing profitability to gain market share" (1) and *Market Share* (G) is something to be expected. Also, the significant positive correlation between "setting prices below competition" (3) and higher *Growth Rate* (E), *Productivity* (F) and *R&D Expenditure* (H)

[15] (1) We often sacrifice profitability to gain market share; (2) We often cut prices to increase market share; (3) We often set prices below competition; (4) We often seek market share position at the expense of cash flow and profitability; (T) Dimension Average Score; (A) Export Share; (B) Debt; (C) Profit Margin; (D) Return on Capital; (E) Growth Rate; (F) Productivity; (G) Market Share; (H) R&D Expenditure; (I) Investment in Innovation.

deserves further discussion. A positive correlation between *R&D Expenditure* and the decision of setting prices below competition can be understood, having in mind that this indicator has been referred to as a possible indicator to assess companies' strategic position (Balsam et al., 2011; Cooper, 1984). Furthermore, *R&D Expenditure* (H) has a positive influence on the firms' returns (Chong et al., 2010).

Analysis Dimension

This dimension is taken here differently than the strategic typology *Analyser* from Miles and Snow's work (1978). In the present study, the purpose is to comprehend the firm's critical thinking ability bound to the decision-making process (Morgan & Strong, 1998) and to evaluate the firm's internal ability to allocate its resources providing the established goals (Venkatraman, 1989).

It should be noted that *Cluster 1* is composed of 30 companies, *Cluster 2* of 4 companies, *Cluster 3* comprises 9 companies, and *Cluster 4* comprises 25 companies *(Table 8)*. We have considered *Cluster 2 and 3* as outliers, since they account for a very low number of companies. Both *Cluster 1 and 4 (Figure 8)* have a similar average score for the analysis dimension.

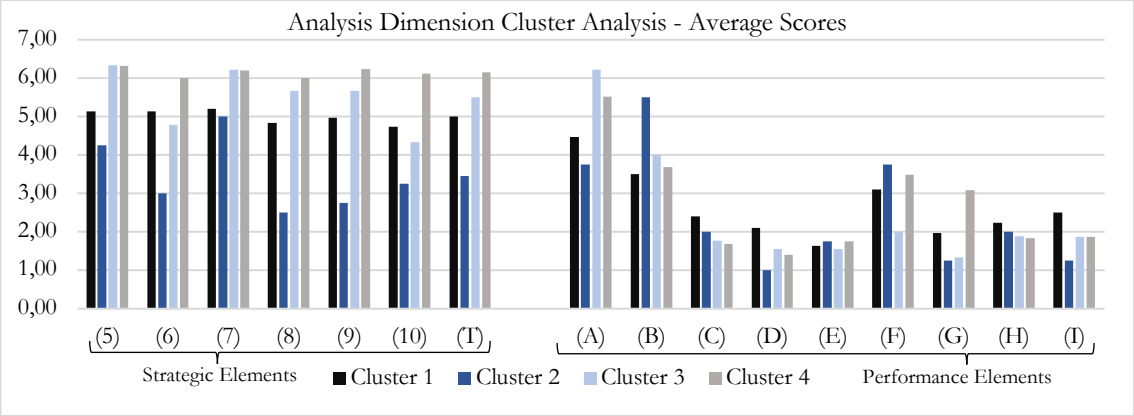

Figure 8 - Analysis Dimension Clustering [16]

However, *Cluster 1* companies have a *ROC* (D) value that is nearly twice the average of the 68 respondents, whilst only reaching the respondents' average in *Growth Rate* (G). Moreover,

[16] (5) We emphasize effective coordination among different functional areas; (6) Our information systems provide support for decision-making; (7) When confronted with a major decision, we usually try to develop through analysis; (8) We use several planning techniques; (9) We use the outputs of management information and control systems; (10) We commonly use manpower planning and performance appraisal of senior managers; (I) Dimension Average Score; (A) Export Share; (B) Debt; (C) Profit Margin; (D) Return on Capital; (E) Growth Rate; (F) Productivity; (G) Market Share; (H) R&D Expenditure; (I) Investment in Innovation.

Cluster 1 companies perform well above average in *Investment in Innovation* (I) and *Cluster 4* distinguishes itself for the above-average *Market Share* (G) compared with that of the full sample.

As one would expect, mainly due to the scope of analysis of this specific dimension, there are many strong positive and negative associations between the strategic choices and the performance indicators analysed, this being clearly displayed in *Table C2 (Annex C)*. Our study results suggest that "emphasizing effective coordination among different functional areas" (5) positively affects the firm's *Export Share* (A), which is aligned with several studies that have identified a positive correlation between exports and innovation (Love & Roper, 2013; Tavassoli, 2018). We have also found that "resorting to information systems as a support for decision-making" (6), "using multiple planning techniques" (8) and using the outputs of management information and control systems" (9) appears to positively impact *Market Share* (G), what seems to be understandable. Lastly, we have discovered that "using the outputs of management information and control systems" (9) may compromise *Profit Margin* (C) and *R&D Expenditure* (H). A similar behaviour appears to occur when a firm "uses manpower planning and performance appraisal of senior managers" (10), since our results found that it compromises its *Debt* (B), but favours *Export Share* (A).

These non-obvious correlations would certainly need further data analysis, eventually going back to the individual company responses and even questioning the respondents on these specific items.

Defensiveness Dimension

This dimension is based on Miles and Snow's typology (Miles et al., 1978). It covers the necessary measures to ensure the firm's market position (Morgan & Strong, 1998), namely cost-efficient methodologies (Venkatraman, 1989).

Cluster 1 is composed of 18 companies, *Cluster 2* of 4 companies, *Cluster 3* comprises 23 companies, and *Cluster 4* comprises 23 companies *(Table 8)*. Using the same rationale from the previous cases, we trust that it is a justified assumption to designate *Cluster 2* as an outlier.

In a first analysis, we would like to highlight *Cluster 3*'s *(Figure 9)* companies' scores as being the highest for all the strategic elements, yet they show well below average performance in *Export Share* (A) and *Profit Margin* (C). This finding is consistent with literature in terms of correlation between some of these indicators (Lu & Beamish, 2006). One could also question a possible relationship between a more defensive strategy and lower company profitability

and exports, as well as with less competitive companies since the high *Export Share* (A) of a company may be an indication that it is highly competitive and innovative (Love & Roper, 2013; Piercy et al., 1998; Tavassoli, 2018).

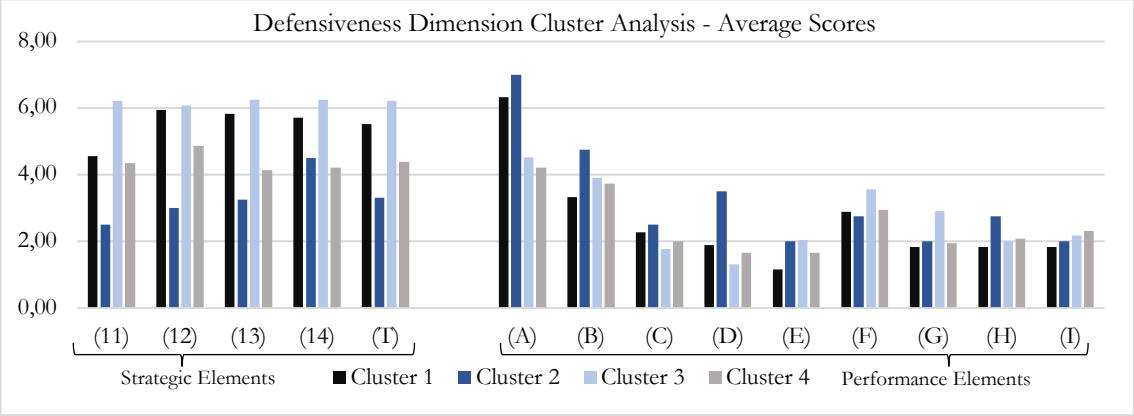

Figure 9 - Defensiveness Dimension Clustering [17]

Table C3 (Annex C) gives evidence of a much-expected negative correlation between most of the defensive strategic approaches and the performance indicators. The most significant negative correlation between "significant alterations to manufacturing technology" (11) and *ROC* (D) is something to be expected. Yet, resorting to "production management techniques" (13) appears to limit the *R&D Expenditure* (H). Lastly, "using control systems for monitoring performance" (12) might exponentiate the *Market Share* (G), since performance awareness is a key for strategic analysis (Guérard et al., 2013).

Futurity Dimension

Futurity is about the firm's contemplation of future goals and aspirations in their strategic approach (Venkatraman, 1989) and planning (Morgan & Strong, 1998). One way of doing so is through constantly being aware of the company's environment (Venkatraman, 1989).

Cluster 1 is composed of 26 companies, *Cluster 2* of 16 companies, *Cluster 3* comprises 9 companies, and *Cluster 4* comprises 17 companies *(Table 8)*. Based on this distribution within clusters, we designated *Cluster 3* as an outlier.

[17] (11) We occasionally conduct significant modifications to manufacturing technology; (12) We often use cost control systems for monitoring performance; (13) We often use production management techniques; (14) We often emphasize product quality through the use of quality circles; (T) Dimension Average Score; (A) Export Share; (B) Debt; (C) Profit Margin; (D) Return on Capital; (E) Growth Rate; (F) Productivity; (G) Market Share; (H) R&D Expenditure; (I) Investment in Innovation.

On a first analysis of *Figure 10, Cluster 2* stands out in every strategic element analysis, being the one with the highest average score. Moreover, companies in *Cluster 2* have above-average values for *Export Share* (A) and *Debt* (B). In an opposite end of the scale, *Cluster 4* shows a considerably lower average score, this being reflected in below-average values for *Export Share* (A), *Debt* (B), *Productivity* (F), *Market Share* (G), *R&D Expenditure* (H), and *Investment in Innovation* (I). This result appears to be consistent with the correlations identified in previous studies (Hirsch & Bijaoui, 1985; Lu & Beamish, 2006; Wernerfelt, 1986). Similarly to what was concluded in the analysis of the previous strategic dimension, companies that do not consider their future goals in strategic decisions appear to perform worst, which is consistent with those that are less innovative, competitive, and productive, as well as less capable of growth and exporting (Cassiman et al., 2010; Love & Roper, 2013; Lu & Beamish, 2006; Piercy et al., 1998; Tavassoli, 2018).

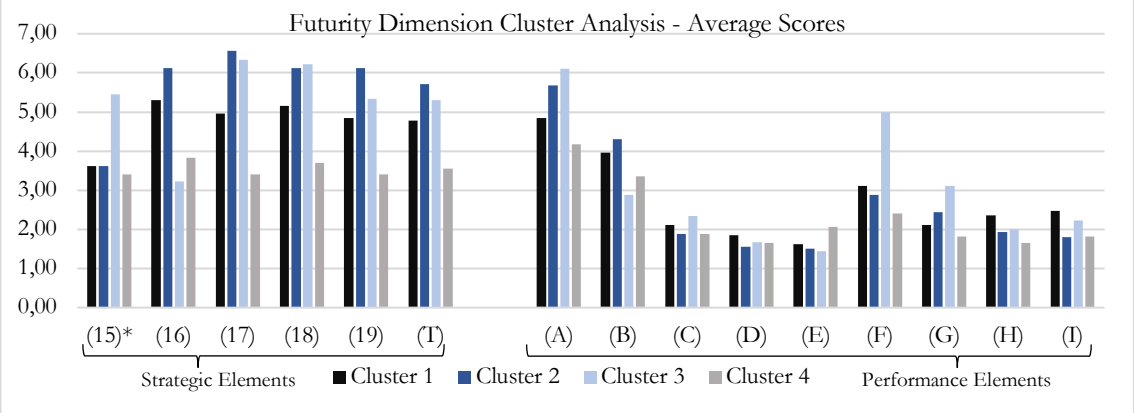

Figure 10 - Futurity Dimension Clustering [18]

The strategic statement (15) requires a reversed analysis, meaning that when respondents answer a high (low) value, it means that should be interpreted as a low (high) score for the overall dimension. Providing that this element's converted average is around 5, it means that the respondents tend to disagree with the sentence "Our criteria for resource allocation generally reflect short-term considerations". A more general analysis of the correlations

[18] (15) Our criteria for resource allocation generally reflect short-term considerations*; (16) We emphasize basic research to provide us with future competitive edge; (17) Forecasting key indicators of operations is common; (18) Formal tracking of significant general trends is common; (19) We often conduct "what if" analyses of critical issues; (I) Dimension Average Score; (A) Export Share; (B) Debt; (C) Profit Margin; (D) Return on Capital; (E) Growth Rate; (F) Productivity; (G) Market Share; (H) R&D Expenditure; (I) Investment in Innovation; (*) Reversed analysis.

(*Table C4, Annex C)* of this strategic dimension with the different performance indicators allows us to infer that a company with a lower risk aversion may be more competitive.

Proactiveness Dimension

Proactiveness refers to the constant search for ways to adapt to market changes (Venkatraman, 1989), partly due to the ability to innovate (Morgan & Strong, 1998), and is related to R&D potential (Gatignon & Xuereb, 1997; Morgan & Strong, 1998).

Cluster 1 is composed of 15 companies, *Cluster 2* of 6 companies, *Cluster 3* comprises 26 companies, and *Cluster 4* comprises 21 companies *(Table 8)*. Based on the overall company distribution within clusters, we believe that is wise to consider *Cluster 2* an outlier.

Cluster 4 stands out (*Figure 11*) for its high overall dimension average score, which in turn is aligned with a higher *Export Share* (A), *Return on Capital* (D), *Productivity* (F) and *Market Share* (G) than those presented by the remaining clusters.

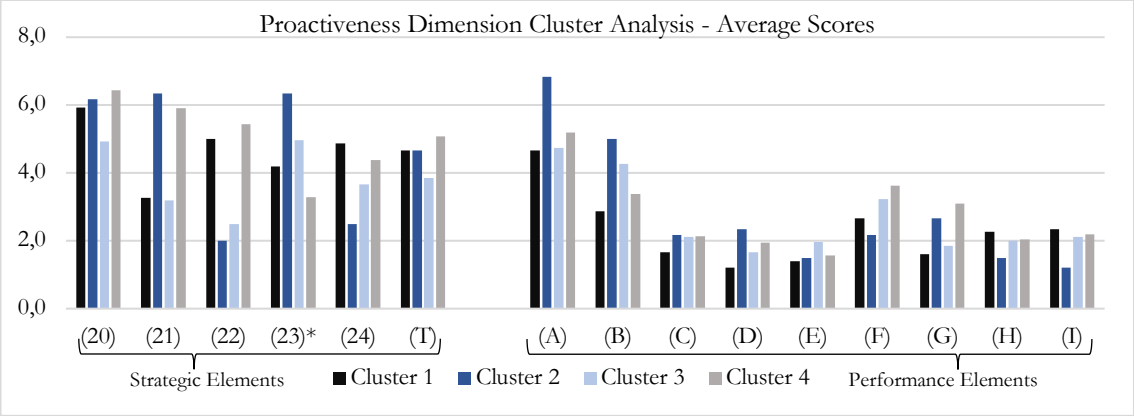

Figure 11 - Proactiveness Dimension Clustering [19]

Cluster 3 has the lowest overall dimension average score, but a considerably higher than average *Debt* (B) as a percentage of sales than that of the 68 companies, whilst having a lower *Export Share* (A) and *Market Share* (G). Lastly, *Cluster 4* has a distinguished lower than average

[19] (20) We are constantly seeking new opportunities related to present operations; (21) We are usually the first ones to introduce new brands or products on the market; (22) We are constantly on the lookout for businesses that can be acquired; (23) Competitors generally pre-empt us by expanding capacity ahead of them*; (24) Operations in later stages of the life cycle are strategically eliminated; (T) Dimension Average Score; (A) Export Share; (B) Debt; (C) Profit Margin; (D) Return on Capital; (E) Growth Rate; (F) Productivity; (G) Market Share; (H) R&D Expenditure; (I) Investment in Innovation; (*) Reversed Analysis.

Debt (B), *Profit Margin* (C), *Return on Capital* (D), and *Market Share* (G), despite the above-average *R&D Expenditure* (H) and *Investment in Innovation* (I).

These findings may suggest that companies that undertake more proactive strategies may indeed benefit from them in terms of performance and maintain lower levels of *Debt* (B). Such results are consistent, yet again, with more innovative, competitive, productive, capable of growth and exporting companies (Cassiman et al., 2010; Love & Roper, 2013; Lu & Beamish, 2006; Piercy et al., 1998; Tavassoli, 2018).

We also found that (*Table C5, Annex C*), "actively seeking market opportunities" (20) appears to positively influence most of the performance indicators, proving to be beneficial for the companies. Contrarily, "expanding capacity ahead of competition" (23) might be not as beneficial, due to its negative correlation with *Productivity* (F), which may derive from lacking the appropriate cost-efficient technology to handle the recent expansion. Lastly, "eliminate operations later in their life cycle" (24) appears to be a limitation for *Return on Capital* (D).

Riskiness Dimension

Lastly, the riskiness dimension is associated with the firm's choices in terms of deciding their resource administration (Venkatraman, 1989) and is a key indicator for decision making (Morgan & Strong, 1998).

Cluster 1 is composed of 12 companies, *Cluster 2* of 17 companies, *Cluster 3* comprises 17 companies, and *Cluster 4* 22 companies (*Table 8*), so no cluster was considered an outlier.

Clusters 2 and *3* appear to be the ones with companies that have a more risk-averse strategy, thus scoring the lowest in this dimension. Furthermore, they score above average in *Export Share* (A) and *Productivity* (F), and better than the remaining clusters in many of the performance indicators (*Figure 12).* This finding appears to suggest a possible link between a more conservative strategic approach and a better performance. Another very interesting result is *Cluster 2* and *3* above average R&D Expenditure (H) and Investment in Innovation (I) scores. This outcome appears to be extremely unexpected given its interpretation, since from these results accrue that companies in these clusters appear to be the most innovative, competitive and productive (Cassiman et al., 2010; Hirsch & Bijaoui, 1985; Love & Roper, 2013; Lu & Beamish, 2006; Piercy et al., 1998; Tavassoli, 2018). *Cluster 1* and *4* have a concerning below-average score for *Return on Capital* (D), *Growth Rate* (E), and *Cluster 1* has also a very low score for *Investment in Innovation* (I).

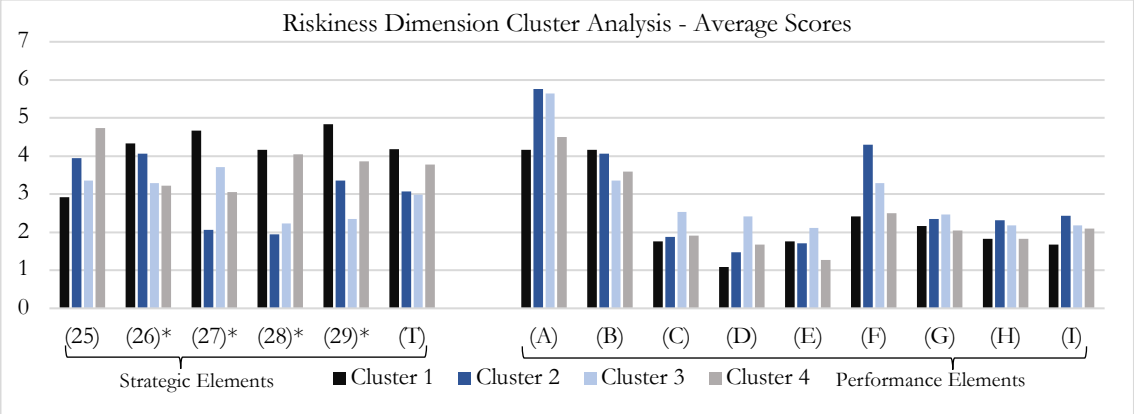

Figure 12 - Riskiness Dimension Clustering [20]

Another insightful observation is the generalized lack of "followed "tried and true" paths" (29), as it seems to be prejudicial performance-wise, as can be seen in *Table C6 (Annex 6)*. Additionally, the fact that "New projects are approved on a "stage by stage" approval" (27) scored close to 3/7, means that in fact, companies appear to be doing so (reversed analysis), which suggests being hurting their performance, which may be consistent with a need for a more holistic approach to achieve best results. Lastly, "high-risk" operations" (25) seem to be rewarding for the company and consistent with firms that have higher *Investment in Innovation* (I) and *R&D Expenditure* (H) policies.

This in-depth analysis of the strategic dimensions allows us to ascertain that indeed hypotheses *H1a* and *H2*, are in agreement with the results of our study:

> *H1a: The expenditure in Innovation and R&D is positively correlated with the company's competitive performance.*

> *H2: To achieve a positive impact in companies' competitive performance, further than having a defined innovation strategy it is important to actively invest in innovation.*

[20] (25) Our operations can be characterized as high-risk; (26) We seem to adopt a rather conservative view when making major decisions*; (27) New projects are approved on a "stage by stage" basis rather than with blanket approval*; (28) We have a tendency to support projects where the expected returns are certain*; (29) Our operations have generally followed the "tried and true" paths*; (T) Dimension Average Score; (A) Export Share; (B) Debt; (C) Profit Margin; (D) Return on Capital; (E) Growth Rate; (F) Productivity; (G) Market Share; (H) R&D Expenditure; (I) Investment in Innovation; (*) Reversed Analysis.

Performance Indicators and Strategic Dimensions Analysis

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(i)	-	-13,06%	-18,75%	-11,26%	-0,84%	-7,08%	0,44%	-2,53%	-5,33%	-1,33%	12,39%	13,01%	-9,32%	18,77%	1,30%
(ii)	-	-	61,44%	68,45%	59,00%	-12,27%	14,53%	-10,13%	-13,79%	2,00%	-3,56%	5,00%	24,59%	-9,39%	0,26%
(iii)	-	-	-	57,04%	58,51%	1,76%	-6,55%	-7,34%	-14,87%	-15,82%	0,01%	3,23%	18,27%	-17,63%	-13,44%
(iv)	-	-	-	-	61,05%	-4,34%	14,30%	7,30%	7,40%	4,42%	-13,84%	12,46%	11,54%	17,83%	10,48%
(v)	-	-	-	-	-	-0,39%	4,30%	-15,83%	10,42%	-3,18%	-13,43%	6,56%	14,90%	-3,14%	1,48%
(vi)	-	-	-	-	-	-	-1,33%	7,92%	-8,59%	-7,57%	0,92%	-18,52%	-5,91%	-4,40%	-4,90%
(A)	-	-	-	-	-	-	-	6,43%	-1,29%	3,53%	-2,84%	-0,42%	-8,01%	5,36%	8,15%
(B)	-	-	-	-	-	-	-	-	3,93%	-1,10%	18,28%	4,00%	6,50%	35,70%	19,49%
(C)	-	-	-	-	-	-	-	-	-	62,73%	16,49%	43,26%	23,30%	39,55%	31,96%
(D)	-	-	-	-	-	-	-	-	-	-	23,66%	34,31%	15,14%	35,46%	34,70%
(E)	-	-	-	-	-	-	-	-	-	-	-	30,47%	8,03%	28,41%	15,16%
(F)	-	-	-	-	-	-	-	-	-	-	-	-	19,16%	23,02%	6,91%
(G)	-	-	-	-	-	-	-	-	-	-	-	-	-	1,22%	5,26%
(H)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	75,03%
(I)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 11 – Strategic Dimensions & Performance Indicators Correlations[21]

[21] (i) Aggressiveness Dimension; (ii) Analysis Dimension; (iii) Defensiveness Dimension; (iv) Futurity Dimension; (v) Proactiveness Dimension; (vi) Riskiness Dimension; (A) Export Share; (B) Debt; (C) Profit Margin; (D) Return on Capital; (E) Growth Rate; (F) Productivity; (G) Market Share; (H) R&D Expenditure; (I) Investment in Innovation. - between [-10% - -20%]; - between [10% - 20%]; - between [20% - 30%]; - >30%.

A more comprehensive and integrated view of the information on companies' strategy, performance and competitiveness, resulting from the data collected with our questionnaire, is presented in *Table 11*.

On a first remark, the results show a very strong correlation between the strategic dimensions and the performance indicators in four out of six dimensions, i.e. *Analysis Dimension* (ii), *Defensiveness Dimension* (iii), *Futurity Dimension* (v) and *Proactiveness Dimension* (v), and the correlation between the last three dimensions is consistent with results in Venkatraman (1989). Oppositely, the results found a negative correlation with s these dimensions by the statements in agreement with *Aggressiveness Dimension* (i) and *Riskiness Dimension* (vi).

Focusing on the correlations between strategic dimensions and performance indicators, we were able to ascertain that there are apparent benefits to conduct an aggressive strategy, with a special emphasis on the results for *Growth Rate* (E)*, Productivity* (F) and *R&D Expenditure* (H). This appears to be gained with a small penalty on *Debt (B)* and *Profit Margin (C). Market Share* (G) appears to be triggered by several strategic approaches, namely analytical, defensive, future, or proactive prone, but not by aggressive or risky approaches, which seems quite understandable. Lastly, a company that focuses more on the long-term goals is more prone to have positive effects in *Productivity* F), *Market Share* (G), *R&D Expenditure* (H) and *Investment in Innovation* (I). In turn, Investment in Innovation (I) and R&D Expenditure (H) are positively associated with a competitive performance (Cassiman et al., 2010; Lu & Beamish, 2006; Prajogo, 2016; Rosenbusch et al., 2011).

As a final remark, as expected, and consistent with what had been concluded in previous studies (Dietzenbacher & Los, 2002), there is a positive correlation between *R&D Expenditure* (H), *Profit Margin (D), Growth rate* (E), *Productivity* (F) and *Return on Capital* (D) (Cassiman et al., 2010; Lu & Beamish, 2006; (Cassiman et al., 2010; Hirsch & Bijaoui, 1985; Lu & Beamish, 2006).

This analysis and interpretation of the strategic dimensions and competitive performance presented above allow us to ascertain that hypotheses *H1* is in agreement with our findings:

> *H1: Companies' strategic dimensions are intrinsically related to each other, as well as the firms' performance and ability to undertake innovation and change processes.*

A more extensive and in-depth analysis may be undertaken using the correlation matrixes (*Annex C*) information and further study on the characteristics of the companies and cluster analysis.

Uncertainty and Performance

Being aware of uncertainty is critical for companies' survival and decision-making (Bergamaschi et al., 2019), since it greatly affects companies' strategies and performance (Amore & Minichilli, 2018; Doan et al., 2020; Madanoglu & Ozdemir, 2019). Yet, to the best of our knowledge, not many studies focused on achieving a better understanding of the relationship between uncertainty and companies' performance (Doan et al., 2020).

According to the responses to our questionnaire, *Public Institutions* state on average almost 4 years of either a "Bad" year or a "Below Average" year, whilst *Private Companies* only declare 3 years per company of "Bad" and "Below average Years". Interestingly, *Public Sector* companies have scored a higher average number of "Good" years than *Private companies*. We are nevertheless aware that this study's sample is not representative as to enable a reliable comparison between the consequences of uncertainty in public institutions and in the private sector, due to sample bias. Despite that, it might be a relevant subject for future research. A simplified and very concise temporal analysis of the performance of the companies that declared having received governmental funds is further detailed in *Table 12*. It should be noted that 47 companies have declared having received governmental funds in at least one year since 2005, and those have attributed an average score of 4,7/7 to the importance of these incentives in the "company's survival during times of crisis and/or economic uncertainty" (*Annex B*).

Average of Number of Years with Governmental Financial Aid (2005-2020)			Average of number of years per performance classification				
			Bad	Below Average	Average	Above Average	Good
Sector	Public	7,6	0,9	3,0	3,0	3,0	4,3
	Private	4,8	0,7	2,5	3,6	3,9	3,4

Table 12 – Companies Performance by Typology

By looking at the table we are led to conclude that government financial incentives actually have an impact on both *Public* and *Private* companies' performance, with no significant difference between the type of ownership. Literature review has shown that there is a linkage between uncertainty and technological change (Teece et al., 2016). These findings appear to

be consistent with our study results, since there is a positive correlation of 16%[22] between *R&D Expenditure* (as a percentage of Sales for the Year 2019) and the number of years the company performed either "Bad" or "Below Average", and positive correlation of 8%[22] between the latter and *Investment in Innovation*. Such results are also in line with the macroeconomic analysis conducted in *Chapter 2.3.*, and the observation that the relationship between *R&D Expenditure* activities as a percentage of Portuguese GDP (PORDATA, 2019) is clearly triggered by crisis events (PORDATA, 2020b).

This above analysis and interpretation of the companies' competitive performance and uncertainty allows us to ascertain that hypotheses *H3* is in agreement with our findings:

> *H3: Innovation is triggered by economic downturns and uncertainty periods, being crucial to companies' ability to survive under these conditions.*

Still, no relevant link can be found between *R&D Expenditure* (as a % of sales for the year 2019) and the *Investment in Innovation* (as a % of sales for the year 2019). This can perhaps be justified by the companies' investment policies, even if it is quite counter-intuitive, since there is evidence that supporting innovation is a determinant factor for growth in a downturn scenario (Barbosa & Romero, 2013) and is set off by uncertain environments (Anwar et al., 2016; Dodgson et al., 2008; Onufrey & Bergek, 2020). We believe that such discrepancy between the results of our study and those in the literature review may be related to the reference year (2019) of *Investment in Innovation*. Since it would be unfeasible to ask the respondents for an annual detailed description of *Investments in Innovation* and *R&D Expenditure* of their company, due to data compliance and confidentiality, we opted to request it for just one year. This choice is certainly a limitation of our work.

Limitations of the Research

With the firm belief that the present work may contribute to a better understanding of the role of companies' business and innovation strategies and of their impact on their competitive performance, it is mandatory to recognize that there are some limitations in our research.

Firstly, it should be recognized that both the sample size and the larger weight of the industry sector, can be considered a limitation of this study. Another limitation could be that the

[22] Value calculated based on our sample.

existence of different types of market competition, such as monopolies or oligopolies, was not taken into account, and in such case, the answers provided by the respondents would have a different interpretation. However, since all of the respondents are Portuguese companies, which are neither monopolists nor oligopolists, we believe that this is not a determining constraint in our results. Another possible limitation follows from the fact that the respondent's perception of both the strategy and the company may be partial, either due to a lack of organizational knowledge or due to the involvement they have in the firm. Such possible limitation may condition the answers provided.

Lastly, as mentioned in the *Uncertainty and Performance* analysis of our questionnaire, we acknowledge that this study's sample is not representative of the entire reality of the Portuguese companies, whether public or private.

5. Conclusion and Future Research

It is widely acknowledged that strategic management and uncertainty-related decisions are deeply intertwined (Magnani & Zucchella, 2019; von Gelderen et al., 2000). Additionally, uncertainty, to a certain extent, is an always and increasingly present reality in business management (Teece et al., 2016). Equally important is the role innovations play in uncertain business environments (Lynn & Akgün, 1998), and how complex and important (Dong, 2021) it is to adjust to change and uncertainty (Miles et al., 1978; Sánchez et al., 2011).

We also know that innovation strategies already comprehend a certain degree of uncertainty (Dodgson et al., 2008), and play an active role in companies' reaction to the necessary adaptations (Onufrey & Bergek, 2020). Furthermore, innovations represent an important factor for firms' continuity and performance (M. E. Porter, 1990; Ramus et al., 2018; Sánchez et al., 2011).

Finally, it has been demonstrated that uncertainty is not only an ever-present element of companies' reality (Barbosa & Romero, 2013; Lynn & Akgün, 1998; Teece et al., 2016), but it should also be always present in companies approaches (Bergamaschi et al., 2019) due to its complexity (Dong, 2021), since volatility and increasing competitiveness are more than ever a present phenomenon (Hu & Zhang, 2021).

Our purpose and main motivation in the present work is to gain insight on the companies' competitive performance and their link to business and innovation strategies in times of uncertainty. We have attempted to do this by providing an empirical analysis and findings with potential value, not only to the companies that participated in the study but also to those that may be interested in understanding how to better cope with uncertainty and change and in knowing which is the best attitude as to attain or maintain competitive advantage.

Previous work has suggested a link between uncertainty and technological change (Teece et al., 2016). Such finding is consistent with our study's results arguing that there is a positive correlation between *R&D Expenditure* and the company's years of hardship, i.e. companies that have a higher *R&D Expenditure,* tend to be the ones with more distress. Moreover, this expenditure was shown to be intrinsically connected with economic downturns in Portugal.

Regarding our strategy-related findings, we were able to ascertain that there is a strong linkage between analytical strategy approaches, and other more defensive, proactive and taking into account the company's future. In turn, companies that focus on a stronger *Futurity Dimension*

appear to perform better in terms of *Export Share* and *Market Share* and report a higher expenditure in *R&D* and *Investment in Innovation*.

Investment in Innovation is positively linked to *R&D Expenditure*, and this appears to be positively influencing companies' overall performance, which is consistent with literature (Chang & Singh, 2000; Hilman & Kaliappen, 2015; M. E. Porter, 1990; Rosenbusch et al., 2011; Sánchez et al., 2011), and also performance, growth (Blanchard, 2020; Bobillo et al., 2006; Dietzenbacher & Los, 2002) and value creation (Medhora, 2017).

Important to note is also the strong relationship between *R&D Expenditure*, *Profit margin, Growth rate*, *Productivity* and especially with *Return on Capital*. Interestingly enough, we did not find any apparent correlation between *Export Share* and *R&D Expenditure* or *Investment in Innovation*, contrary to what could be found in literature (Altomonte et al., 2013; Love & Roper, 2013; Tavassoli, 2018). However, such discrepancy can possibly be justified by the limitation in the number of years in data collection of the performance indicators.

Last but not least, our findings suggest a relationship between defensive strategies and lower performance results, which is in line with literature (Chang & Singh, 2000; Hilman & Kaliappen, 2015; M. E. Porter, 1990; Rosenbusch et al., 2011; Sánchez et al., 2011).

We believe that the present study and its results will be important not only for the participating companies, but also for those that are developing their business and innovation strategies. Furthermore, we trust these results may be paramount for public policies to support innovation, which will be critical for the recovery of the Portuguese economy in the post pandemic stage.

For future work, we think it would be very insightful to further analyse all of the correlations evidenced in the matrixes that are not yet supported in the literature. We also believe that repeating the analysis with a larger sample, and with a more balanced economic activities distribution, could also be of great value. Lastly, further understanding the relationship between government fundings and company performance deserves a more in-depth analysis.

References

Aguinis, H., & Burgi-Tian, J. (2020). Measuring performance during crises and beyond: The Performance Promoter Score. *Business Horizons, 64*(1), 149-160.

Altomonte, C., Aquilante, T., Békés, G., Ottaviano, G. I. P., & Manacorda, M. (2013). Internationalization and innovation of firms: evidence and policy. *Economic Policy, 28*(76), 663-700.

Ambastha, A., & Momaya, K. (2003). Competitiveness of Firms: Review of Theory, Frameworks and Models. *Singapore Management Review, 26*.

Amore, M. D., & Minichilli, A. (2018). Local Political Uncertainty, Family Control, and Investment Behavior. *Journal of Financial and Quantitative Analysis, 53*(4), 1781-1804.

Amram, M., & Kulatilaka, N. (1999). Uncertainty: the new rules for strategy. *Journal of Business Strategy, 20*(3), 25-29.

Anderson, C. R., & Zeithaml, C. P. (1984). Stage of the Product Life Cycle, Business Strategy, and Business Performance. *The Academy of Management Journal, 27*(1), 5-24.

Añón Higón, D., Gómez, J., & Vargas, P. (2017). Complementarities in innovation strategy: do intangibles play a role in enhancing firm performance? *Industrial and Corporate Change, 26*(5), 865-886.

Anwar, J., & Hasnu, S. (2016). Strategy-performance relationship: A scoring method framework for typological research. *International Journal of Information, Business and Management, 8*(2), 19.

Anwar, J., Shah, S., & Hasnu, S. (2016). Business Strategy and Organizational Performance: Measures and Relationships. *Pakistan Economic and Social Review, 54*(1), 97-122.

Bahl, M., Lahiri, S., & Mukherjee, D. (2021). Managing internationalization and innovation tradeoffs in entrepreneurial firms: Evidence from transition economies. *Journal of World Business, 56*(1), 101-150.

Balsam, S., Fernando, G. D., & Tripathy, A. (2011). The impact of firm strategy on performance measures used in executive compensation. *Journal of Business Research, 64*(2), 187-193.

Barbosa, F., & Romero, F. (2013). *Business strategies in contexts of high uncertainty : a case study on the innovation and internationalization processes of a technological Portuguese SME*. Paper presented at the 8th European Conference on Innovation and Entrepreneurship - ECIE.

Barbosa, F., & Romero, F. (2016). *The Links Between Innovation, Strategy and Internationalization Processes: A Comprehensive Literature Review*. Paper presented at the European Conference on Innovation and Entrepreneurship, Reading.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management, 17*(1), 99-120.

Bergamaschi, L., Mabey, N., Born, C., & White, A. (2019). A New Approach to Managing Uncertainty. In *Managing Climate Risk for a Safer Future* (pp. 17-19): E3G.

Bessant, J., & Tidd, J. (2013). *Managing Innovation*: John Wiley & Sons inc.

Blackmore, K., & Nesbitt, K. (2013). Verifying the Miles and Snow strategy types in Australian small- and medium-size enterprises. *Australian Journal of Management, 38*(1), 171-190.

Blanchard, K. (2020). Innovation and strategy: Does it make a difference! A linear study of micro & SMEs. *International Journal of Innovation Studies, 4*(4), 105-115.

Blandinières, F., Dürr, N., Frübing, S., Heim, S., Pieters, B., Janger, J. r., & Peneder, M. (2017). *Measuring Competitiveness*. European Union

Blumentritt, T., & Danis, W. M. (2006). Business Strategy Types and Innovative Practices. *Journal of Managerial Issues, 18*(2), 274-291.

Bobillo, A. M., Sanz, J. R., & Gaite, F. T. (2006). Innovation investment, competitiveness, and performance in industrial firms. *Thunderbird International Business Review, 48*(6), 867-890.

Bommer, M., & Jalajas, D. S. (2004). Innovation sources of large and small technology-based firms. *IEEE Transactions on Engineering Management, 51*(1), 13-18.

Bowman, E. H., & Helfat, C. E. (2001). Does Corporate Strategy Matter? *Strategic Management Journal, 22*(1), 1-23.

Bowonder, B., Dambal, A., Kumar, S., & Shirodkar, A. (2010). Innovation strategies for creating competitive advantage. *Research-Technology Management, 53*(3), 19-32.

Buckley, P., Pass, C., & Prescott, K. (1988). Measures of International Competitiveness: A Critical Survey. *Journal of Marketing Management, 4*, 175-200.

Buckley, P. J. (1995). Foreign market servicing strategies and competitiveness. *Foreign Direct Investment and Multinational Enterprises*, 115-136.

Cassiman, B., Golovko, E., & Martínez-Ros, E. (2010). Innovation, exports and productivity. *International Journal of Industrial Organization, 28*(4), 372-376.

Cetindamar, D., & Kilitcioglu, H. (2013). Measuring the competitiveness of a firm for an award system. *Competitiveness Review: An International Business Journal, 23*(1), 7-22.

Chang, S.-J., & Singh, H. (2000). Corporate and industry effects on business unit competitive position. *Strategic Management Journal, 21*(7), 739-752.

Chen, H.-C., Chou, R. K., & Lu, C.-L. (2018). Saving for a rainy day: Evidence from the 2000 dot-com crash and the 2008 credit crisis. *Journal of Corporate Finance, 48*, 680-699.

Chong, H., Zey, M., & Bessler, D. A. (2010). On corporate structure, strategy, and performance: a study with directed acyclic graphs and PC algorithm. *Managerial and Decision Economics, 31*(1), 47-62.

Chrisman, J. J., Hofer, C. W., & Boulton, W. R. (1988). Toward a System for Classifying Business Strategies. *The Academy of Management Review, 13*(3), 413-428.

Claessens, S., & Van Horen, N. (2015). The Impact of the Global Financial Crisis on Banking Globalization. *IMF Economic Review, 63*(4), 868-918.

Cooper, R. (1984). The Performance Impact of Product Innovation Strategies. *European Journal of Marketing, 18*, 5-54.

Csath, M. (2007). The Competitiveness of Economies: Different Views and Arguments. *Society and Economy, 29*(1), 87-102.

Debenham, J., & Wilkinson, I. (2006). Exploitation versus Exploration in Market Competition. *Industry and Innovation, 13*(3), 263-289.

Denton, D. K. (1999). Gaining competitiveness through innovation. *European Journal of Innovation Management, 2*(2), 82-85.

DeSarbo, W. S., Anthony Di Benedetto, C., Song, M., & Sinha, I. (2005). Revisiting the Miles and Snow strategic framework: uncovering interrelationships between strategic types, capabilities, environmental uncertainty, and firm performance. *Strategic Management Journal, 26*(1), 47-74.

Dietzenbacher, E., & Los, B. (2002). Externalities of R&D Expenditures. *Economic Systems Research, 14*(4), 407-425.

Doan, A.-T., Le, A.-T., & Tran, Q. (2020). Economic uncertainty, ownership structure and small and medium enterprises performance. *Australian Economic Papers, 59*(2), 102-137.

Dobni, C. (2010). Achieving synergy between strategy and innovation: The key to value creation. *International Journal of Business Science and Applied Management, 5*(1), 48-58.

Dodgson, M., Gann, D., & Salter, A. (2008). *The Management of Technological Innovation : Strategy and Practice*: Oxford University press.

Dong, J. Q. (2021). Technological choices under uncertainty: Does organizational aspiration matter? *Strategic Management Journal, 42*(5), 898-916.

Doyle, P., & Wong, V. (1998). Marketing and competitive performance: an empirical study. *European Journal of Marketing, 32*(5/6), 514-535.

Drezner, D. W. (2010). The global financial crisis and its effects. *Great Decisions*, 55-66.

Drucker, P. (2002). The Discipline of Innovation. *Harvard business review, 80*, 95-100,102,148.

Du, X., Luan, W., & Lu, Y. (2020). Impact of economic policy uncertainty and financial constraints on firms' markups: evidence from China. *Applied Economics Letters*, 1-5.

Dudek, A., & Walesiak, M. (2020). *The Choice of Variable Normalization Method in Cluster Analysis*. Paper presented at the 35th IBIMA Conference.

Edeh, J. N., Obodoechi, D. N., & Ramos-Hidalgo, E. (2020). Effects of innovation strategies on export performance: New empirical evidence from developing market firms. *Technological Forecasting and Social Change, 158*, 120-167.

Edwards-Schachter, M. (2018). The nature and variety of innovation. *International Journal of Innovation Studies, 2*(2), 65-79.

Euchner, J. A. (2010). From the Editor: Managing Strategy and Innovation. *Research Technology Management, 53*(3), 7-7.

EUROSTAT. (2008). *NACE Rev. 2 - Statistical classification of economic activities in the European Community*. European Communities.

Farjoun, M. (2002). Towards an organic perspective on strategy. *Strategic Management Journal, 23*(7), 561-594.

Ferguson, B. (2019). Adjusting to change: The role of innovation. In *Competing for Influence* (pp. 353-376): ANU Press.

Gao, H., Hsu, P.-H., & Li, K. (2018). Innovation Strategy of Private Firms. *Journal of Financial and Quantitative Analysis, 53*(1), 1-32.

Gatignon, H., & Xuereb, J.-M. (1997). Strategic Orientation of the Firm and New Product Performance. *Journal of Marketing Research, 34*(1), 77-90.

Gimenez, F. A. (1999). *Miles and Snow's strategy model in the context of small firms*. Paper presented at the Proceedings of the 1999 ICSB Naples conference.

Gobble, M. M. (2012). Innovation and Strategy. *Research-Technology Management, 55*(3), 63-67.

Goold, M., Campbell, A., & Alexander, M. (1998). Corporate strategy and parenting theory. *Long Range Planning, 31*(2), 308-314.

Grupp, H. (1997). The links between competitiveness, firms' innovative activities and public R&D support in Germany: an empirical analysis. *Technology Analysis & Strategic Management, 9*(1), 19-34.

Guérard, S., Langley, A., & Seidl, D. (2013). Rethinking the concept of performance in strategy research: towards a performativity perspective. *M@ n@ gement, 16*(5), 566-578.

Gurkov, I. (2010). Strategy techniques for the times of high uncertainty. *Journal of East European Management Studies, 15*(2), 177-186.

Hambrick, D. C. (1983). Some Tests of the Effectiveness and Functional Attributes of Miles and Snow's Strategic Types. *The Academy of Management Journal, 26*(1), 5-26.

Hausmann, R., Hidalgo, C. A., Bustos, S., Coscia, M., Simoes, A., & Yıldırım, M. A. (2013). *The Atlas of Economic Complexity | Mapping Paths to Prosperity*: The MIT Press.

Hax, A. C., & Majluf, N. S. (1988). The Concept of Strategy and the Strategy Formation Process. *Interfaces, 18*(3), 99-109.

Hicks, S. C., & Irizarry, R. A. (2015). Quantro: a data-driven approach to guide the choice of an appropriate normalization method. *Genome biology, 16*(1), 1-8.

Hilman, H., & Kaliappen, N. (2015). Innovation strategies and performance: are they truly linked? *World Journal of Entrepreneurship, Management and Sustainable Development, 11*(1), 48-63.

Hippel, E. v. (1988). *The Sources of Innovation*. New York: Oxford University Press.

Hirsch, S., & Bijaoui, I. (1985). R&D Intensity and Export Performance: A Micro View. *Weltwirtschaftliches Archiv, 121*(2), 238-251.

Hoen, A. R. (2002). Identifying Linkages with a Cluster-based Methodology. *Economic Systems Research, 14*(2), 131-146.

Hollanders, H., & Es-Sadki, N. (2020). *European Innovation Scoreboard 2020 - Annex B*. Publications Office of the European Union.

Hollanders, H., Es-Sadki, N., Merkelbach, I., & Khalilova, A. (2020). *European Innovation Scoreboard 2020*. Publications Office of the European Union.

Hu, S., & Zhang, Y. (2021). COVID-19 pandemic and firm performance: Cross-country evidence. *International Review of Economics & Finance, 74*, 365-372.

Hurley, R. F., & Hult, G. T. M. (1998). Innovation, Market Orientation, and Organizational Learning: An Integration and Empirical Examination. *Journal of Marketing, 62*(3), 42-54.

Igartua, J. I., Garrigós, J. A., & Hervas-Oliver, J. L. (2010). How Innovation Techniques Support an Open Innovation Strategy. *Research Technology Management, 53*(3), 41-52.

Issawi, C. (1978). The 1973 Oil Crisis and After. *Journal of Post Keynesian Economics, 1*(2), 3-26.

Jennings, D. F., Rajaratnam, D., & Lawrence, F. B. (2003). Strategy-Performance Relationships In Service Firms: A Test For Equifinality. *Journal of Managerial Issues, 15*(2), 208-220.

Johnson, G., Whittington, R., Scholes, K., Angwin, D., & Regnér, P. (2011). *Exploring strategy*: Financial Times Prentice Hall.

Jurado, K., Ludvigson, S. C., & Ng, S. (2015). Measuring Uncertainty. *The American Economic Review, 105*(3), 1177-1216.

Kaliappen, N., & Hilman, H. (2017). Competitive strategies, market orientation types and innovation strategies: finding the strategic fit. *World Journal of Entrepreneurship, Management and Sustainable Development, 13*(3), 257-261.

Karlsson, C., & Tavassoli, S. (2016). Innovation strategies of firms: What strategies and why? *The Journal of Technology Transfer, 41*(6), 1483-1506.

Kazmi, A., & Kazmi, A. (1992). *Strategic management*: McGraw-Hill Education.

Kilian, L. (2014). Oil Price Shocks: Causes and Consequences. *Annual Review of Resource Economics, 6*, 133-154.

Koller, T., Goedhart, M., & Wessels, D. (2010). *Valuation: measuring and managing the value of companies* (Vol. 499): John Wiley & Sons.

Korsgaard, S., Berglund, H., Thrane, C., & Blenker, P. (2010). A Tale of Two Kirzners: Time, Uncertainty, and the Nature of Opportunities. *Entrepreneurship Theory and Practice, 40*, 867 - 889.

Kotha, S., & Vadlamani, B. L. (1995). Assessing Generic Strategies: An Empirical Investigation of Two Competing Typologies in Discrete Manufacturing Industries. *Strategic Management Journal, 16*(1), 75-83.

Liesch, P. W., Welch, L. S., & Buckley, P. J. (2011). Risk and Uncertainty in Internationalisation and International Entrepreneurship Studies. *Management International Review, 51*(6), 851-873.

Love, J., & Roper, S. (2013). SME innovation, exporting and growth: A review of existing evidence. *International Small Business Journal, 33*, 28 - 48.

Lu, J. W., & Beamish, P. W. (2006). SME internationalization and performance: Growth vs. profitability. *Journal of International Entrepreneurship, 4*(1), 27-48.

Lynn, G. S., & Akgün, A. E. (1998). Innovation Strategies Under Uncertainty: A Contingency Approach for New Product Development. *Engineering Management Journal, 10*(3), 11-18.

Madanoglu, M., & Ozdemir, O. (2019). Economic policy uncertainty and hotel operating performance. *Tourism Management, 71*, 443-452.

Magnani, G., & Zucchella, A. (2019). Coping with uncertainty in the internationalisation strategy. *International Marketing Review, 36*(1), 131-163.

Mckeown, M. (2019). *The strategy book*: Pearson UK.

Medhora, R. P. (2017). Introduction. In *New Thinking on Innovation* (pp. 3-11): Centre for International Governance Innovation.

Miles, R. E., Snow, C. C., Meyer, A. D., & Coleman, H. J. (1978). Organizational Strategy, Structure, and Process. *The Academy of Management Review, 3*(3), 546-562.

Miller, B. K., Bierly, P. E., & Daly, P. S. (2007). The Knowledge Strategy Orientation Scale: Individual Perceptions of Firm-level Phenomena. *Journal of Managerial Issues, 19*(3), 414-435.

Mills, J., & Bourne, M. (2002). *Strategy and Performance* (Vol. 2): Cambridge University Press.

Morgan, R. E., & Strong, C. A. (1998). Market orientation and dimensions of strategic orientation. *European Journal of Marketing, 32*(11/12), 1051-1073.

Morris, J. J., & Alam, P. (2012). Value relevance and the dot-com bubble of the 1990s. *The Quarterly Review of Economics and Finance, 52*(2), 243-255.

Morrison, A. J., & Roth, K. (1992). A Taxonomy of Business-Level Strategies in Global Industries. *Strategic Management Journal, 13*(6), 399-417.

Moxham, C. (2009). Performance measurement: Examining the applicability of the existing body of knowledge to nonprofit organisations. *International Journal of Operations & Production Management, 29*(7), 740-763.

Nakayama, T. (2018). Empirical Study on the Application of Strategic Management Tools and Techniques in the Japanese Companies. *European Journal of Business and Management, 10*, 134-143.

Narver, J. C., & Slater, S. F. (1990). The Effect of a Market Orientation on Business Profitability. *Journal of Marketing, 54*(4), 20-35.

OECD, & Eurostat. (2018). *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation, 4th Edition*: OECD Publishing.

Onufrey, K., & Bergek, A. (2020). Transformation in a mature industry: The role of business and innovation strategies. *Technovation*, 102 190.

Organisation for Economic Co-operation and Development, & Statistical Office of the European Communities. (2005). *Oslo Manual: Guidelines for collecting and interpreting innovation data*. Paris: Organisation for Economic Co-operation and Development.

Parnell, J. A. (2006). Generic strategies after two decades: a reconceptualization of competitive strategy. *Management Decision, 44*(8), 1139-1154.

Philipson, S. (2020). Sources of innovation: Consequences for knowledge production and transfer. *Journal of Innovation & Knowledge, 5*(1), 50-58.

Piercy, N. F., Kaleka, A., & Katsikeas, C. S. (1998). Sources of competitive advantage in high performing exporting companies. *Journal of World Business, 33*(4), 378-393.

PORDATA. (2019). Expenditure in research and development activities (R&D) as a % of GDP. Retrieved 15/04/2021, from https://www.pordata.pt/en/Portugal/Expenditure+in+research+and+development+activities+(R+D)+as+a+percentage+of+GDP-779

PORDATA. (2020a). About PORDATA. PORDATA Retrieved 15/04/2021, from PORDATA

PORDATA. (2020b). Real GDP growth rate. Retrieved 15/04/2021, from https://www.pordata.pt/en/Portugal/Real+GDP+growth+rate-2298

PORDATA. (2020c). Trade account as a % of GDP. Retrieved 15/04/2021, from https://www.pordata.pt/en/Portugal/Trade+account+as+a+percentage+of+GDP-2595

Porter, M., & Stern, S. (2001). Innovation: Location Matters. *MIT Sloan Management Review, 42*, 28-36.

Porter, M. E. (1985). *Competitive advantage : creating and sustaining superior performance*. New York; London: Free Press; Collier Macmillan.

Porter, M. E. (1989). From competitive advantage to corporate strategy. In *Readings in strategic management* (pp. 234-255): Springer.

Porter, M. E. (1990). The Competitive Advantage of Nations. *Harvard business review, 68 (2)*, 73-93.

Porter, M. E. (1996). What is strategy? *Harvard business review, 74*(6), 61-78.

Prajogo, D. I. (2016). The strategic fit between innovation strategies and business environment in delivering business performance. *International Journal of Production Economics, 171*, 241-249.

Ramus, T., La Cara, B., Vaccaro, A., & Brusoni, S. (2018). Social or Commercial? Innovation Strategies in Social Enterprises at Times of Turbulence. *Business Ethics Quarterly, 28*(4), 463-492.

Report from the Select Committee on Overseas Trade : session 1984-85. Vol.3, Written evidence. (1985). London: HMSO.

Rosenbusch, N., Brinckmann, J., & Bausch, A. (2011). Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs. *Journal of Business Venturing, 26*(4), 441-457.

Sánchez, A., Lago, A., Ferràs, X., & Ribera, J. (2011). Innovation Management Practices, Strategic Adaptation, and Business Results: Evidence from the Electronics Industry. *Journal of technology management & innovation, 6*, 14-39.

Schilling, M. (2013). *Strategic Management of Technological Innovation* (4th ed.): McGraw-Hill.

Sharma, P., Leung, T. Y., Kingshott, R. P. J., Davcik, N. S., & Cardinali, S. (2020). Managing uncertainty during a global pandemic: An international business perspective. *Journal of Business Research, 116*, 188-192.

Shen, Y. (2020). Measuring macroeconomic uncertainty: A historical perspective. *Economics Letters, 196*, 109592.

Slater, S. F., & Narver, J. C. (1995). Market Orientation and the Learning Organization. *Journal of Marketing, 59*(3), 63-74.

Slater, S. F., & Narver, J. C. (1998). Customer-Led and Market-Oriented: Let's Not Confuse the Two. *Strategic Management Journal, 19*(10), 1001-1006.

Slater, S. F., Olson, E. M., & Reddy, V. K. (1997). Strategy-based performance measurement. *Business Horizons, 40*(4), 37-44.

Snow, C. C., & Hambrick, D. C. (1980). Measuring Organizational Strategies: Some Theoretical and Methodological Problems. *The Academy of Management Review, 5*(4), 527-538.

Srinivasan, M., Srivastava, P., & Iyer, K. N. S. (2020). Response strategy to environment context factors using a lean and agile approach: Implications for firm performance. *European Management Journal, 38*(6), 900-913.

Stankevice, I., & Jucevicius, G. (2010). Innovation strategy: an integrated theoretical framework. *Social Sciences, 3*(69), 24-31.

Star, S., Russ-Eft, D., Braverman, M. T., & Levine, R. (2016). Performance Measurement and Performance Indicators: A Literature Review and a Proposed Model for Practical Adoption. *Human Resource Development Review, 15*(2), 151-181.

Subbarao, D. (2020). Lessons of the Global Financial Crisis. In *Post-Crisis Issues in Financial Sector Regulation* (pp. 6-9). S. Rajaratnam School of International Studies: S. Rajaratnam School of International Studies.

Tavassoli, S. (2018). The role of product innovation on export behavior of firms. *European Journal of Innovation Management, 21*(2), 294-314.

Teece, D., Peteraf, M., & Leih, S. (2016). Dynamic Capabilities and Organizational Agility: Risk, Uncertainty, and Strategy in the Innovation Economy. *California Management Review, 58*(4), 13-35.

Thietart, R. A., & Vivas, R. (1984). An Empirical Investigation of Success Strategies for Businesses along the Product Life Cycle. *Management science, 30*(12), 1405-1423.

Tidd, J. (2006). Innovation models. *Imperial College London, 17*.

Venkatraman, N. (1989). Strategic orientation of business enterprises: The construct, dimensionality, and measurement. *Management science, 35*(8), 942-962.

von Gelderen, M., Frese, M., & Thurik, R. (2000). Strategies, Uncertainty and Performance of Small Business Startups. *Small Business Economics, 15*(3), 165-181.

Wang, Z. (2007). Technological innovation and market turbulence: The dot-com experience. *Review of Economic Dynamics, 10*(1), 78-105.

Watkins, M. D. (2007). Demystifying Strategy: The What, Who, How, and Why. *Strategic Planning, Harvard Business Review,* (May).

Wernerfelt, B. (1986). The Relation Between Market Share and Profitability. *Journal of Business Strategy, 6*, 67-74.

Wernerfelt, B., & Karnani, A. (1987). Competitive Strategy Under Uncertainty. *Strategic Management Journal, 8*(2), 187-194.

White, R. E. (1986). Generic Business Strategies, Organizational Context and Performance: An Empirical Investigation. *Strategic Management Journal, 7*(3), 217-231.

World Bank. (2021). TCData360 | Indicators. The World Bank Retrieved 15/04/2021, from The World Bank (https://tcdata360.worldbank.org/topics)

Zahra, S. A., & Covin, J. G. (1993). Business Strategy, Technology Policy and Firm Performance. *Strategic Management Journal, 14*(6), 451-478.

Annexes

A. Portuguese Macroeconomic Indicators

Portuguese Real GDP Growth Rate (1961-2020)

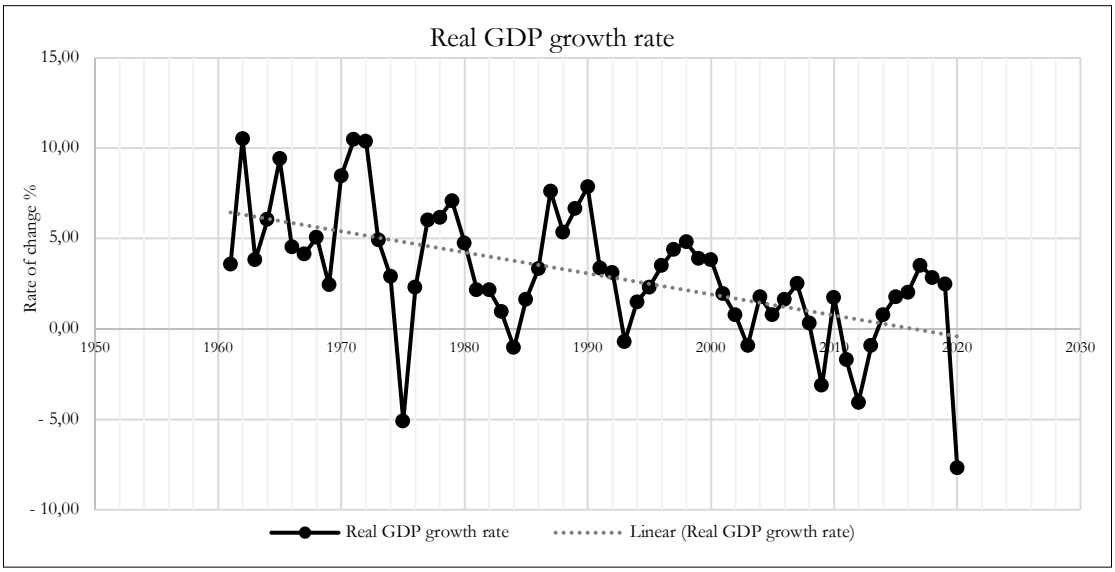

Figure A 1 - Real GDP Growth Rate[23]

Portuguese Trade Account as a Percentages of GDP

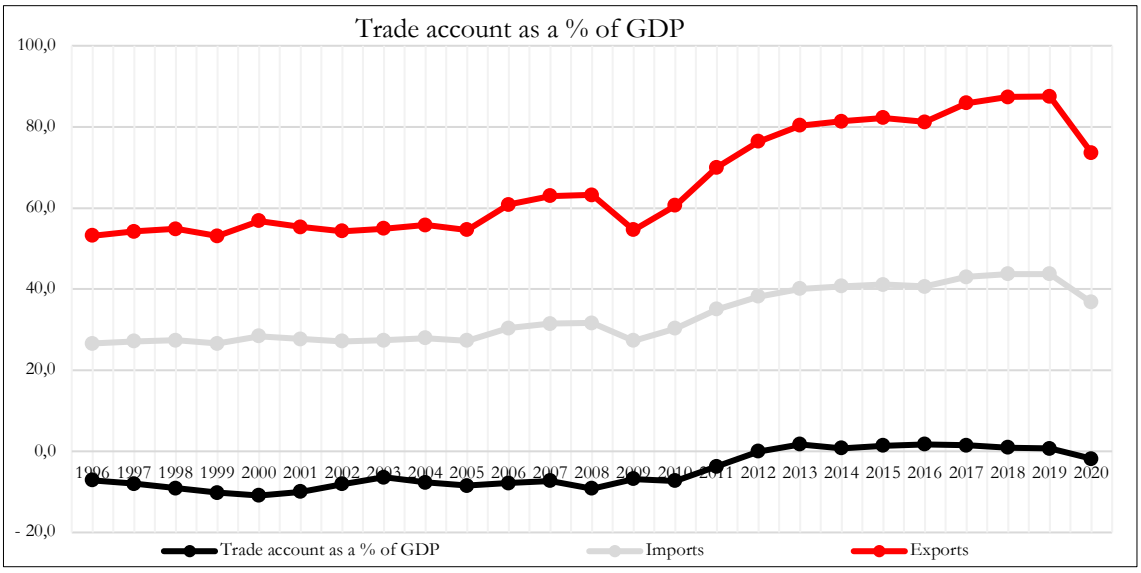

Figure A 2 - Trade account as a % of GDP[24]

[23] Data source: PORDATA (2020b).

[24] Data source: PORDATA (2020c).

B. Questionnaire

- Company's name (remains anonymous);
- Classify your company:

  Public or Private
- Is your company a SME?

  Yes or No
- What is your position in the company?

  Executive/Board Member, Senior Management, Middle Management or Collaborator
- Company's Economic Activity:

Agriculture, forestry, and fishing
Industry
Energy, water supply and sewerage
Construction
Wholesale and retail trade, repair of motor vehicles and motorcycles, accommodation, and food service activities
Transportation and storage, information, and communication
Financial, insurance and real estate activities
Other service activities

Table B 1 - Portuguese Classification of Economic Activities

- Classify the following years in terms of Business Performance[25]:

	Bad	Below Average	Average	Above Average	Good	N/A
2005						
2006						
2007						
2008						
2009						
2010						
2011						
2012						
2013						
2014						
2015						
2016						
2017						
2018						
2019						
2020						

Table B 2 – Companies' Yearly Performance Classification Surveyed Chart

[25] Companies were advised to only select N/A if they were not yet operating in the selected year, or if they did not have the requested information available.

- Since 2005, has your company received any governmental aid or financial support?

Yes or No

- If "Yes", in which years?

Classify the following statements (1 – "strongly disagree" to 7 – "strongly agree"):

- Obtaining these types of funds and/or aids played an important role in the company's survival during times of crisis and/or economic uncertainty.

Classify the following statements (1 – "strongly disagree" to 7 – "strongly agree"):

1. We often sacrifice profitability to gain market share.
2. We often cut prices to increase market share.
3. We often set prices below competition.
4. We often seek market share position at the expense of cash flow and profitability.
5. We emphasize effective coordination among different functional areas.
6. Our information systems provide support for decision-making.
7. When confronted with a major decision, we usually try to develop through analysis.
8. We use several planning techniques.
9. We use the outputs of management information and control systems.
10. We commonly use manpower planning and performance appraisal of senior managers.
11. We occasionally conduct significant modifications to manufacturing technology.
12. We often use cost control systems for monitoring performance.
13. We often use production management techniques.
14. We often emphasize product quality through the use of quality circles.
15. Our criteria for resource allocation generally reflect short-term considerations.
16. We emphasize basic research to provide us with future competitive edge.
17. Forecasting key indicators of operations is common.
18. Formal tracking of significant general trends is common.
19. We often conduct "what if" analyses of critical issues.
20. We are constantly seeking new opportunities related to present operations.
21. We are usually the first ones to introduce new brands or products on the market.
22. We are constantly on the lookout for businesses that can be acquired.
23. Competitors generally pre-empt us by expanding capacity ahead of them.
24. Operations in later stages of the life cycle are strategically eliminated.
25. Our operations can be characterized as high-risk.

26. We seem to adopt a rather conservative view when making major decisions.

27. New projects are approved on a "stage by stage" basis rather than with blanket approval.

28. We have a tendency to support projects where the expected returns are certain.

29. Our operations have generally followed the "tried and true" paths.

-Rate the following indicators as:

	<0%	0-10%	11-20%	21-30%	31-40%	41-50%	51-60%	61-70%	71-80%	81-90%	91-100%	>100%
as a % of Sales for the year 2019:												
Export Share	-											
Debt	-											
as a % for the year 2019:												
Profit Margin												
Return on Capital												
Growth Rate												
Productivity												
Market Share												

	0-5%	6-10%	11-20%	21-50%	>50%
as a % of Sales for the year 2019:					
R&D Expenditure					
Investment in Innovation					

Table B 3 – Competitive Performance Surveyed Indicators

C. Correlation Matrixes

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1)	12,89%	-5,79%	-11,05%	-6,97%	-3,71%	-5,05%	-20,55%	17,31%	7,66%
(2)	2,42%	4,34%	-12,92%	-3,27%	4,54%	6,26%	-9,03%	6,34%	-4,82%
(3)	-3,09%	-4,09%	9,42%	5,80%	31,00%	28,20%	-3,89%	20,68%	4,33%
(4)	-11,11%	-2,68%	-2,98%	-0,10%	6,86%	11,55%	3,83%	15,97%	-3,13%

Table C 1 - Aggressiveness Dimension & Performance Indicators Correlation

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(5)	27,31%	-1,23%	-16,90%	-7,91%	-10,34%	-8,03%	8,50%	5,46%	7,14%
(6)	-2,85%	-2,83%	-11,89%	-13,33%	-10,10%	4,43%	20,34%	-8,15%	-3,93%
(7)	-2,77%	-1,93%	2,01%	18,86%	-3,12%	15,58%	18,32%	-0,53%	-5,32%
(8)	13,84%	-5,53%	-7,54%	11,30%	8,15%	0,92%	21,69%	1,58%	14,78%
(9)	6,98%	-9,03%	-27,40%	-13,71%	-12,22%	-4,70%	21,82%	-33,27%	-18,97%
(10)	20,60%	-22,15%	1,56%	16,23%	9,61%	15,88%	19,23%	-4,17%	6,55%

Table C 2 - Analysis Dimension & Performance Indicators Correlations

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(11)	-13,63%	0,68%	-23,62%	-35,39%	-0,45%	-0,15%	15,59%	-12,95%	-3,34%
(12)	-12,21%	4,55%	-10,66%	-10,96%	-1,73%	10,18%	20,39%	-17,94%	-15,30%
(13)	5,51%	-13,14%	-7,31%	0,00%	3,11%	2,86%	15,82%	-22,37%	-16,20%
(14)	-2,58%	-13,88%	-6,44%	-5,12%	-1,43%	-1,35%	7,95%	-3,48%	-8,94%

Table C 3 - Defensiveness Dimension & Performance Indicators Correlations

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(15)[26]	11,97%	-18,71%	-3,53%	-18,41%	-34,50%	-11,49%	-5,00%	-11,17%	-5,35%
(16)	-5,55%	20,45%	12,42%	26,57%	10,29%	8,28%	-0,98%	24,52%	15,90%
(17)	18,24%	8,21%	-2,52%	-6,46%	-5,62%	14,83%	12,12%	2,40%	-4,77%
(18)	16,97%	9,20%	7,68%	-3,41%	-10,70%	26,14%	21,71%	16,80%	8,58%
(18)	8,51%	2,08%	8,92%	10,89%	-7,98%	4,93%	13,24%	23,82%	18,29%

Table C 4 - Futurity Dimension & Performance Indicators Correlations

[26] Reversed Analysis.

- between [-10% - -20%]; - between [-20% - -30%]; - <-30%.

- between [10% - 20%]; - between [20% - 30%]; - >30%.

(A) Export Share; (B) Debt; (C) Profit Margin; (D) Return on Capital; (E) Growth Rate; (F) Productivity; (G) Market Share; (H) R&D Expenditure; (I) Investment in Innovation.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(20)	10,19%	-7,62%	21,83%	24,90%	9,89%	13,14%	4,78%	21,42%	24,70%
(21)	2,41%	-10,56%	15,96%	13,45%	-3,20%	18,07%	26,02%	-0,45%	0,44%
(22)	-6,69%	-19,68%	-1,60%	-6,78%	-11,72%	0,88%	12,98%	-7,68%	2,54%
(23)[27]	18,65%	6,07%	-4,39%	-13,52%	-14,51%	-27,43%	-4,97%	-17,98%	-15,24%
(24)	-9,16%	-3,90%	-1,66%	-22,59%	-10,04%	12,12%	-8,61%	4,45%	-3,32%

Table C 5 - Proactiveness Dimension & Performance Indicators Correlations

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(25)	17,09%	18,32%	1,59%	0,77%	-7,50%	-5,72%	-10,56%	12,18%	21,04%
(26)[27]	-11,26%	1,53%	-1,04%	-3,27%	27,54%	12,44%	5,37%	18,50%	13,31%
(27)[27]	7,14%	0,09%	-11,29%	-1,77%	4,91%	-16,17%	10,54%	-20,77%	-17,07%
(28)[27]	-9,68%	16,14%	-4,49%	2,21%	-5,92%	-23,16%	3,76%	-11,80%	-8,86%
(29)[27]	-9,39%	-19,91%	-6,71%	-19,14%	-16,01%	-12,76%	-25,90%	-8,74%	-22,35%

Table C 6 - Riskiness Dimension & Performance Indicators Correlations

[27] Reversed Analysis.

- between [-10% - -20%]; - between [-20% - -30%]; - <-30%.

- between [10% - 20%]; - between [20% - 30%]; - >30%.

(1) We often sacrifice profitability to gain market share; (2) We often cut prices to increase market share; (3) We often set prices below competition; (4) We often seek market share position at the expense of cash flow and profitability; (5) We emphasize effective coordination among different functional areas; (6) Our information systems provide support for decision-making; (7) When confronted with a major decision, we usually try to develop through analysis; (8) We use several planning techniques; (9) We use the outputs of management information and control systems; (10) We commonly use manpower planning and performance appraisal of senior managers; (11) We occasionally conduct significant modifications to manufacturing technology; (12) We often use cost control systems for monitoring performance; (13) We often use production management techniques; (14) We often emphasize product quality through the use of quality circles; (15) Our criteria for resource allocation generally reflect short-term considerations; (16) We emphasize basic research to provide us with future competitive edge; (17) Forecasting key indicators of operations is common; (18) Formal tracking of significant general trends is common;(19) We often conduct "what if" analyses of critical issues; (20) We are constantly seeking new opportunities related to present operations; (21) We are usually the first ones to introduce new brands or products on the market; (22) We are constantly on the lookout for businesses that can be acquired; (23) Competitors generally pre-empt us by expanding capacity ahead of them; (24) Operations in later stages of the life cycle are strategically eliminated; (25) Our operations can be characterized as high-risk; (26) We seem to adopt a rather conservative view when making major decisions; (27) New projects are approved on a "stage by stage" basis rather than with blanket approval; (28) We have a tendency to support projects where the expected returns are certain; (29) Our operations have generally followed the "tried and true" paths.

D. Strategic Dimensions Clustering

1. Aggressiveness Dimension Clustering Distribution

4 - Cluster Analysis with Normalized Scores					*SSE*	117,09
No.	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Min.	Cluster
1	1,58	6,83	3,93	2,14	1,58	1
2	3,93	14,21	7,84	0,38	0,38	4
3	0,78	6,32	4,58	1,20	0,78	1
4	10,30	1,58	13,76	22,60	1,58	2
5	1,58	7,17	0,80	5,14	0,80	3
6	1,58	3,70	0,80	6,87	0,80	3
7	0,84	5,74	2,27	4,36	0,84	1
8	8,13	1,15	11,59	19,57	1,15	2
9	1,89	2,88	4,05	6,92	1,89	1
10	0,38	5,11	3,38	2,40	0,38	1
11	7,57	1,18	13,36	16,74	1,18	2
12	8,77	3,66	14,67	15,71	3,66	2
13	3,93	14,21	7,84	0,38	0,38	4
14	7,40	1,58	7,95	18,25	1,58	2
15	3,93	14,21	7,84	0,38	0,38	4
16	2,40	1,58	4,48	10,00	1,58	2
17	10,23	25,27	14,26	2,72	2,72	4
18	0,74	2,50	3,67	5,02	0,74	1
19	2,35	5,40	0,76	8,39	0,76	3
20	7,73	3,57	13,44	16,55	3,57	2
21	8,94	3,81	7,28	19,83	3,81	2
22	2,23	7,54	0,00	5,94	0,00	3
23	7,40	4,63	11,00	15,20	4,63	2
24	1,85	9,53	1,99	1,58	1,58	4
25	0,43	2,67	2,67	4,09	0,43	1
26	0,76	2,48	3,65	5,88	0,76	1
27	8,83	1,89	12,33	19,42	1,89	2
28	5,23	1,15	5,78	15,21	1,15	2
29	5,72	13,94	8,14	4,02	4,02	4
30	2,48	10,61	2,50	3,57	2,48	1
31	4,02	15,24	7,13	1,22	1,22	4
32	0,76	4,09	5,25	2,67	0,76	1
33	3,97	1,52	9,06	10,78	1,52	2
34	3,93	10,75	7,84	2,12	2,12	4
35	3,41	7,73	10,07	5,25	3,41	1
36	2,48	12,13	4,02	2,04	2,04	4
37	7,84	3,93	6,83	19,33	3,93	2
38	1,18	7,57	1,20	3,13	1,18	1
39	0,38	5,11	3,38	2,40	0,38	1
40	0,40	3,57	1,83	4,79	0,40	1
41	3,49	1,22	7,02	11,81	1,22	2
42	1,58	0,80	3,70	8,33	0,80	2
43	0,81	2,29	2,29	5,23	0,81	1
44	7,03	2,42	8,23	18,47	2,42	2
45	0,78	3,19	1,45	5,94	0,78	1
46	3,49	5,78	1,15	10,29	1,15	3
47	0,00	3,97	2,23	2,78	0,00	1
48	2,78	12,31	5,94	0,00	0,00	4
49	6,61	1,15	11,59	16,52	1,15	2
50	0,80	1,58	4,48	5,17	0,80	1
51	3,44	9,47	1,93	7,22	1,93	3
52	9,41	2,78	9,16	21,86	2,78	2
53	2,72	4,08	1,18	8,78	1,18	3
54	12,31	2,78	14,96	26,22	2,78	2
55	19,79	6,32	23,13	36,05	6,32	2
56	7,24	20,06	11,96	1,22	1,22	4
57	5,23	1,15	5,78	15,21	1,15	2
58	3,97	8,46	9,06	7,32	3,97	1
59	10,23	18,33	14,26	6,19	6,19	4
60	2,72	8,74	5,83	2,52	2,52	4
61	9,09	2,78	14,96	16,58	2,78	2
62	2,23	10,67	3,13	1,20	1,20	4
63	3,93	7,84	10,75	3,57	3,57	4
64	2,40	1,58	4,48	10,00	1,58	2
65	2,40	1,58	4,48	10,00	1,58	2
66	3,70	1,58	10,29	9,53	1,58	2
67	1,89	7,02	1,22	4,09	1,22	3
68	3,97	0,00	7,54	12,31	0,00	2

4 - Cluster Analysis – Cluster Centres				
No.	(1)	(2)	(3)	(4)
47	-0,280	-0,082	-0,257	-0,455
68	0,354	0,536	0,948	0,862
22	0,354	0,536	-1,462	-0,455
48	-1,547	-0,699	-0,859	-1,114

Clusters Count	
Cluster 1	19
Cluster 2	26
Cluster 3	8
Cluster 4	15

Table D 1 - Aggressiveness Dimension Clustering

2. Analysis Dimension Clustering Analysis

4 - Cluster Analysis with Normalized Scores					SSE	269,473
No.	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Min.	Cluster
1	0,000	32,056	5,009	6,011	0,000	1
2	2,004	32,056	3,005	4,007	2,004	1
3	3,005	51,090	12,021	3,005	3,005	1
4	4,007	52,091	7,012	2,004	2,004	4
5	7,012	37,065	4,007	7,012	4,007	3
6	8,014	32,056	7,012	10,018	7,012	3
7	3,005	35,062	12,021	11,019	3,005	1
8	14,025	60,106	7,012	8,014	7,012	3
9	6,011	14,025	9,016	20,035	6,011	1
10	12,021	12,021	19,033	34,060	12,021	2
11	10,018	14,025	17,030	28,049	10,018	1
12	13,023	75,132	24,042	5,009	5,009	4
13	4,007	38,067	7,012	6,011	4,007	1
14	7,012	39,069	10,018	19,033	7,012	1
15	3,005	23,040	6,011	11,019	3,005	1
16	5,009	51,090	6,011	1,002	1,002	4
17	24,042	96,169	25,044	6,011	6,011	4
18	4,007	46,081	7,012	2,004	2,004	4
19	3,005	43,076	8,014	3,005	3,005	1
20	4,007	22,039	9,016	14,025	4,007	1
21	3,005	23,040	10,018	15,026	3,005	1
22	22,039	12,021	27,047	48,084	12,021	2
23	5,009	41,072	2,004	5,009	2,004	3
24	15,026	71,125	12,021	3,005	3,005	4
25	11,019	61,107	12,021	3,005	3,005	4
26	7,012	31,055	4,007	11,019	4,007	3
27	32,056	0,000	31,055	58,102	0,000	2
28	7,012	47,083	10,018	3,005	3,005	4
29	2,004	32,056	7,012	8,014	2,004	1
30	0,000	32,056	5,009	6,011	0,000	1
31	3,005	25,044	8,014	15,026	3,005	1
32	4,007	50,088	7,012	2,004	2,004	4
33	12,021	76,134	15,026	2,004	2,004	4
34	3,005	33,058	6,011	7,012	3,005	1
35	13,023	61,107	16,028	13,023	13,023	4
36	6,011	32,056	13,023	12,021	6,011	1
37	3,005	39,069	2,004	3,005	2,004	3
38	6,011	46,081	5,009	4,007	4,007	4
39	6,011	58,102	9,016	0,000	0,000	4
40	5,009	31,055	0,000	9,016	0,000	3
41	11,019	71,125	14,025	3,005	3,005	4
42	16,028	64,113	21,037	6,011	6,011	4
43	14,025	38,067	15,026	16,028	14,025	1
44	1,002	27,047	8,014	9,016	1,002	1
45	5,009	35,062	4,007	5,009	4,007	3
46	5,009	51,090	6,011	1,002	1,002	4
47	1,002	39,069	8,014	5,009	1,002	1
48	8,014	62,109	11,019	2,004	2,004	4
49	3,005	45,079	4,007	3,005	3,005	1
50	2,004	22,039	7,012	12,021	2,004	1
51	24,042	96,169	25,044	6,011	6,011	4
52	15,026	69,121	16,028	3,005	3,005	4
53	6,011	50,088	5,009	4,007	4,007	4
54	15,026	77,135	18,032	3,005	3,005	4
55	2,004	38,067	3,005	4,007	2,004	1
56	12,021	70,123	15,026	2,004	2,004	4
57	23,040	5,009	28,049	47,083	5,009	2
58	19,033	43,076	20,035	27,047	19,033	1
59	24,042	96,169	25,044	6,011	6,011	4
60	9,016	51,090	4,007	5,009	4,007	3
61	3,005	45,079	6,011	3,005	3,005	1
62	4,007	36,063	5,009	6,011	4,007	1
63	5,009	51,090	10,018	5,009	5,009	1
64	1,002	27,047	4,007	9,016	1,002	1
65	2,004	36,063	7,012	4,007	2,004	1
66	14,025	70,123	15,026	4,007	4,007	4
67	1,002	33,058	8,014	9,016	1,002	1
68	6,011	58,102	9,016	0,000	0,000	4

4 - Cluster Analysis – Cluster Centres						
No.	(5)	(6)	(7)	(8)	(9)	(10)
30	-0,677	-0,677	-0,677	-0,677	-0,677	-0,677
27	-0,677	-2,679	0,324	-3,680	-3,680	-3,680
40	0,324	-1,678	0,324	0,324	-0,677	-1,678
39	0,324	0,324	0,324	0,324	0,324	0,324

Cluster Count	
Cluster 1	30
Cluster 2	4
Cluster 3	9
Cluster 4	25

Table D 2 – Analysis Dimension Clustering

3. Defensiveness Dimension Clustering Analysis

4 - Cluster Analysis with Normalised Scores					SSE	116,846
No.	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Min.	Cluster
1	16,333	0,000	21,360	4,763	0,000	2
2	3,779	5,427	6,292	0,664	0,664	4
3	9,720	4,799	14,747	1,292	1,292	4
4	2,513	21,360	0,000	8,284	0,000	3
5	1,292	21,539	1,292	9,720	1,292	1
6	1,292	21,539	1,292	9,720	1,292	1
7	3,114	7,419	5,628	2,657	2,657	4
8	3,114	18,158	5,628	6,236	3,114	1
9	10,710	14,928	8,197	4,072	4,072	4
10	8,197	9,902	10,710	1,559	1,559	4
11	19,654	0,664	24,680	5,427	0,664	2
12	4,627	34,829	2,114	17,064	2,114	3
13	2,742	6,463	7,769	1,847	1,847	4
14	9,084	3,963	9,084	1,523	1,523	4
15	4,876	9,237	7,389	0,895	0,895	4
16	4,627	24,090	2,114	13,484	2,114	3
17	7,769	39,227	2,742	20,206	2,742	3
18	1,183	15,444	1,183	4,735	1,183	1
19	0,664	14,340	3,177	3,779	0,664	1
20	4,799	4,407	7,312	2,114	2,114	4
21	3,779	5,427	6,292	0,664	0,664	4
22	20,948	7,769	18,435	6,292	6,292	4
23	7,092	4,627	7,092	2,187	2,187	4
24	1,292	16,225	1,292	4,407	1,292	1
25	3,732	28,564	1,219	14,379	1,219	3
26	8,284	9,789	5,771	2,513	2,513	4
27	4,106	6,427	6,620	0,555	0,555	4
28	5,504	8,609	10,531	1,523	1,523	4
29	0,000	16,333	2,513	5,771	0,000	1
30	3,732	16,593	1,219	4,627	1,219	3
31	11,776	2,742	14,290	1,559	1,559	4
32	3,408	27,624	0,895	10,969	0,895	3
33	0,628	18,218	0,628	6,399	0,628	1
34	0,628	18,218	0,628	6,399	0,628	1
35	6,874	32,963	1,847	17,521	1,847	3
36	1,450	9,084	3,963	3,211	1,450	1
37	10,112	4,407	12,625	2,114	2,114	4
38	7,769	39,227	2,742	20,206	2,742	3
39	0,628	18,218	0,628	6,399	0,628	1
40	1,847	13,451	1,847	2,742	1,847	1
41	3,963	31,508	1,450	13,743	1,450	3
42	4,627	34,829	2,114	17,064	2,114	3
43	10,454	6,292	20,507	7,769	6,292	2
44	2,742	8,977	2,742	1,847	1,847	4
45	4,627	18,777	2,114	8,171	2,114	3
46	2,513	21,360	0,000	8,284	0,000	3
47	3,177	19,367	0,664	6,292	0,664	3
48	2,513	21,360	0,000	8,284	0,000	3
49	4,799	4,407	7,312	2,114	2,114	4
50	5,771	4,763	8,284	0,000	0,000	4
51	3,177	14,340	10,717	6,292	3,177	1
52	18,051	8,312	18,051	5,622	5,622	4
53	3,840	19,445	3,840	6,517	3,840	1
54	3,177	24,680	0,664	11,605	0,664	3
55	2,114	7,092	4,627	1,219	1,219	4
56	1,847	25,423	1,847	12,494	1,847	1
57	23,825	4,106	28,851	13,559	4,106	2
58	7,312	14,747	4,799	9,940	4,799	3
59	7,769	39,227	2,742	20,206	2,742	3
60	1,292	16,225	1,292	4,407	1,292	1
61	3,732	16,593	1,219	4,627	1,219	3
62	7,105	18,509	2,078	8,866	2,078	3
63	2,187	11,751	2,187	3,512	2,187	1
64	2,513	21,360	0,000	8,284	0,000	3
65	0,000	16,333	2,513	5,771	0,000	1
66	2,513	21,360	0,000	8,284	0,000	3
67	2,742	8,977	2,742	1,847	1,847	4
68	2,513	21,360	0,000	8,284	0,000	3

4 - Cluster Analysis – Cluster Centres				
No.	(11)	(12)	(13)	(14)
29	-0,734	0,515	0,559	0,551
1	-1,527	-2,323	-1,676	-1,079
4	0,851	0,515	0,559	0,551
50	-0,734	-0,431	-0,931	-1,079

Cluster Count	
Cluster 1	18
Cluster 2	4
Cluster 3	23
Cluster 4	23

Table D 3 – Defensiveness Dimension Clustering

4. Futurity Dimension Clustering Analysis

4 - Cluster Analysis with Normalised Scores					SSE	178,096
No.	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Min.	Cluster
1	6,864	18,236	12,367	3,420	3,420	4
2	1,132	3,360	4,492	9,172	1,132	1
3	5,035	5,186	0,948	12,887	0,948	3
4	2,814	2,747	7,619	15,336	2,747	2
5	4,066	1,494	1,533	15,812	1,494	2
6	4,066	1,494	1,533	15,812	1,494	2
7	1,879	11,246	11,132	1,533	1,533	4
8	8,916	6,630	12,980	23,580	6,630	2
9	7,860	21,393	17,078	2,255	2,255	4
10	10,656	26,426	22,111	2,814	2,814	4
11	5,657	17,721	13,406	1,520	1,520	4
12	15,932	9,720	5,175	31,393	5,175	3
13	1,281	3,210	3,172	8,450	1,281	1
14	9,055	23,084	17,523	1,708	1,708	4
15	10,296	18,712	10,656	7,619	7,619	4
16	7,153	12,367	12,022	12,282	7,153	1
17	5,072	0,973	4,042	18,267	0,973	2
18	2,685	6,466	4,492	9,172	2,685	1
19	1,494	3,432	1,841	8,654	1,494	1
20	10,445	22,050	21,225	5,597	5,597	4
21	2,426	10,699	9,491	2,079	2,079	4
22	14,482	33,319	27,298	3,420	3,420	4
23	3,332	4,569	2,267	8,928	2,267	3
24	0,948	3,979	3,481	8,108	0,948	1
25	2,079	1,294	3,979	13,133	1,294	2
26	2,772	6,247	3,945	6,132	2,772	1
27	6,371	17,703	16,343	2,814	2,814	4
28	0,388	4,103	6,712	6,865	0,388	1
29	1,106	2,267	2,229	9,043	1,106	1
30	0,973	5,858	7,297	5,110	0,973	1
31	2,426	10,699	9,491	2,079	2,079	4
32	1,520	5,159	10,032	10,337	1,520	1
33	10,296	11,300	3,244	15,031	3,244	3
34	0,585	6,247	6,132	3,945	0,585	1
35	3,634	6,759	5,475	8,359	3,634	1
36	5,547	2,685	0,000	16,413	0,000	3
37	10,994	23,911	15,779	3,741	3,741	4
38	2,288	3,757	7,919	11,010	2,288	1
39	7,189	4,300	1,691	18,158	1,691	3
40	5,620	1,494	4,639	18,919	1,494	2
41	8,815	10,812	9,353	11,388	8,815	1
42	9,615	1,708	7,116	28,960	1,708	2
43	8,916	21,453	27,803	8,757	8,757	4
44	1,879	11,246	11,132	1,533	1,533	4
45	14,535	31,827	27,360	5,017	5,017	4
46	9,615	3,895	11,491	28,960	3,895	2
47	1,691	8,496	7,288	2,814	1,691	1
48	4,492	0,000	2,685	19,251	0,000	2
49	0,000	4,492	5,547	5,700	0,000	1
50	5,700	19,251	16,413	0,000	0,000	4
51	7,189	2,747	3,244	19,711	2,747	2
52	9,392	5,821	3,979	18,704	3,979	3
53	5,374	7,320	4,885	14,789	4,885	3
54	9,615	1,708	7,116	28,960	1,708	2
55	4,475	8,132	14,482	13,197	4,475	1
56	1,691	1,682	2,814	11,968	1,682	2
57	6,604	12,297	8,518	7,821	6,604	1
58	8,450	3,507	9,550	27,018	3,507	2
59	22,478	15,950	8,757	37,163	8,757	3
60	3,210	1,281	5,060	16,500	1,281	2
61	0,734	3,757	4,813	7,903	0,734	1
62	1,553	4,492	8,654	8,806	1,553	1
63	1,106	6,741	6,703	4,569	1,106	1
64	2,576	4,103	4,525	9,052	2,576	1
65	2,138	6,247	9,239	7,051	2,138	1
66	3,556	0,935	3,161	17,539	0,935	2
67	0,000	4,492	5,547	5,700	0,000	1
68	0,000	4,492	5,547	5,700	0,000	1

4 - Cluster Analysis – Cluster Centres					
No.	(15)	(16)	(17)	(18)	(19)
68	-0,598	0,092	-0,099	-0,139	0,112
48	0,141	0,715	1,397	0,718	0,877
36	0,881	-0,532	1,397	0,718	0,112
50	-0,598	-0,532	-1,595	-0,996	-1,417

Cluster Count	
Cluster 1	26
Cluster 2	16
Cluster 3	9
Cluster 4	17

Table D 4 – Futurity Dimension Clustering

5. Proactiveness Dimension Clustering Analysis

4 - Cluster Analysis with Normalised Scores					SSE	195,776
No.	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Min.	Cluster
1	9,819	11,773	3,638	19,034	3,638	3
2	1,477	12,724	6,184	1,678	1,477	1
3	6,085	2,810	2,740	9,543	2,740	3
4	12,210	27,928	25,187	5,836	5,836	4
5	18,418	2,718	10,993	16,184	2,718	2
6	18,418	2,718	10,993	16,184	2,718	2
7	7,254	4,227	2,094	13,380	2,094	3
8	8,805	17,494	19,066	1,608	1,608	4
9	4,679	12,015	1,678	14,435	1,678	3
10	10,866	20,877	6,460	16,564	6,460	3
11	14,633	16,903	4,783	21,744	4,783	3
12	10,047	19,063	22,791	7,489	7,489	4
13	4,227	11,348	8,935	0,303	0,303	4
14	2,094	15,404	4,879	4,358	2,094	1
15	1,240	11,068	6,685	1,914	1,240	1
16	2,201	8,399	5,939	4,086	2,201	1
17	21,527	6,950	9,177	22,837	6,950	2
18	0,000	11,262	4,817	4,529	0,000	1
19	13,561	10,782	2,740	22,355	2,740	3
20	2,765	9,210	0,842	7,317	0,842	3
21	5,625	8,587	2,515	8,587	2,515	3
22	9,826	7,971	1,899	12,811	1,899	3
23	2,201	8,399	2,093	4,086	2,093	3
24	8,078	22,940	18,229	2,740	2,740	4
25	1,779	10,746	8,520	5,906	1,779	1
26	7,304	5,498	7,304	3,606	3,606	4
27	10,162	14,180	3,982	21,440	3,982	3
28	2,687	7,960	1,608	10,380	1,608	3
29	5,161	4,493	0,344	9,333	0,344	3
30	1,240	15,193	6,685	6,040	1,240	1
31	8,763	8,179	4,124	12,492	4,124	3
32	2,148	6,530	2,147	4,637	2,147	3
33	1,844	7,809	3,660	5,389	1,844	1
34	2,397	9,797	3,585	9,797	2,397	1
35	16,645	8,834	12,562	11,782	8,834	2
36	4,817	6,212	0,000	11,052	0,000	3
37	14,475	9,649	3,764	25,535	3,764	3
38	5,491	10,797	10,306	2,171	2,171	4
39	3,094	11,137	6,941	13,030	3,094	1
40	7,108	2,711	8,689	7,023	2,711	2
41	11,262	0,000	6,212	13,466	0,000	2
42	3,772	7,046	8,805	7,046	3,772	1
43	10,183	10,623	4,177	13,571	4,177	3
44	1,969	7,918	5,598	1,185	1,185	4
45	2,718	13,669	5,161	6,936	2,718	1
46	4,278	8,908	0,539	9,435	0,539	3
47	5,921	7,053	2,810	5,161	2,810	3
48	3,124	17,126	12,650	1,240	1,240	4
49	2,930	8,880	4,637	2,147	2,147	4
50	9,892	16,090	5,939	11,777	5,939	3
51	7,843	7,011	6,941	8,904	6,941	3
52	8,528	7,529	7,272	10,477	7,272	3
53	4,649	8,536	10,202	1,803	1,803	4
54	5,859	15,751	17,416	4,177	4,177	4
55	8,031	20,054	11,265	5,223	5,223	4
56	0,594	13,043	6,598	6,310	0,594	1
57	9,742	7,358	3,396	18,404	3,396	3
58	7,771	6,460	6,062	9,407	6,062	3
59	12,203	14,750	22,791	11,802	11,802	4
60	5,087	17,506	12,795	2,147	2,147	4
61	3,688	7,575	7,317	0,842	0,842	4
62	0,937	15,450	6,941	8,717	0,937	1
63	4,529	13,466	11,052	0,000	0,000	4
64	3,750	8,512	6,192	1,779	1,779	4
65	4,952	7,023	8,689	2,711	2,711	4
66	4,591	14,404	9,927	0,937	0,937	4
67	1,477	12,724	6,184	1,678	1,477	1
68	6,633	11,692	11,341	0,646	0,646	4

Table D 5– Proactiveness Dimension Clustering

4 - Cluster Analysis – Cluster Centres					
No.	(20)	(21)	(22)	(23)	(24)
18	0,274	-0,776	0,599	-0,292	0,736
41	0,274	0,983	-1,052	1,911	-0,034
36	-0,707	-0,776	-1,052	0,443	-0,034
63	0,274	0,983	1,149	-1,026	-0,034

Cluster Count	
Cluster 1	15
Cluster 2	6
Cluster 3	26
Cluster 4	21

6. Riskiness Dimension Clustering Analysis

4 - Cluster Analysis with Normalised Scores					SSE	238,139
No.	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Min.	Cluster
1	4,081	5,408	9,991	1,095	1,095	4
2	11,460	2,208	5,126	6,456	2,208	2
3	10,179	12,114	6,724	9,976	6,724	3
4	10,239	5,653	0,000	6,917	0,000	3
5	5,502	5,182	14,840	3,560	3,560	4
6	5,502	5,182	14,840	3,560	3,560	4
7	13,702	8,833	1,060	9,815	1,060	3
8	7,415	5,079	3,536	3,664	3,536	3
9	6,555	5,338	5,680	2,439	2,439	4
10	1,060	6,456	8,896	5,884	1,060	1
11	0,954	9,530	13,171	8,181	0,954	1
12	13,167	11,185	22,277	24,055	11,185	2
13	8,495	4,392	3,664	3,536	3,536	4
14	3,481	6,009	11,793	2,898	2,898	4
15	2,335	11,840	12,574	12,395	2,335	1
16	3,134	8,115	19,257	7,836	3,134	1
17	14,736	27,059	16,792	19,482	14,736	1
18	7,021	1,060	4,592	4,314	1,060	2
19	5,389	3,536	6,917	0,000	0,000	4
20	9,461	5,884	2,703	5,882	2,703	3
21	0,000	5,678	10,239	5,389	0,000	1
22	7,890	11,963	8,942	8,059	7,890	1
23	3,587	5,338	12,324	5,407	3,587	1
24	20,418	9,461	3,395	11,296	3,395	3
25	11,977	3,513	3,240	5,565	3,240	3
26	5,041	3,240	3,513	5,989	3,240	2
27	7,262	9,517	17,449	9,433	7,262	1
28	12,980	4,505	6,221	5,573	4,505	2
29	5,884	6,009	9,390	0,495	0,495	4
30	3,595	2,703	4,046	5,386	2,703	2
31	2,439	5,078	10,275	1,749	1,749	4
32	12,912	5,963	9,882	13,815	5,963	2
33	17,070	13,421	4,428	9,657	4,428	3
34	8,703	2,489	12,583	4,187	2,489	2
35	10,812	22,787	28,011	12,311	10,812	1
36	9,433	1,252	3,099	3,586	1,252	2
37	4,011	8,892	5,538	6,124	4,011	1
38	10,104	1,145	4,195	6,659	1,145	2
39	5,678	0,000	5,653	3,536	0,000	2
40	17,377	14,452	20,458	4,914	4,914	4
41	12,347	17,216	17,406	5,549	5,549	4
42	10,379	3,357	7,526	1,593	1,593	4
43	8,190	9,823	4,736	13,350	4,736	3
44	7,339	4,195	2,983	1,643	1,643	4
45	5,182	3,099	1,252	5,565	1,252	3
46	18,599	5,389	9,862	5,678	5,389	2
47	7,490	2,206	3,134	3,481	2,206	2
48	2,933	3,594	8,791	2,243	2,243	4
49	7,836	2,703	3,481	1,145	1,145	4
50	7,014	6,716	6,139	4,736	4,736	4
51	10,179	4,158	6,724	5,998	4,158	2
52	6,659	0,992	4,655	5,511	0,992	2
53	15,691	5,006	3,049	6,139	3,049	3
54	13,793	14,919	9,862	11,645	9,862	3
55	12,439	1,593	8,032	6,900	1,593	2
56	5,078	10,394	7,455	12,992	5,078	1
57	9,393	4,939	1,557	9,318	1,557	3
58	8,793	3,701	3,360	7,444	3,360	3
59	15,505	12,159	14,401	14,336	12,159	2
60	8,793	5,539	3,360	11,120	3,360	3
61	13,388	6,034	5,127	3,558	3,558	4
62	8,181	3,431	7,731	0,954	0,954	4
63	7,941	1,749	1,608	3,089	1,608	3
64	10,490	7,518	9,014	5,466	5,466	4
65	7,941	1,749	1,608	3,089	1,608	3
66	5,546	5,703	9,953	4,505	4,505	4
67	3,664	4,618	3,689	2,208	2,208	4
68	4,161	3,126	4,187	1,711	1,711	4

4 - Cluster Analysis – Cluster Centres					
No.	(25)	(26)	(27)	(28)	(29)
21	-0,588	1,049	0,529	0,641	1,186
39	0,090	0,274	-0,881	-0,765	0,380
4	-0,588	-0,502	0,529	-0,765	-1,234
19	0,768	-0,502	-0,176	0,641	0,380

Cluster Count	
Cluster 1	12
Cluster 2	17
Cluster 3	17
Cluster 4	22

Table D 6 – Riskiness Dimension Clustering

E. Industry - Economic Sector Breakdown

Industry - Economic Sector Breakdown		
	Frequency	%
Manufacture of food products, beverages, and tobacco products	3	7%
Manufacture of textiles, wearing apparel and leather products	2	5%
Manufacture of wood and paper products, and printing	4	9%
Manufacture of chemicals and chemical products	1	2%
Manufacture of basic pharmaceutical products and pharmaceutical preparations	1	2%
Manufacture of rubber and plastic products, and other non-metallic mineral products	3	7%
Manufacture of basic metals and fabricated metal products, except machinery and equipment	17	39%
Manufacture of computer, electronic and optical products	2	5%
Manufacture of electrical equipment	1	2%
Manufacture of machinery and equipment n.e.c.	4	9%
Manufacture of transport equipment	1	2%
Manufacture of furniture; other manufacturing; repair and installation of machinery and equipment	5	11%

Table E 1 - Industry – Economic Sector Breakdown[28]

[28] According to the NACE Rev.2 – Statistical Classification of Economic Activities (EUROSTAT, 2008).