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Does Uncertainty Boost Exports? A Study on the Effect of Innovation and Marketing Capabilities in a Small and Innovation-Intensive Sector

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Abstract: The main goal of this research is to study the impact of uncertainty on export performance, from a resource-based perspective. Despite the ample research on how economies behave during periods of high uncertainty, there is still a poor understanding of how this affects smaller sectors, particularly the most exposed to global competition. In this paper, we perform an evaluation of export performance for the Portuguese pharmaceuticals sector (PPI), before and after a period of considerable uncertainty. This study's results show strong incremental performance gains, during this period. It also confirmed the importance of marketing capabilities, innovation and networking resources in developing international businesses.

Keywords: export performance; innovation; marketing capabilities; pharmaceutical industry; resource-based view; uncertainty

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1. Introduction

We live in an ever-globalized world. Dominant companies are usually global players that can take advantage of opportunities in several markets (Barney et al. 2001). In the pharma sector (PI), leading companies are also characterized by operating at a global scale. The so-called 'Big Pharma' enterprises are not only notably important in their home markets, but also in all countries where they operate (Public Eye 2021; Teramae et al. 2020). Regional organizations are faced with challenges to their survival in such a highly competitive environment. The local markets that previously generated large revenue figures, are now proving to be unsustainable. Highly specific sectors in small economies are particularly sensible to periods of uncertainty, as a consequence of their volatile context (Liesch et al. 2011). This is the group where the PPI sector is included (Apifarma 2020).

The Portuguese economy was subjected to a rigorous economic adjustment program from 2011 to 2015. As a result, the local pharmaceutics market suffered a strong contraction of approximately 25% during this period (Apifarma 2016). Companies that mostly relied on their local activities where severely impacted. As a consequence of the highly uncertain playing field that originated from this period, organizations looked for ways to mitigate their losses; one of which was to expand their activities to foreign markets (Cuervo-Cazurra et al. 2017; Vieira et al. 2021). The pharmaceutical industry (PI) is highly innovative, particularly when competing at a global scale (EFPIA 2022). The PPI, mostly comprised of small and medium sized companies with limitations in terms of resources and capabilities, faces severe challenges when penetrating a highly competitive and global environment (DiMasi et al. 2016). There is no available research dedicated to studying the effects of internationalization of small sector companies, during uncertainty periods, when innovation and resource availability is particularly crucial.

In order to study this phenomenon, we performed a literature review that enabled the framing of PI's internationalization strategies and uncertainty, in our research.

Buckley et al. (2017), when studying internationalization, highlighted that the current body of knowledge does not have an impactful contribution for companies to overcome their respective challenges. As a means to provide a more adequate answer to this problem, we formulated the following research question: Which are the PI resources that contribute the most to export performance in an uncertainty environment?

Very specific sectors of the economy are more vulnerable when exposed to international competition, particularly in environments characterized by being intensely innovative. This study aims to be a small contribution to the academic knowledge related to internationalization and uncertainty, specifically that which regards the resources and capabilities with higher impact on export performance.

2. Background

2.1. The Pharmaceutical Industry

The pharmaceutical industry (PI) plays a very important role in the modern world, considering how it is associated with populations' quality of life. We have recently seen remarkable advances in treatments for numerous diseases that used to have high mortality rates, and can now be either completely cured or at least allow patients to live a normal life, often with no limitations (EFPIA 2022). The recent contribution of the PI in response to the COVID-19 global pandemic was a notable achievement, providing a swift response with the development of vaccines and other treatments, in a very short time. This allowed the world's population to return to a situation of relative normality (WHO 2022). As such, the PI is considered a strategic economic sector for all countries, due to the impact of some of its developments for economic indicators (EFPIA 2022).

The sustainability model of PI companies has seen deep changes in the last 25 years. Former blockbuster products, that provided a comfortable cushion for the 'Big Pharma', have since been replaced by their much cheaper generic counterparts, as a consequence of expiring patents. This led to reduced commercial margins and financial resources (Bartlett and Ghoshal 2000). As a consequence, the PI started to channel resources towards the development of sustainable competitive advantages (Barney 1991; Tan and Sousa 2015), by targeting R&D to create new, innovative and more sophisticated drugs, with more added value and reproducibility complexity, thus reducing the chances of being copied by competitors (Teramae et al. 2020; Vieira et al. 2021).

Investing in pharmaceutical R&D is very demanding in regards to resources. The cost of developing new and innovative medicine has tripled in the last 25 years and can surpass EUR 1 billion (EFPIA 2022). It is also an activity that is highly prone to risks, considering how small the number of newly developed products that reach the market is (DiMasi et al. 2016).

The modern PI business model is centered around developing innovative products with high added value. These are commonly associated with higher prices and better commercial margins. As a way to leverage this model's sustainability and achieve greater financial returns in the short term, companies try to market these products in as many countries as possible, therefore increasing their internationalization levels (Teramae et al. 2020; EFPIA 2022). Consequentially, the world's pharmaceutics market has been increasing consistently in volume and revenue. In 2021 it was valued at EUR 1.192 billion, with a YoY growth of 8% (IQVIA 2021).

2.2. Internationalization in the Pharmaceutic Sector

Internationalization determinants have been thoroughly analyzed in both academic and corporate fields, in the last decades. Several approaches were used, with the goal of understanding them from different perspectives. However, the body of work aiming to study the exporting dynamics at lower levels and in specific sectors, namely the PI, are scarce. Moreover, the study of PI internationalization in times of uncertainty are practically non-existent.

Available research (see Appendix A) is dispersed in terms of adopted methodological criteria and objectives, resulting in added complexity when performing a homogenous

analysis, as highlighted by other researchers (Wrona and Trąpczyński 2012). The most common theoretical frameworks are the resource-based view, incremental internationalization models and the eclectic paradigm (Ribau et al. 2015). These approaches explain internationalization from the standpoint of available resources, tendentially in an incremental way, from the first export stages up to the establishment of commercial or production branches in target markets (Vahlne and Johanson 2017). These same studies highlight a set of key attributes with a higher impact on export performance, most notably the available resources, marketing capabilities and innovation (Kaleka and Morgan 2017).

2.3. The Portuguese Pharmaceutics Production Sector

The Portuguese economy is relatively small, when compared with global competitors. The PPI sector is in line with the country's other economic sectors, mostly comprised of small and medium companies (Apifarma 2020). The domestic market represents roughly 0.4% of the world's pharmaceutics market (IQVIA 2021), with a reported revenue of EUR 4 billion in 2021. Innovation capabilities are also rather low, evidenced by the small volume of investment allocated to it, which is significantly lower than that of similar economies. This paints the picture of a relatively fragile sector, as it tries to compete in a global market (EFPIA 2022).

In 2011, the Portuguese economy was subjected to a financial bailout that resulted in an enormous contraction of all economic activity sectors, with special impact on the PI. From 2011 until 2014, the pharmaceutical market value decreased by EUR 827 million, roughly 25% (Apifarma 2016). This situation was very impactful for companies with activities focused primarily in the domestic market, as their margins and financial resources harshly fell. This sudden and drastic turn to an uncertain and unfavorable environment, led companies to start or intensify their international projects, to compensate for the losses suffered domestically (Vieira et al. 2021). With this research, we aim to study the changes in export performance during this period, as well as to identify the resources and capabilities proven to be more impactful.

3. Theoretical Framework

3.1. The Perception of Uncertainty

Uncertainty and risk aversion are frequently associated with lower performance levels, hesitation and delays in internationalization strategies (Baley et al. 2020; Liesch et al. 2011). Export activities can be seriously compromised when the perceived risk and uncertainty are not considered acceptable (Johanson and Vahlne 1977; Vahlne and Johanson 2017).

Uncertainty and risk are important factors for decisions related to internationalization, through all stages; for example, when choosing which markets to expand to or which strategy to adopt (Bonfim et al. 2018; Cuervo-Cazurra et al. 2017; Helm and Krinner 2014; Kuiken et al. 2021).

Lack of information on target markets and limited resources are common traits of early internationalization stages. This increases risk and uncertainty, resulting in greater complexity for decision-makers (Liesch et al. 2011; Vieira et al. 2021). In academic literature, psychic distance has been identified as one of the determinant factors of internationalization (Ciszewska-Mlinarič and Trąpczyński 2016). The effect of psychic distance in export performance shows controversial results, often seemingly paradoxical, perhaps because of its subjective nature as a construct, as it is heavily dependent on the manager's perceptions (Sousa and Lages 2011).

McDougall and Oviatt (2000) introduce a different perspective, stating that risk is entirely owned by managers from the earliest stages. According to researchers, the managers' experience is considered fundamental for reducing risk and uncertainty perceptions and, consequentially, for the success of internationalization endeavors. Previously, Penrose (1959) highlighted the importance of top management as one of the most critical resources in internationalization projects.

Risk and uncertainty perception does not originate exclusively from analyzing target markets. It is often a characteristic of companies' domestic market (Cuervo-Cazurra et al. 2017; Helm and Krinner 2014; Jhunior et al. 2021). In such cases, risk and uncertainty can originate from politically unstable climates (Henisz et al. 2010). Political instability, as the uncertainty related to political and social shifts imposed on the institutional domain, can overcome macroeconomic indicators, and negatively impact entrepreneurial activities.

Cuervo-Cazurra et al. (2017) state that organizations can acquire key exporting competences, by dealing with unfavorable institutional contexts in their home country; for example, due to severe corruption or political instability levels. This stability, or lack thereof, can become an important factor, for instance, due to losses in the domestic market share or profitability. In such cases, it can be an important catalyst for internationalization, when companies decide to mitigate exposure to the local market by increasing exporting activities (Hollensen 2017, p. 86). Institutional instability is, therefore, a strong incentive for companies to become international, albeit reactively, as a response to structural or contextual episodes occurring in their original markets (Anil et al. 2016).

3.2. Evaluating Export Performance

Understanding determinant factors for export performance is considered critical to assure the long-term sustainability of organizations and their strategies (for example Anil et al. 2016). Scientific literature has defined 'export performance' as the evaluation of strategy results (Lages et al. 2005). More than just a variable, it is regarded as a key indicator of the adequate use of the resources and capabilities available for internationalization. This has been extensively studied in recent years, with the goal of understanding which factors and behaviors contribute the most to the success of corporate international expansion (Beleska-Spasova 2014). Despite this fact, this remains a rather controversial topic, mainly due to the identification of performance factors and how these are measured (Garrido et al. 2009).

Shoham (1998) defines export performance as the results of a company's activity in foreign markets. Performance can be measured through economic indicators (such as sales volume, financial results, margins, market share, export intensity) as well as non-economic indicators (experience in certain markets, product penetration, results perception and so on). Export intensity is another useful indicator to measure export performance (Sousa 2004). Kahiya and Dean (2014) reported this determinant as having a good explanation potential, when compared to firm factors.

Measuring perceived performance, as opposed to measuring performance per se, captures the company's aspirations. The company is successful if international performance is better than initially expected. These perception determinants are comparable between different companies (Lages and Lages 2004; Tan and Sousa 2015).

Zou et al. (1998) developed the EXPERF scale, which has been frequently used in academic research, due to its robustness, multidimensionality and for being consensually accepted in international studies (Shoham 1998). Based on organizational capacity and companies' management resources, this scale represents the performance of internationalization led by internal factors, namely characteristics, competences and strategy. According to Wheeler et al. (2008), the EXPERF scale combines financial measures (sales, results, growth), with non-financial dimensions (success perception, satisfaction and achieved results). It establishes a bridge between quantitative and qualitative internationalization performance factors, turning it into an appropriate tool to be used in various contexts. Its credibility results from extensive empirical validation.

Cuervo-Cazurra et al. (2017) hypothesized and confirmed that political instability in origin countries is positively correlated with internationalization performance. The PPI has suffered from great uncertainty domestically, due to local market contractions, from 2011 until 2015. In order to understand the behavior of export performance, during and after this period, we propose the following hypothesis:

Hypothesis 1a (H1a). *Export performance increased after the period of local market instability.*

Hypothesis 1b (H1b). *Export intensity increased after the period of local market instability.*

Hypothesis 1c (H1c). *International revenue increased after the period of local market instability.*

3.3. Resources and Internal Capabilities

According to a resources-based view, a company's main role is to acquire resources for the production of goods and services to generate profit (Kozlenkova et al. 2014; Penrose 1959). Experienced human resources are key as they are responsible for assuring that available resources are managed optimally (Penrose 1959). These resources can be tangible or intangible assets; for example, physical, technological or human. The competitive advantages of a company depend on these resources (Barney et al. 2011; Penrose 1959). Companies make use of heterogenous resources and capabilities that, when used for the development of resources that are unique, valuable and hard to copy by competitors, enable sustainable competitive advantages. These result from unique or highly valuable resources and from the creation of specific capabilities that enable the company to compete with higher returns (Barbosa et al. 2016; Morgan et al. 2004).

Therefore, international expansion can occur when companies have sufficiently competitive resources available, surpassing the additional costs of starting to operate in a new market. Internationalization can be faced as a way to increase revenue streams from optimizing valuable resources (Barbosa et al. 2016). Rivalry in target markets is based on resources that companies not only possess but are also very knowledgeable about. Consequentially, respective managers can often be the most valuable and inimitable resources. The manager's role is considered even more important in small and medium companies, where they are often also the owner. Their perception of external markets is critical for determining the company's export behavior (Anil et al. 2016).

Research in this area usually highlights the importance of identifying specific and highly valuable resources, given how these can be the source of competitive advantage in an international context. Morgan et al. (2006) have isolated six types of resources that form an important source of competitive advantage in internationalization ventures: reputational (intangible assets such as brand equity); financial (access to financial resources); human (volume and diversification of human resources at the company's disposal to implement internationalization strategies); cultural (shared values and beliefs within the organization that determine behavioral norms, shaping competitive strategies); relational (relevance of networking in target markets); and informational (access to information sources regarding business, customer, channels, suppliers and competitors).

Morgan et al. (2006), when studying the English and German industrial sector, did not notice any significant impacts in export performance resulting from resource availability, contradicting previous research on resource-based view and its importance for companies. We aim to study these phenomena within this study's object sector, with the following hypothesis:

Hypothesis 2 (H2). *Higher resource availability is positively associated with export performance.*

Hypothesis 2a (H2a). *Higher financial resource availability is positively associated with export performance.*

Hypothesis 2b (H2b). *Higher human resource availability is positively associated with export performance.*

Hypothesis 2c (H2c). *Higher cultural resource availability is positively associated with export performance.*

Hypothesis 2d (H2d). *Higher networking resource availability is positively associated with internationalization performance.*

Hypothesis 2e (H2e). *Higher informational resource availability is positively associated with export performance.*

3.4. Marketing Capabilities and Internationalization

Marketing capabilities have been established as one of the most important sources of increased performance and competitive advantage (Costa et al. 2020; Tan and Sousa 2015). One of the consequences of internationalization processes is more exposure to competition. This leads to an increasing need to develop marketing capabilities, as a way to identify and fulfill the needs of customers in foreign markets, better than competitors (Morgan et al. 2018).

Some authors suggest that strategic decisions are a response to what managers perceive as being more relevant within the competitivity context. This happens, essentially, at a product-market management level, where strategic decisions are the result of an analysis continuum, involving the constant tension between cost efficiency strategies versus marketing differentiation (Kaleka and Morgan 2019).

This concept has been the subject of recent academic research (Morgan 2012; Morgan et al. 2018). Marketing capabilities can be defined as complex groups of capabilities and accumulated knowledge that allow the company to coordinate its activities and effectively utilize its assets. It is the ability of a company for using available resources for achieving marketing objectives and desired results (Costa et al. 2020; Morgan et al. 2012).

Marketing capabilities are, therefore, evident in a company's processes, from available resources to current and potential customers, when building and communicating added value offers (Kotler and Armstrong 2018; Morgan et al. 2012).

Morgan (2012) conceptualized four types of marketing capabilities: specialized (based on product, price, place and promotion, the traditional 4P marketing-mix strategy); architectural (regarding the development and implementation of the marketing strategy); multifunctional (focused on brand management, CRM and new product development); and dynamic capabilities (related to the understanding of the market and the optimization of available resources and capabilities).

The development of competitive advantage from marketing capabilities is conceptually sustained by the theory of dynamic capacities and of competitive advantage, both of which explain its impact on export performance (Barney et al. 2011; Newbert 2007). The company's ability to explore and reassign resources as per the market dynamics is intrinsically connected to sustainable competitive advantage, developed through time (Morgan et al. 2018; Tan and Sousa 2015).

In recent years, internationalization literature has studied the impact of marketing capabilities on export performance, at a macro level, regardless of the sector under analysis (for example Morgan et al. 2012; Tan and Sousa 2015). With this study, we want to evaluate the relationship between marketing capabilities and export performance in a specific sector, highly demanding in terms of resources and capabilities. As such, we believe that the eventually drawn conclusions may be innovative and a relevant contribution to the existing body of knowledge, in regard to internationalization theory. We also aim to study how marketing capabilities can be used as a leaver for internationalization during uncertain periods, something yet to be demonstrated (Helm and Krinner 2014). Zou et al. (2003) described the relationship between marketing-mix variables in export performance for Chinese companies. In this study we want to identify relationships between dynamic capabilities and export performance, in the PPI sector, the object of this research. As such, we present the follow hypothesis:

Hypothesis 3 (H3). *Marketing capabilities are positively associated with export performance.*

Hypothesis 3a (H3a). *Price capabilities are positively associated with export performance.*

Hypothesis 3b (H3b). *Product capabilities are positively associated with export performance.*

Hypothesis 3c (H3c). *Promotion capabilities are positively associated with export performance.*

Hypothesis 3d (H3d). *Placement capabilities are positively associated with export performance.*

3.5. Innovation as a Determinant of Export Performance

Uncertainty challenges companies to maintain a constant ability to reinvent its business processes and to come up with new ways to grow and generate additional profit (Clauss 2017). Because of this, research on innovation has been intense in recent years (Brancati et al. 2022).

According to Knight and Cavusgil (2004), innovation originates from two different sources: research and internal development, resulting from accumulated knowledge within the company and by imitating other companies. Some studies demonstrate a positive correlation between innovation and financial performance, while others studied the influence of innovation in companies' internationalization ventures (Moreira et al. 2022).

Not all companies have enough resources to sustain the high costs of internationalization (increased fixed and variable costs, higher distribution and transportation costs and more complex marketing strategies). According to some authors, only the most productive firms become exporters, supporting the self-selection vision of internationalization (Bernard et al. 1995). They argued that innovation is an important determinant of export performance. So, corporations require important innovation skills before exporting (Movahedi and Gaussens 2012; Wagner 2007). Conversely, companies improve their performance and innovation capabilities after entering external markets. As a consequence of the intense global competition, companies have to improve their efficiency, innovation capabilities and product differentiation, thus improving their productivity levels (De Loecker 2013; Segarra-Blasco et al. 2020). Available studies regarding these views have given controversial evidence regarding its power to explain export performance. Segarra-Blasco et al. (2020), when studying European manufacturing firms between 2001 and 2014, found different results depending on the innovation level within each country.

Innovation is the process through which new architectures and value chains are created, such as new products or services, new ways of operating in existent markets or even organizational processes that improve the performance of organizations (Chesbrough 2010). The ability to integrate innovation in business is of critical importance to maintain a competitive performance and consistent value for customers, assuring a higher probability of success in local and international operations (Child et al. 2017).

The PI is highly intensive in innovation (EFPIA 2022). Despite resources' limitations in the PPI (Apifarma 2020), its ability to explore innovation related resources may prove to be a key aspect of export performance for the sector. Asemokha et al. (2019) and Moreira et al. (2022) demonstrated a positive association between innovation and export performance. With this research we intend to identify significant associations between innovation and export performance. In addition, we want to study potential associations between innovation and marketing capabilities, identifying eventual sources of innovation in the studied sample (Knight and Cavusgil 2004; Movahedi and Gaussens 2012). Therefore, we propose the following hypothesis:

Hypothesis 4 (H4). *Higher levels of innovation are associated with better export performance.*

Hypothesis 4a (H4a). *Higher levels of innovation are associated with higher volumes of marketing-mix resources (pricing).*

Hypothesis 4b (H4b). *Higher levels of innovation are associated with higher volumes of marketing-mix resources (product).*

Hypothesis 4c (H4c). *Higher levels of innovation are associated with higher volumes of marketing-mix resources (placement).*

Hypothesis 4d (H4d). *Higher levels of innovation are associated with higher volumes of marketing-mix resources (promotion).*

3.6. Research Framework

A diagram of this study's broad framework can be seen in Figure 1. Additionally, a group of control variables were included, in order to better characterize and contextualize the sector under analysis; namely, the years of international activity, the volume of countries where the company is present, the total number of employees, the percentage of employees allocated to international activity and the main international activity (see Appendix A).

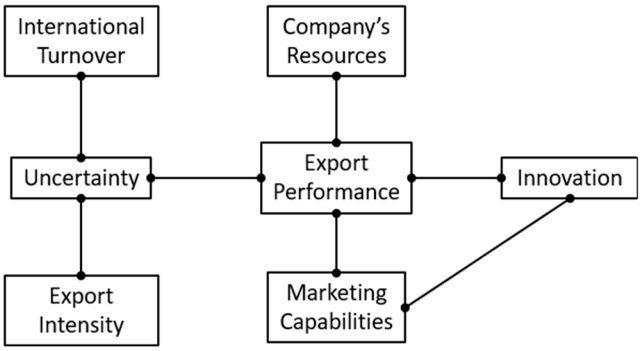

Figure 1. Research framework.

4. Methodology

4.1. Methodological Options

We used a quantitative methodology, sourcing data from structured surveys (Quivy and Campenhoudt 2005; Saunders et al. 2009). The main objective of this study is the identification of the resources most commonly used by companies and which are associated with higher levels of export performance in contexts of uncertainty. The object under study is the PPI, characterized by intense innovation and international competitivity (EFPIA 2022). Due to these specific characteristics, only manufacturing companies with exporting activity were selected. This selection was performed, using the Iberinform database (Iberinform 2019). All companies with the Portuguese Economic Classification (CAE) 21,100 (manufacturer of basic pharmaceutical products) and 21,201 (medicine manufacturer) were considered. This selection took place on 18 September 2019. Eighty-two companies were identified. Sample validation was performed by using information available in companies' websites, as well as from an additional contact, by e-mail or phone call, when necessary, in order to identify whether companies had international commercial activities, at the time. Sixty-six companies were excluded, 34 for being subsidiaries and 32 because their activities did not conform to the nature of this study. As such, the universe of this research is comprised of 16 companies, that match the pre-determined selection criteria: pharmaceutic companies, with production and exporting activities of pharmaceutical products, headquartered in Portugal.

The analysis of results was subjected to several tests, in line with the nature of the variables and hypothesis under scrutiny. A descriptive analysis of each variable was performed, as well as Spearman's correlation tests on ordinal variables, to identify existing correlations. In order to determine the differences between variables with two distinct evaluation moments, Wilcoxon non-parametric tests were also performed. The survey's reliability was tested, using the Cronbach's alpha calculation. The pre-determined significance level used in all tests was 0.05 or lower, when applicable (Bryman and Cramer 2003; Morgan 2017). MS© Excel 2016 and IBM© SPSS© 25 were used for analyzing the data.

4.2. Survey and Sampling Process

The constructs that served as the base for the survey were extracted from a previous literature review, which enabled the selection of a previously academically validated group of variables and scales, as described in Appendices B and C. Surveys were subjected to a reliability test, using the Cronebach's alpha calculation (Saunders et al. 2009), with a value

of α = 0.970 (see Table 1). This survey was performed using the Google© Forms platform (https://www.google.com/forms/about/, accessed on 10 September 2022).

Table 1. Descriptive analysis.

Variable/Dimension	Nº Items	Mean	Median	SD	α
IPT2010	10	3.69	4.00	1.396	0.984
IPF2010	10	3.83	4.00	1.381	0.975
IPS2010	10	3.57	4.00	1.508	0.971
IPA2010	10	3.67	4.00	1.423	0.957
IPT2018	10	5.45	5.56	0.780	0.940
IPF2018	10	5.67	5.83	0.831	0.900
IPS2018	10	5.20	5.00	0.804	0.865
IPA2018	10	5.60	5.50	0.940	0.934
RECT	10	4.80	4.78	0.592	0.873
RFIN	10	4.07	4.17	1.438	0.972
RHUM	10	5.43	5.50	0.704	0.865
RNET	10	5.53	5.25	0.750	0.837
RINF	10	4.60	4.50	1.029	0.870
RCUL	10	4.97	5.00	1.127	0.907
MKTT	10	4.66	4.88	0.959	0.926
MPRI	10	4.85	5.00	1.107	0.889
MPRO	10	4.48	4.50	1.436	0.958
MDIS	10	4.73	4.88	0.786	0.675
MCOM	10	4.70	4.50	1.206	0.924
INOV	10	5.02	5.00	0.882	0.872
Years of International Activity	10	5.00	4.50	1.247	-
Countries International Act. 2010	10	3.60	3.50	1.430	-
Countries International Act. 2018	10	6.20	7.00	1.398	-
Yearly Turnover 2010	10	3.50	3.50	1.900	-
Yearly Turnover 2018	10	5.00	5.00	2.000	-
% International Turnover 2010	10	3.20	2.00	1.989	-
% International Turnover 2018	10	4.60	4.50	1.897	-
Total Employee	10	6.20	7.00	1.033	-
% Employee intern. Business	10	2.20	1.50	1.932	-
R&D Investment	10	4.20	4.00	2.394	-
Main International Activity	10	1.80	2.00	0.422	-

See Appendix B for more details on each variable and response scales.

The focus of this research, the PPI, is characteristically specific, especially considering the additional context of uncertainty. As such, the research's universe is rather small, comprised of only 16 companies. Considering this limitation and in line with suggestions from existing literature (Saunders et al. 2009), all companies in this universe were enquired. Data collection was heavily conditioned as it took place during a period in which the world was facing a global pandemic, in 2020, which led to the premature interruption of contacts with companies. Nonetheless, data was collected for 63% of companies (10), a considerable sample size, which was submitted to a representativity test (Saunders et al. 2009). Three variable and nine stratification items were selected, in accordance with the recommendations from existing literature. Representativity levels were considerably high, across all nine items. Research focusing on the pharmaceutic sector is usually characterized by its relatively small samples, the most common type being case studies (see Appendix A). As such, we consider the sample size of this study to be in line with existing research in the area. According to Quivy and Campenhoudt (2005) and Kruskal and Mosteller's (1979) recommendations regarding the use of the word "representativeness", considering that our sample is highly homogeneous, it is reasonable to conclude that it is representative of the studied sector.

Two in-person surveys were carried out, as pre-tests to confirm that respondents were able to accurately perceive the questions that they were being asked. The survey was sent to the top management of the targeted companies (members of the board of directors, general managers and international senior managers) and took place from 1 December 2019 until 31 March 2020.

5. Findings

5.1. Descriptive Analysis

The descriptive analysis shows that the PPI is comprised of companies that are significantly larger than the country's average, in terms of revenue and number of employees. The level of international experience is high, in terms of the number of markets in which companies are present and how long they have maintained international activities. The increase in both export intensity and international and total revenues is notable, however, the sector still shows limited innovation levels as well as considerably lower R&D investment compared to the sector's average, internationally (EFPIA 2022).

5.2. Hypothesis Confirmation

5.2.1. Export Performance

In our analysis, export performance increased significantly, from 2010 to 2018, before and after it the period of abnormal uncertainty (H1a, $Z = -2.805$, $p = 0.002$). These differences were significant across all three performance dimensions: financial, competitivity and satisfaction (see Appendix D). During the same period, export intensity also saw a significant increase (H1b, $Z = -2.820$, $p = 0.002$) and international revenue did so too (H1c, $Z = -2.565$, $p = 0.008$). Hypothesis H1a, H1b and H1c are, therefore, validated, which is consistent with findings in similar studies (Cuervo-Cazurra et al. 2017). This confirms a significant increase in export performance, during periods of uncertainty (see Appendix D).

5.2.2. Internal Resources and Capabilities

Our research shows no observed associations between companies' resources and higher export performance (H2, $rs = 0.547$, $p > 0.05$), in line with the findings of Morgan et al. (2006). However, when different dimensions were analyzed, significantly positive associations between cultural and networking resources were found (H2c, $rs = 0.665$, $p < 0.05$; H2d, $rs = 0.676$, $p < 0.05$, respectively). This research partially validates previous theoretical studies (Barney et al. 2011; Davcik and Sharma 2016) but also suggests that some resources are more relevant for internationalization than others, in the studied sector (see Appendix D).

5.2.3. Marketing Capabilities

Our findings reveal a strong association between marketing capabilities and export performance (H3, $rs = 0.676$, $p < 0.05$). This association is particularly significant for Price (H3a, $rs = 0.641$, $p < 0.05$) and Placement (H3d, $rs = 0.669$, $p < 0.05$). Conversely, no noticeable associations were found for Product (H3b, $rs = 0.451$, $p > 0.05$) and Promotion (H3c, $rs = 0.509$, $p > 0.05$). As such, we are only able to partially confirm the conclusions drawn in the literature review (Morgan et al. 2012; Tan and Sousa 2015; Zou et al. 2003), although, it is suggested that some marketing capabilities, Price and Place, are the most relevant leavers of international activities, in this sector.

5.2.4. Innovation and Internationalization

A clearly positive association between innovation and export performance was confirmed in our analysis (H4, $rs = 0.669$, $p < 0.05$), in accordance with previous research (Asemokha et al. 2019). Regarding marketing capabilities, results show a positive and highly significant association between innovation and Price (H4a, $rs = 0.739$, $p < 0.05$), Product (H4b, $rs = 0.666$, $p < 0.05$) and Placement (H4c, $rs = 0.693$, $p < 0.05$), contrary to Promotion (H4d, $rs = 0.227$, $p > 0.05$).

6. Discussion

Periods of great uncertainty have a deep impact on economic development. They can condition companies' expansion strategies, particularly for internationalization ventures. On the other hand, uncertainty can catalyze corporate development, as it reduces the perception of incremental risk and business losses, when companies operate in more restricted sectors or are focused on their domestic market, for example. Organizations that are accustomed to operating in uncertainty contexts can become more resilient to risks found in external markets (Cuervo-Cazurra et al. 2017). Larger economies are more exposed and more sensitive to situations of local risk and uncertainty, which increases when the later originates from international or global phenomena. This study was greatly inspired by the period of institutional uncertainty, experienced in Portugal from 2011 to 2015. This topic is quite relevant in the present, considering the singular period of uncertainty, after the global pandemic of COVID-19 and now the war in Ukraine. As such, we wanted to study the response of the PPI in a period of great exposure to economic and political uncertainty, as a consequence of the financial bailout to which the Portuguese economy was subjected to, from 2011 until 2015 (Apifarma 2016).

With this research we have confirmed that export performance saw significant increases during the period of uncertainty. In line with this, both revenue and export intensity also grew. Together, these results seem to indicate a strong increase in international activity, as a reaction to contexts of great uncertainty in local markets, previously the main source of income for these companies. The PPI was already a relatively internationalized sector; however, international activities saw a significant increase during the previously mentioned period of uncertainty. Such a positive conclusion may result from improved resilience and capacity to overcome obstacles, inherent to internationalization endeavors (Cuervo-Cazurra et al. 2017; Kuiken et al. 2021). Vahlne and Johanson (2017) describe this as the commitment process, which can occur in situations of risk and uncertainty, through which companies revamp and reconfigure their activities, triggering knowledge development, learning and confidence building.

We aimed to identify which resources are associated with greater levels of internationalization. Our results were in line with the findings in this work's theoretical framing, considering that no significant association was established between resources and export performance. However, resources regarding corporate culture and networking capabilities show strong positive associations with export performance. It is possible that these resources can contribute to overcome the scarcity of other competitive advantages and increase the success of internationalization, in line with some internationalization theories (McDougall and Oviatt 2000; Vahlne and Johanson 2017).

Concerning marketing capabilities, this study has confirmed the findings of previous studies (Dias and Pereira 2017; Morgan et al. 2012, 2018). However, positive associations were identified between export performance and *Price* and between export performance and Placement dimensions. Analyzed companies support their internationalization on pricing strategies and the establishment of supply agreements in target markets. Tan and Sousa (2015) highlighted that companies apply certain marketing capabilities to obtain competitive advantages, a fact that is in agreement with our findings. Together with previously mentioned results, this work suggests that the PPI typically follow an incremental internationalization model, supported on less sophisticated methods, with lower risk and less demanding in internal resources (Kuiken et al. 2021; Johanson and Vahlne 2009). The fact that no significant associations were found with the Product variable may indicate a relative lack of sophistication and differentiated products, consistent with the characterization of PPI sector (EFPIA 2022). These results are in line with previous research in this area (Kuiken et al. 2021; Vieira et al. 2021).

In this study, the PPI showed high levels of innovation, strongly associated with export performance. It is important to consider the scale used to evaluate innovation. According to Asemokha et al. (2019), the evaluation of innovation in international contexts tries to capture the company's ability to react to market volatility, whether resulting from

contextual changes derived from situations of high uncertainty (such as the ones that characterize this research) or from the identification of new opportunities in target markets and the ability of organizations to take advantage of them (see Appendix C). This scale is particularly successful in capturing innovation capabilities during tactical stages but less in early phases of R&D. As such, we decided to analyze potential associations between innovation and marketing capabilities. We were able to observe relevant associations between Price, Product and Placement dimensions but not for Promotion. These results are partially consistent with observations from the theoretical framework (Moreira et al. 2022). When analyzed together with other variables, there seems to exist consistent evidence around competitive advantages leveraged by Price and Placement policies.

Figure 2 shows the relationships confirmed in this study. The nature of this analysis and performed tests do not allow the identification of eventual dependencies nor mediating of latent variables. However, it is possible to observe interdependent relationships between analyzed factors in a context of uncertainty, on export performance measuring variables.

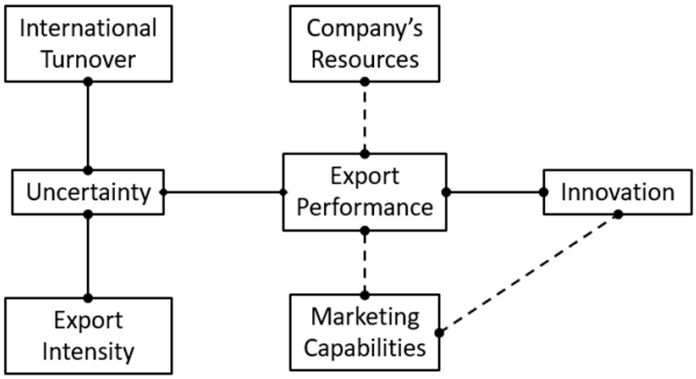

Figure 2. The working model. Solid lines- confirmed connection. Dashed lines- partially confirmed connection.

7. Conclusions, Limitations and Future Work

This research confirmed that environments of great instability and uncertainty can leverage companies' operations, as a way to mitigate risk perception and strengthen internal resources and capabilities. It also confirmed that innovative capabilities can become available rather quickly, by means of marketing resources at the company's disposal, increasing competitivity in foreign markets. These results are particularly interesting given how they arise from a specific sector of the economy, characteristically strong in innovation and R&D, exposed to intense international competition, and dominated by global players. This work contributed towards increasing the knowledge related to internationalization theories from the analysis of a specific sector of the economy and how it behaves in contexts of high uncertainty. Previous research analyzed several sectors, with no particular regard for existing differences between them. As such, we consider the findings in this work to be highly innovative and encouraging for future research.

The study of a specific sector of the economy is considered inherently limited conceptually, given the relatively small sample sizes for which they are characterized. Due to this fact, our statistical test options were constrained to those used in this work. Nonetheless, the output is considered quite significant and can serve as the groundwork for future research, focusing on internationalization phenomena in other economic sectors and their internationalization abilities in the context of uncertainty.

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Appendix A

Table A1. Internationalization Studies in PI.

Reference	Study Type	Study Object	Internationalization Theory	Sample (Companies)
Fina and Rugman (1996)	Empirical	Internationalization Strategies	Uppsala	1
Buckley and Chapman (1997)	Empirical	Internationalization Strategies	Uppsala	10
Javalgi and Wright (2003)	Conceptual	Entry Mode		
Chittoor and Sougata (2007)	Empirical	Internationalization Strategies to emerging markets		40
Kuntluru et al. (2012)	Empirical	Internationalization Strategies, foreign companies	Life Cicle	103
Wrona and Trąpczyński (2012)	Empirical	Internationalization Strategies to emerging markets	OLI	5
Chitour (2013)	Conceptual	Entry Mode		
Mowla et al. (2014)	Empirical	Internationalization Strategies	OLI	1
Campins (2015)	Empirical	Internationalization Strategies	Uppsala Resources and Capabilities	2
Barbosa et al. (2016)	Empirical	Internationalization Strategies	Resources and Capabilities	163
Díaz et al. (2017)	Empirical	Internationalization Strategies		1
Pereira and Gomes (2017)	Empirical	Internationalization Strategies	OLI Uppsala	4
Rentala et al. (2017)	Empirical	Export performance		23
Teramae et al. (2020)	Empirical	Internationalization Strategies		30

Appendix B

Table A2. Variables, Dimensions and Scales.

Variable	Dimension	Items	Comments	Scale
Export Performance 2010 (Zou et al. 1998)	**Finantial** (IPF2010)	3	EXPERF SCALE, capture the export performance in 2010. 1: Fully disagree; . . . ; 3: Neither disagree or agree; . . . ; 7: Fully Agree	Ordinal, seven-point Likert
	Strategical (IPS2010)	3		
	Satisfaction (IPA2010)	3		
Export Performance 2018 (Zou et al. 1998)	**Finantial** (IPF2018)	3	EXPERF SCALE, capture the export performance in 20108. 1: Fully disagree; . . . ; 3: Neither disagree or agree; . . . ; 7: Fully Agree	Ordinal, seven-point Likert
	Strategical (IPS2018)	3		
	Satisfaction (IPA2018)	3		
Resources (Morgan et al. 2006)	**Finantial** (RFIN)	4	The resources used in internationalization ventures. 1: Fully disagree; . . . ; 3: Neither disagree or agree; . . . ; 7: Fully Agree	Ordinal, seven-point Likert
	Human (RHUM)	4		
	Networking (RNET)	4		
	Informational (RINF)	4		
	Cultural (RCUL)	3		
Marketing Capabilities (Kaleka and Morgan 2017)	**Price** (MPRI)	2	The marketing capabilities used in international activity. 1: Fully disagree; . . . ; 3: Neither disagree or agree; . . . ; 7: Fully Agree	Ordinal, seven-point Likert
	Promotion (MPRO)	4		
	Distribution (MDIS)	4		
	Comunication (MCOM)	2		
Inovation (Asemokha et al. 2019)	**INOV**	5	Captures the sensibility to innovate in international activity. 1: Fully disagree; . . . ; 3: Neither disagree or agree; . . . ; 7: Fully Agree	Ordinal, seven-point Likert
International Activity (Ferreira and Simões 2016; Oliveira et al. 2018)		1	1: < 5 years; 2: 5–10 years; 3: 11–15 years; 4: 16–20 years; 5: 21–25 years; 6: 26–30 years; 7: > 31 years	Ordinal, seven point
Countries with Int. Activity 2010 (Ferreira and Simões 2016; Oliveira et al. 2018)		1	1: No int activity; 2: < 10 countries; 3: 10–20 countries; 4: 21–30 countries; 5: 31–40 countries; 6: 41–50 countries; 7: >50 countries	Ordinal, seven point
Countries with Int. Activity 2018 (Ferreira and Simões 2016; Oliveira et al. 2018)		1	1: No int activity; 2: < 10 countries; 3: 10–20 countries; 4: 21–30 countries; 5: 31–40 countries; 6: 41–50 countries; 7: >50 countries	Ordinal, seven point
Yearly Turnover 2010 (Zou et al. 2003)		1	1: <25 M€; 2: 26–50 M€; 3: 51–75 M€; 4: 76–100 M€; 5: 101–150 M€; 6: 151–200 M€; 7: >200 M€	Ordinal, seven point
Yearly Turnover 2018 (Zou et al. 2003)		1	1: <25 M€; 2: 26–50 M€; 3: 51–75 M€; 4: 76–100 M€; 5: 101–150 M€; 6: 151–200 M€; 7: >200 M€	Ordinal, seven point
% Turnover international business 2010 (Ferreira and Simões 2016; Zou et al. 2003)		1	1: <15%; 2: 15–30%; 3: 31–45%; 4: 46–60%; 5: 61–75%; 6: 76–90%; 7: >90%	Ordinal, seven point
% Turnover international business 2018 (Ferreira and Simões 2016; Zou et al. 2003)		1	1: <15%; 2: 15–30%; 3: 31–45%; 4: 46–60%; 5: 61–75%; 6: 76–90%; 7: >90%	Ordinal, seven point
Total number Employee (Zou et al. 2003)		1	1: <50; 2: 51–100; 3: 101–200; 4: 201–300; 5: 301–400; 6: 401–500; 7: >500	Ordinal, seven point

Table A2. *Cont.*

Variable	Dimension	Items	Comments	Scale
% Employee international business (Ferreira and Simões 2016; Oliveira et al. 2018)		1	1: <15%; 2: 15–30%; 3: 31–45%; 4: 46–60%; 5: 61–75%; 6: 76–90%; 7: >90%	Ordinal, seven point
R&D Investment (Chittoor and Sougata 2007)		1	% Total turnover to R&D investment. 1: <6%; 2: 6–8%; 3: 9–11%; 4: 12–14%; 5: 15–17%; 6: 18–20%; 7: >20%	Ordinal, seven point
Main International Activity		1	1: innovative products; 2: commodities/others	Nominal, two point

Appendix C. Variable's Questionnaire

All INNOVATION-INOV1: We have the necessary capacity and flexibility to adapt our structure in order to improve the commercial offer to our customers; INOV2: Faced with an opportunity in foreign markets my company is quick to reorganize work processes; INOV3: If necessary, we are quick to change and reorganize our partner network to better respond to our customers' needs; INOV4: My company quickly implements new opportunities to better serve our customers; INOV5: Innovative ideas are quickly assimilated to improve our price offering to be reflected in international customers; INT. PERFORMANCE2018- IPF2018: The profitability of international activity in 2018; IPF2018: The sales volume generated by the internationalization activity in 2018; IPF2018: The evolution of international activity in 2018; IPS2018: The company's overall competitiveness in 2018; IPS2018: The company's global strategic position in 2018; IPS2018: The evolution of global market share in 2018; IPA2018: The performance of the international area in 2018; IPA2018: The success of the international area in 2018; IPA2018: Expectations with the results of the international area in 2018; INT. PERFORMANCE2010- IPF2010: The profitability of international activity in 2010; IPF2010: The sales volume generated by the internationalization activity in 2010; IPF2010: The global evolution of international activity in 2010; IPS2010: The company's overall competitiveness in 2010; IPS2010: The company's global strategic position in 2010; IPS2010: The evolution of the global market share in 2010; IPA2010: The performance of the international area in 2010; IPA2010: The success of the international area in 2010; IPA2010: Expectations with the results of the international area in 2010; RESOURCES- RFIN1: Access to financing for international activity; RFIN2: Speed of availability and implementation of financial resources; RFIN3: Size of financial resources available for international activity; RFIN4: Possibility to find new sources of funding when necessary; RHUM1: Know-how of the team of employees of the international area; RHUM2: Professional quality of the team of employees of the international area; RHUM3: International experience of the team of employees in the international area; RHUM4: Skills of the team of employees in the international area; RNET1: Ability to relationship with international customers; RNET2: Quality of relationship with international customers; RNET3: Duration of business relationship with international distributors; RNET4: Frequency of contacts and meetings with international clients; RINF1: Access to information on new opportunities in international markets; RINF2: Access to information about potential international clients; RINF3: Access to information on the main international competitors; RINF4: Knowledge of distribution channels in international markets; RCUL1: The international orientation of my company's culture; RCUL2: The strength of my company's corporate culture; RCUL3: My company's international experience; MARKETING- MPRI1: Flexibility of internal structures to respond quickly to price changes implemented by competitors; MPRI2: Speed of communication of new sales prices to international customers; MPRO1: Our R&D ability to develop new products for international markets; MPRO2: Successful launch of products/product ranges in foreign markets; MPRO3: Speed in the development and launch of new products in foreign markets; MPRO4: The overall capacity to develop new products for foreign markets; MDIS1: Meeting the needs of distributors in foreign markets; MDIS2: Ability to add value

to distributors' business in foreign markets; MDIS3: Proximity to local distributors in foreign markets; MDIS4: Support and business support of local distributors in foreign markets; MCOM1: Marketing communication skills and competences in international markets; MCOM2: Ability to effectively manage communication strategies to target customers in international markets.

Appendix D

Table A3. Hypotheses List and Validation.

Hypothesis	Test	Result	Hypothesis Validation
H_{1a}: Export performance increased during the local uncertainty period	Wilcoxon	$Z = -2.805$ $p = 0.002$	Yes
H_{1b}: Export intensity increased during the local uncertainty period	Wilcoxon	$Z = -2.820$ $p = 0.002$	Yes
H_{1c}: International turnover increased during the local uncertainty period	Wilcoxon	$Z = -2.565$ $p = 0.008$	Yes
H_2: Resources availability is positively associated with export performance	Spearman's Correlation	$rs = 0.547$ $p > 0.05$	No
H_{2a}: Finantial resources availability is positively associated with export performance	Spearman's Correlation	$rs = 0.329$ $p > 0.05$	No
H_{2b}: Human resources availability is positively associated with export performance	Spearman's Correlation	$rs = 0.084$ $p > 0.05$	No
H_{2c}: Cultural resources availability is positively associated with export performance	Spearman's Correlation	$rs = 0.665$ $p < 0.05$	Yes
H_{2d}: Networking resources availability is positively associated with export performance	Spearman's Correlation	$rs = 0.676$ $p < 0.05$	Yes
H_{2e}: Informational resources availability is positively associated with export performance	Spearman's Correlation	$rs = 0.226$ $p > 0.05$	No
H_3: Marketing capabilities are positively associated with export performance	Spearman's Correlation	$rs = 0.676$ $p < 0.05$	Yes
H_{3a}: Price marketing capabilities are positively associated with export performance	Spearman's Correlation	$rs = 0.641$ $p < 0.05$	Yes
H_{3b}: Product marketing capabilities are positively associated with export performance	Spearman's Correlation	$rs = 0.451$ $p > 0.05$	No
H_{3c}: Communication marketing capabilities are positively associated with export performance	Spearman's Correlation	$rs = 0.509$ $p > 0.05$	No
H_{3d}: Distribution marketing capabilities are positively associated with export performance	Spearman's Correlation	$rs = 0.669$ $p < 0.05$	Yes
H_4: Innovation is positively associated with better export performance	Spearman's Correlation	$rs = 0.669$ $p < 0.05$	Yes
H_{4a}: Innovation is positively associated with larger marketing capabilities (price)	Spearman's Correlation	$rs = 0.739$ $p < 0.05$	Yes
H_{4b}: Innovation is positively associated with larger marketing capabilities (product)	Spearman's Correlation	$rs = 0.666$ $p < 0.05$	Yes
H_{4c}: Innovation is positively associated with larger marketing capabilities (communication)	Spearman's Correlation	$rs = 0.227$ $p > 0.05$	No
H_{4d}: Innovation is positively associated with larger marketing capabilities (distribution)	Spearman's Correlation	$rs = 0.693$ $p < 0.05$	Yes

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