

A Work Project, presented as part of the requirements for the Award of a Master's degree in International Development and Public Policy from the Nova School of Business and Economics.

**UNLOCKING THE POTENTIAL OF START-UPS: EXPLORING THE
EFFECTS OF LEAN-RELATED PRACTICES ON THE PORTUGUESE
START-UP ECOSYSTEM**

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Abstract

This Master's thesis explores the dynamics of the Portuguese start-up ecosystem, focusing on key elements that drive its growth and sustainability. Through in-depth research and analysis, this study investigates the role of management practices in fostering innovation, entrepreneurship, and success. The study draws upon insights from survey data from start-up founders and an in-depth literature review. By shedding light on these factors, this thesis has the objective at providing valuable insights for policymakers, entrepreneurs, and stakeholders seeking to understand and enhance the Portuguese start-up ecosystem.

Keywords: Start-up; Management Practices; Business; Innovation; Success; Portugal.

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Glossary

EU: European Union

HQ: Headquarters

IDC: International Data Corporation

IAPMEI: Instituto de Apoio Às Pequenas e Médias Empresas e ao Investimento

IPO: Initial Public Offering

LS: Lean Start-up

MOPS: Management and Organizational Practices Survey

R&D: Research & Development

ROI: Return On Investment

SDG: Sustainable Development Goal

UN: United Nations

VC: Venture Capital

i. Introduction

This research aims to explore the multifaced aspects that influence start-up success while focusing on the Portuguese entrepreneurial environment. The project investigates one of the ecosystem's internal pillars: business practices. This research represents a collaborative partnership between Nova School of Business and Economics and Start-up Portugal. It serves as a Policy Analysis Project that has the objective to address, investigate and provide recommendations to questions posed by Start-up Portugal while contributing to the completion of our Master's degree.

Recognized as a Statute of Public Utility (Decreto-Lei n.º 33/2019 Artigo 2.º), StartUp Portugal is a non-profit organization that promotes entrepreneurship in the country by working with private and public entities to attract investment, launch initiatives and ultimately foster the start-up ecosystem (Startup Portugal).

1. Definition of Start-up

The existing literature lacks a single and precise definition of start-up; however, it is possible to draw on it to identify the variables that are most often associated with the concept. Before the 2000s, researchers considered novelty the primary characterising factor for a start-up (Ehsan, 2021). For instance, Keeble (1976) denotes "the creation of an entirely new enterprise which did not formerly exist as an organisation". Similarly, according to Gudgin (1978), a start-up is defined as one "which began production for the first time". Contemporary literature identifies another critical element: innovation (Ehsan, 2021). Innovation involves developing and launching new products (Kuczmarski, 2003). Generally, the extent to which a company pursues innovation is represented by its investments in Research & Development (R&D)

(Krejčí, Strielkowski, & Čabelková, 2015). Innovation is necessary to meet the dynamic needs of consumers in the current market (Ehsan, 2021), and studies show that it plays a vital role in growth: both R&D investments and new product development have a significant impact on competitiveness and performances, such as larger profit margins, high revenue streams, or elevated stock prices (Kuczmarski, 2003; Skawinska & Zalewski, 2020).

Definitions are crucial from an academic point of view, but also in establishing criteria for government programs. Portuguese politics has certainly been receptive to the needs of this segment of the economy and the need to regulate it, with instruments such as Law 21/2023 of May 25th (the “*Startup Law*”), which defines what a start-up, scaleup and business angel are. A start-up is specifically categorized as an entity that meets any of the following conditions: (i) it exhibits the potential for innovation and is characterized by inventive business models, products, or services; (ii) it has effectively completed at least one round of venture capital funding through a legally authorized entity; (iii) it has received investment from Banco Português de Fomento, S. A., or its affiliated entities, including subsidiary companies or equity instruments (Assembleia da República, 2023).

2. Problem Statement

Start-ups directly support economic growth and development by creating new job opportunities, contributing to regional immigration, and enhancing regional productivity levels (Thurik & Wennekers, 1999; Van Stel, Carree, & Thurik, 2005; Fritsch & Mueller, 2004). Furthermore, the emergence of new businesses stimulates existing companies to operate with greater efficiency, leading to an increase in competition and innovation within the market (Fritsch & Mueller, 2004).

The Portuguese start-up ecosystem is thriving with 150+ registered incubators in the country (Startup Portugal), experiencing continuous growth although with a slight setback in 2021 (Startup Portugal & IDC, 2022). Portugal can capitalize on numerous strengths when it comes to human capital available, such as the availability of a highly skilled technical workforce¹ and a high English fluency in the country², however, to secure its position at the European, and perhaps global, stage, exploiting these factors might be insufficient. The prosperity of a start-up does not solely depend on its founder's characteristics and qualifications as the outcome of other variants, such as investment, business practices and external factors is key to the success of the start-up (Lussier, 1995).

Consequently, the aim of this research is to analyse the various factors influencing start-up success, particularly in Portugal, with a primary focus on addressing the following question: What management practices are currently being used by Portuguese start-ups?

3. Research Objectives

This project aims to contribute to the already existing literature by providing an in-depth academic study of the Portuguese start-up ecosystem as of 2023, integrating the most recent reports elaborated in 2022 on the same topics (IDC & Startup Portugal, 2022) with updated information and data.

¹ Portugal has 14 universities ranked amongst the best of the world (Times Higher Education World University Rankings, 2023)

² Portugal ranked 9th out of 111 countries in the English Proficiency Index elaborated by Education First (EF) in 2022

The study seeks to identify connections between managerial practices in Portuguese start-ups and their company performance without establishing causal links. Drawing from existing literature and prior research, it utilizes data collected through a survey to examine the extent to which Portuguese start-ups embrace Lean-related practices, i.e. a specific set of techniques that will be discussed in detail in Chapter V. Ultimately, the study aims to offer insights to StartUp Portugal to improve operational practices in the Portuguese start-up ecosystem.

4. Background

In today's economy, start-ups are facing an exceptional and demanding situation due to various factors including COVID-19, surging inflation, and elevated energy costs linked with the conflict in Ukraine (Dreier, et al., 2022). To tackle these challenges, according to Deloitte surveys conducted in October 2022 and May 2023, companies' leaders expressed the importance of allocating efficiently scarce resources, both financial and human, by prioritizing Return On Investment (ROI), efficient cost reduction, workforce realignment, and utilization of automation technologies (Jarvis, 2023). Is the Portuguese start-up ecosystem able to withstand such challenges?

Over the past decade, Portugal's start-up environment has experienced remarkable growth due to dedicated government policies, namely the Tech Visa³ and Startup Visa⁴. This progress has

³ "Tech Visa" is a certification program addressed to technological and innovative companies aiming at granting visas or resident permits to highly qualified third country nationals, interested in working in such companies (Tech Visa).

⁴ Startup Visa is a residence visa- provided through IAPMEI (Instituto de Apoio Às Pequenas e Médias Empresas e ao Investimento) for entrepreneurs, which aims to attract investment, talent, and capacity for innovation to Portugal (Startup Visa).

been accompanied by the emergence of seven Unicorns within a span of only seven years (IDC & Startup Portugal, 2022), garnering significant attention and recognition. However, it is worth mentioning that out of seven unicorns, only one of them, Feedzai, has kept its headquarters in Portugal (Startup Portugal & IDC, 2022). The start-up environment, given its vibrancy and dynamicity, encourages and is subject to changes: it is common for a start-up to be established in Portugal and then move to more fiscally attractive countries, as exemplified by Farfetch- one of the seven unicorns- which moved its HQ to London (Bearne, 2016).

Portugal benefits from favourable conditions such as the availability of skilled engineering expertise and widespread English fluency, making it an attractive destination for digital nomads and investors alike. Investors view Portugal as an excellent base to capitalize on opportunities within the European Single Market, as well as a launching point for accessing the vast Brazilian market, which shares the same language and has strong international ties. As a result of these factors, Lisbon's start-up ecosystem has reached substantial achievements with its start-ups raising 428 million euros, with the entire Portuguese ecosystem raising 884 million euros in 2022 (Dealroom.com), while leaving room for further improvement. For instance, the Portuguese ecosystem raised 451 million euros in VC investment in 2022 (Dealroom.com). As a benchmark for comparison, the Spanish ecosystem reached 4 billion euros in VC investment alone in 2022 (Dealroom, 2023), while France raised 16.1 billion euros only in 2022 (14 Juillet 2023: Startups & VC in France, 2023). Expressed in per capita terms, this results in 44.2 euros in Portugal, 84.2 euros in Spain and 182.4 euros in France of Venture Capital investment in start-ups⁵.

⁵ Per capita amounts were calculated by dividing the absolute VC investment amounts reported by Dealroom by population of the respective country (Statista).

IDC (International Data Corporation) and Startup Portugal have identified crucial elements in their *Scale Up Nation 2022* report to ensure the ecosystem maintain start-ups after their first development stages. These factors aim to facilitate Portugal's ability to attract and retain international talent and foster investment, enabling the country to accommodate companies during their scale-up phases. Utilizing tax incentives, both for corporations and individuals, is seen as an effective strategy for attracting talent (Startup Portugal & IDC, 2022). Additionally, Portugal's specialization in key sectors in which it arguably has a comparative advantage, like the ocean economy, life sciences, healthcare, and sustainability, while simultaneously solidifying its position in fintech and tech industries, further enhances its appeal on the international scene (Startup Portugal & IDC, 2022). In addition to industries in which it holds a competitive advantage because of its geographical location namely the ocean economy; there currently exists a pharmaceutical cluster of firms in Portugal, which could benefit from further targeted investment (Daniel Guedelha, Deloitte, 2018). Facilitating collaboration between start-ups and established large companies is also essential for fostering systemic growth within the sector.

A pivotal role is played by start-up incubators, which have recently multiplied across the country including Startup Lisboa, Centro de Incubação de Évora, and Startup Braga, among the over 150 existing in the country (Startup Portugal). Incubators are a prime example of the necessary collaboration between private and public players in the start-up landscape, established on public initiatives, like Startup Lisboa.

Although several incentives and laws have been created to support the entrepreneurial setting in Portugal, the Portuguese start-up ecosystem also faces weaknesses, primarily associated with the tax system, which is considered to be too burdening (especially in the early stages of start-ups), and the availability of capital, particularly in the later stages of development (IDC &

Startup Portugal, 2022). Global market uncertainties represent the primary threats to the ecosystem's sustainability (IDC & Startup Portugal, 2022).

ii. Literature Review

1. Summary of Existing Literature

The U.S. Census Bureau's Management and Organizational Practices Survey (MOPS) in 2015 evaluated management practices' impact on firm performance, highlighting the positive relationship between effective business techniques and growth (Nunn & Shambaugh, 2018).

In 2011, Eric Ries defined a set of practices called the Lean Start-up method “for helping entrepreneurs increase their odds of building a successful start-up” (Ries, 2011).

The emerging academic understanding of the Lean Start-up method mainly comprises qualitative studies, although research concerning its application exists. For example, Bocken & Snihur (2019) investigate the impact of Lean Start-up on business model innovation, finding that it reduces uncertainty, engages stakeholders, and enhances collaborative learning. Ghezzi et al. (2015) confirm this through quantitative analysis, showing that combining Business Model Design with Lean Start-up leads to better performance than conventional planning. Moreover, Harms & Schwery (2020) conduct a quantitative study confirming Lean Start-up's positive impact on company performance, particularly in uncertain markets.

2. Summary of Gaps Related to Management Practices

However, the Lean Start-up method has some notable limitations and gaps in existing literature offer opportunities for future investigation. Firstly, the method lacks a strong theoretical foundation, which makes challenging to acknowledge its academic relevance (Lizarelli, et al., 2022). Current research often focuses on specific industries, limiting the understanding of Lean Start-up method's effectiveness in diverse contexts. Moreover, there is a lack of research on the method's long-term effects, sustainability, and innovation potential. Finally, the impact of team

dynamics, leadership styles, and organizational culture on Lean Start-up implementation is an underexplored area as well as the influence of contextual elements and external factors.

To complement these gaps, the following study examines Lean Start-up adoption in start-ups at different growth stages and evaluates the extent of Lean Start-up adoption in Portuguese companies compared to traditional methods. Finally, it investigates a topic not typically addressed in the literature: companies that unconsciously implement Lean Start-up principles and, as a result, potentially could benefit from targeted training to foster their capabilities.

iii. Methodology

To comprehensively investigate and answer the question of interest and with the guidance of the literature review, the following methodology was used to draw results for our study.

Firstly, a literature review on the topics of interest was developed in section ii of the report, which the reader has just encountered.

Secondly, secondary data on the Dealroom⁶ portal made available through StartUp Portugal profile was used. The Dealroom database, accessed through Startup Portugal profile, gave us access to a sample of 2,524 verified start-ups and 77 Venture Capital (VC) funds observations. Its strength lies in having an extended reach, including different Portuguese regions with constantly updated information. Information includes cross-sectional data about firm characteristics (market, location, revenue etc.).

Finally, the report uses primary data coming from a survey developed by us and distributed online to our sample through network sampling⁷ (circulated online from 1st August 2023 to 7th September 2023) which reached a sample of 43 respondents. Primary data coming from our survey (see *Appendix 1 for more detail*) includes demographic questions on gender and education level attained of the respondent, and demographic data about the start-up itself (year of establishment, development stage, number of employees, number of funders, field in which it operates, type of customer base). The rest of the survey was tailored to answer the three

⁶ Dealroom.co is a provider of data and intelligence on startups and tech ecosystems, Startup Portugal profile is available at <https://startupportugal.dealroom.co/intro?applyDefaultFilters=true>

⁷ we made use of our personal connections and open-source lists of startup funders, who we then tracked down on LinkedIn.

sections of the report and its corresponding research questions. The rationale for each research question will be further developed in the relative sections of the report.

iv. Limitations

The challenges encountered concern mainly the establishment of causal relationships and the severe constraints posed by limited sample sizes of 43 total respondents, non-probabilistic samples, and self-selection bias. This is why this research is presented more as a descriptive analysis of the landscape. Also, it has to be addressed the methodological challenge in defining what is a start-up, and even more precisely what is a Portuguese start-up. The perimeter of this analysis heavily depends on these definitions, which are all but straightforward (as discussed in section i, chapter 1). This issue is common across the different attempts to create a census of the existing start-ups, no matter the scope of the analysis. The EU start-up monitor in 2018, which ranges across all EU member states, in its methodological note stresses (Steigertahl , Methodological note, 2018) *“First, there are no reliable data about the overall population of start-ups in Europe. Hence it is unclear what relative sample size our sample emerged from. Second, in terms of representativeness, there is variation in the response behaviour among countries, which often is dependent on the level of sophistication within each country's start-up ecosystem. This, there is a clear bias towards start-ups with a digital business model”*.

As mentioned above, the Dealroom portal has been used as a source for secondary data and definition of our population of interest (the entire Portuguese ecosystem), however, there are some limitations of the sampling method: start-ups can either self-register into the portal (which the only verification needed is that there exists a web domain corresponding to the enrolled start-up) or the start-ups can be included through web scraping carried out by web crawlers of Dealroom itself: anytime there are press releases, media outlet attention or data coming from the Portuguese Stock Exchange Authority (Euronext Lisboa), the platform verifies the existence of a start-up to match with this information. Despite being reassured by the verification process

adopted by the platform, there might be a bias in the dataset coming from the exclusion of non-digital businesses and commercial activities that would formally satisfy the definition of a start-up but are not interested in having a web presence. These limitations should be borne in mind when interpreting results, even though the included start-ups may be arguably the ones of greater interest from a policy point of view as in recent years Portugal has tried to target scalable projects in more innovative industries (European Investment Bank (EIB), 2018).

In addition, Dealroom itself recognizes that there exists a lag in data registration affecting the last 12 months of activity, leaving consolidated figures only up until 2021 (Dealroom.com).

Limitations further exist in the survey given the reliance on snowball sampling and the bias due to the self-selection of participants (i.e., the response rate is not independent of characteristics such as time availability) on top of possible Hawthorne effects⁸ triggered by the survey, even though full anonymity was ensured. Moreover, the sample was targeted based on personal connections responsiveness through LinkedIn, all but random criteria. However, Startup Portugal helped by spreading the survey in their bi-weekly newsletter, as well as Startup Lisboa, which shared the survey with their portfolio of start-ups.

⁸ Hawthorne effect: type of human behavior reactivity in which individuals modify an aspect of their behavior in response to their awareness of being observed (McCarney & Warner, 2007)

v. Unlocking the Potential of Start-ups: Exploring the Effects of Lean-Related Practices on the Portuguese Start-up Ecosystem

1. Introduction

1.1. Problem Statement

Managers define company's objectives based on the expectations of all relevant stakeholders: clients, employees, co-operators, and other interested parties, such as the community or the government (Coda, Invernizzi, & Russo, 2017). According to these objectives, managers implement practices and make decisions that regularly affect the value and viability of the firm (Rode, 1997). These decisions concern every area of the company: from pricing to investments, from HR policies to mergers and acquisitions, and from performance monitoring to production process characterisation (Bloom, Lemos, Sadun, Scur, & Van Reenen, 2016). Consequently, a company produces results that may or may not align with the established goals (Coda, Invernizzi, & Russo, 2017).

One central question arises: which managerial practices are most strongly associated with good business performance? This question becomes even more crucial when applied to start-ups.

Chapter I explored the absence of a universally accepted academic definition for start-up. The examination of existing literature led the conclusion that two fundamental elements distinguish a start-up: novelty and the capacity to continuously innovate. To survive in the long term and achieve success, start-ups should implement managerial practices consistent with these two distinctive factors (Ries, 2011). Unfortunately, only a portion of the start-ups in the market

implements effective and efficient business practices, consequently benefiting the economy in which it operates.

This study analyses which managerial practices are currently being implemented by start-ups operating in the Portuguese environment, thoroughly described previously, and how these practices relate to performances.

1.2. Background

In 2011, Eric Ries wrote *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses* to define “a set of practices for helping entrepreneurs increase their odds of building a successful start-up” (Ries, 2011). In formulating the core concepts, Ries drew inspiration from the Lean thinking principles, theorized in 1996 by James P. Womack and Daniel T. Jones, adapting them to the concepts of entrepreneurship and innovation (Ries, 2011). That is why Ries's set of practices is named the Lean Start-up methodology.

The Lean Startup (LS) methodology consolidates two categories of tangible and hands-on techniques: one set aims to teach entrepreneurs how to navigate the start-up journey effectively, while the other empowers them to rapidly grow and scale their business (Ries, 2011).

For this research, it is more relevant to focus on the elements that set apart this approach from the traditional one, rather than describing the array of proposed practices.

The traditional method suggests that initially founders have to produce a business plan, usually including a five-year projection for revenue, earnings, and cash flow (Blank, 2013). Subsequently, after securing funds from investors, the product development phase begins. However, it is only after the product is launched that entrepreneurs gather feedback from

customers, often discovering that many of the product's features are unnecessary or unwanted (Blank, 2013). Conversely, the LS method involves starting with hypotheses, seeking customer input, and embracing continuous development, allowing start-ups to refine their ideas through iterative cycles and build products that meet customer needs efficiently (Blank, 2013).

How does the LS method relate to the Portuguese environment? First, Portugal's growing start-up ecosystem and entrepreneurial and tech culture are consistent with LS's focus on innovation and experimentation. Moreover, large start-up communities, like those in Portugal, support continuous learning, a key element of the LS. Also, this approach emphasizes the necessity to efficiently allocate resources, which could be helpful in Portugal, where especially financial resources are limited. Finally, country's location offers opportunities for global growth, matching LS's focus on growing efficiently.

1.3. Research Objectives

This study aims at identifying connections between the managerial practices used by Portuguese start-ups and their company's performance, rather than establishing causal links.

Using primary data collected from a comprehensive survey, the report will explore the extent to which Portuguese start-ups adopt Lean-related practices and how this adoption is linked to their performance.

The analysis will focus on both conscious implementations, when start-ups deliberately apply them, and unconscious ones, when start-ups integrate these practices for varied functional or strategic reasons, regardless of their explicit awareness.

Finally, the study will provide valuable insights to StartUp Portugal, drawing from both existing literature and previous research, to contribute to the enhancement of operational practices within the Portuguese start-up ecosystem.

2. Literature Review

2.1. Previous Studies

The implementation of specific management approaches increases the likelihood of a business's success; however, effective management is not a trait of every business, especially of small ones (Nunn & Shambaugh, 2018). In this regard, in 2015, the U.S. Census Bureau conducted the Management and Organizational Practices Survey (MOPS) to evaluate structured management practices and their impact on company's performances (U.S. Census Bureau, 2015). The results suggest that firms can grow when they implement superior business techniques. Even though not all entrepreneurs aim for large businesses, those who do play a vital role for economic advancement (Nunn & Shambaugh, 2018; Thurik & Wennekers, 1999; Fritsch & Mueller, 2004; Van Stel, Carree, & Thurik, 2005).

Academic knowledge on the effectiveness of the LS method is emerging (Bocken & Snihur, 2019), however existing literature primarily involves qualitative studies on the subject. Despite these limitations, it is possible to identify several research that support, and critique, the application of these techniques.

For instance, Bocken & Snihur (2019) investigate the relationship between the implementation of LS and innovation of a company's business model. The results show that new business models based on the LS approach can contribute to reduce uncertainty, actively involve stakeholders, and enhance collaborative learning (Bocken & Snihur, 2019). Ghezzi et al. (2015)

conduct a quantitative analysis that confirms these results by finding that the combination of Business Model Design with LS leads the firm to obtain better performances than it happens with conventional business planning.

Moreover, Harms & Schwery (2020) propose a quantitative study to assess the impact of LS principles on German companies' performances. The authors found moderately strong, robust, and highly significant positive relationship between the application of LS and performance outcomes (Harms & Schwery, 2020). Additionally, they observed that the relationship is stronger in situations of greater market and technological uncertainty (Harms & Schwery, 2020).

Finally, Felin et al. (2020) discuss LS's main limitations. In particular, they identify the need for further investigation of when to use certain LS practices, as the method relies on Lean tools usually used in manufacturing industry, which are more suitable for incremental improvements rather than creating entirely new products (Felin, Gambardella, Stern, & Zenger, 2020).

2.2. Gaps in the Literature

In addition to the limitations mentioned earlier, it is important to consider the gaps in the existing literature and the potential areas for future research. Firstly, in his work, Eric Ries presents a highly practical and tangible approach (Ries, 2011), which, however, lacks a strong theoretical foundation. Despite referencing his sources of inspiration, Ries does not undertake a theoretical analysis of the techniques proposed, which makes scholars reluctant to accept their academic relevance (Lizarelli, et al., 2022). However, studies such as the one conducted by Frederiksen & Brem (2017) have attempted to assess the scientific basis of the Lean Start-up method, concluding that the theoretical underpinnings are indeed robust. This aspect certainly holds potential for further research, especially if aiming to gain acceptance within the academia.

Furthermore, current literature tends to concentrate on isolated instances of application of the LS method (such as mostly within digital companies), potentially limiting a comprehensive understanding of its efficacy across different industries and contexts.

Additionally, due to the method's novelty, there is a lack of research that follows the long-term effects of LS adoption beyond the initial start-up phase, including its sustainability and its potential to drive innovation. Comparatively, only a limited number of studies systematically contrast the outcomes of LS practices with those from conventional business planning and management approaches, creating challenges in evaluating its relative effectiveness.

Given the collaborative and iterative nature of the LS approach, there is room for further exploration into how factors like team dynamics, leadership approaches, and organizational culture influence its implementation and results. Finally, the impact of contextual elements and external factors on the successful implementation of the LS method remains relatively unexplored.

This study addresses the gaps in the existing literature in three main ways. Firstly, it examines start-ups at various stages of development, not solely during their initial phases. This approach allows for a thorough exploration of how the LS methodology is applied across different growth stages. Furthermore, this research seeks to assess the extent of LS adoption in Portuguese companies by drawing a clear distinction between those adhering to traditional methods and those embracing Lean practices. This differentiation enables a comparison of these two approaches. Lastly, it is worth noting that prior research has not delved into companies that may unconsciously implement LS principles. This represents a focal point of this investigation since these companies could benefit from targeted training to fully leverage their capabilities.

3. Methodology

3.1. Research Design

This section identifies the research questions and outlines the hypotheses and the models on which the research is based. It aims at answering the following research questions:

- *RQ1: How does the application of certain practices relate to the founder's prior training or work experience in management?*
- *RQ2: How does the application of specific practices affect the company, especially regarding its financial performance?*
- *RQ3: How does the implementation of certain practices relate with company's claim of adopting Lean-related practices?*

To answer these questions, primary data were collected by employing a quantitative approach using a comprehensive survey, thoroughly described in Chapter III.

To conduct the data analysis linear regression models were specified to seek patterns between the implementation of Lean-related practices and certain characteristics of the founders, company's performance, and familiarity with Lean concepts, prioritizing the investigation of correlations over direct causation. Findings are discussed within research goals and theory, focusing on connections between practices and performance. Implications for Portugal's start-up ecosystem are derived from findings and literature, offering practical recommendations to StartUp Portugal. Finally, limitations like bias are acknowledged, with suggestions for future research.

3.2. Data Collection

The final section of the survey, which is included in the Appendix, was allocated to examine management practices. Participants were tasked with answering a series of questions focused

on their start-up's managerial methods and performance. The questions were designed to explore three primary dimensions.

Initially, participants ranked the top three practices they employ when introducing new products by choosing among eight distinct and non-repetitive options: four aligned with Lean practices and four with traditional ones. As a result, it was then possible to create an ordinal categorical variable, called *Degree of Lean Implementation*, which identifies the level of application of Lean practices within the company and takes on the following values:

- *Total Lean* if all three responses were consistent with Lean practices,
- *Almost Lean* if two out of three were consistent,
- *Slightly Lean* if only one out of three was consistent,
- *Not Lean* if none of the chosen options was consistent.

Following this, participants were asked about their company's performance relative to competitors, thus if they perceived their approach as distinctive, as well as its organizational and financial aspects. Responses concerning operational and competitive outcomes were derived solely from participants' statements, whereas financial outcomes were evaluated based on their responses regarding the company's Return on Investment (ROI) – the calculation and description of which will be provided in the Appendix B. Specifically, three variables were identified: *Competitive Advantage*, *Operating Impact*, and *ROI*. The first one is a binary dummy variable that answers the question "Do you consider your operating method to be a differentiating factor from your competitors?". The second is an ordinal categorical variable that, in response to the question "Do you consider that this way of operating had positive impacts on the company?", takes on four values ranging from "Obtained measurable positive economic, financial, and operational results" to "No positive impact". Lastly, the *ROI* variable

was established, with values determined based on the categories of ROI provided as potential responses: negative, positive lower than 15%, between 15% and 34%, between 34% and 105%, and higher than 105%. It is crucial to specify that respondents also had the option to refrain from answering the ROI question, as one of the provided response options was “Do not know or prefer not to say”.

Lastly, the concluding section delved into whether respondents were familiar with Lean concepts and consciously implement Lean practices. As a result, based on the responses to the questions "Are you familiar with at least one of the following concepts: Lean techniques, Lean Start-up, Lean transformation, Agile?" and "Do you consider that your company successfully implements at least one of these techniques?", it was possible to derive two dummy variables named *Lean Familiarity* and *Lean Implementation*.

Finally, to conduct a more detailed analysis, it was necessary to draw from the preliminary demographic section of the survey to identify whether the founders had experience or training in management. The resulting variables are two dummy variables, namely *Management Training* and *Management Experience*, which correspond to the questions "Did you have any formal training in management before launching the start-up?" and "Did you have any work experience in management before launching the start-up?", respectively.

3.3. Data Analysis and Hypotheses Testing

Using the variables just described, it was possible to conduct a data analysis to investigate the following hypotheses formulated in accordance with the research questions previously outlined.

H1: The application of Lean practices relates to former training or work experience in management of the founder.

This hypothesis was assessed by employing a multivariate linear regression model, with *Degree of Lean Implementation* as the dependent variable and *Management Experience* and *Management Training* as independent variables.

$$(5.1) \quad \text{Degree of Lean Implementation} = \beta_0 + \beta_1 \cdot \text{Management Experience} + \beta_2 \cdot \text{Management Training} + \mu$$

In this model, β_1 quantifies the impact of *Management Experience* on *Degree of Lean Implementation* while holding *Management Training* constant. Similarly, β_2 represents the change on *Degree of Lean Implementation* due to an increase in *Management Training* while keeping *Management Experience* fixed. It is hypothesized that both $\beta_1 > 0$ and $\beta_2 > 0$.

H2: Having some positive impacts on the company, especially on financial performances, relates to the implementation of Lean practices.

To test the second hypothesis, three linear regressions models were used, each with *Degree of Lean Implementation* as the independent variable, whereas *ROI*, *Competitive Advantage*, and *Operational Impact* were used as dependent variables.

$$(5.2) \quad \text{ROI} = \alpha_0 + \alpha_1 \cdot \text{Degree of Lean Implementation} + \mu$$

In the first model α_1 measures the change in *ROI* due to an increase in *Degree of Lean Implementation*. It is hypothesized $\alpha_1 > 0$.

$$(5.3) \quad \text{Competitive Advantage} = \delta_0 + \delta_1 \cdot \text{Degree of Lean Implementation} + \mu$$

In this regression, δ_1 quantifies the impact of increasing the *Degree of Lean Implementation* on *Competitive Advantage*. δ_1 is assumed strictly positive.

$$(5.4) \quad \text{Operational Impact} = \gamma_0 + \gamma_1 \cdot \text{Degree of Lean Implementation} + \mu$$

In the third model, γ_1 quantifies the shift in *Operational Impact* resulting from an increase in *Degree of Lean Implementation*. γ_1 would be greater than zero.

H3: Affirming that the company successfully adopts Lean-related practices relates with being familiar with those and effectively implementing them.

Finally, to explore the third hypothesis a multivariate linear regression model was employed. by using *Lean Implementation* as dependent variable and *Degree of Lean Implementation* and *Lean Familiarity* as independent variables. It is important to emphasize that *Degree of Lean Implementation* is a categorical ordinal variable that reflects the factual application of Lean practices. Conversely, *Lean Implementation* is a dummy variable that denotes the claim of using Lean practices, even if they are not necessarily put into action.

$$(5.5) \quad \text{Lean Implementation} = \theta_0 + \theta_1 \cdot \text{Degree of Lean Implementation} + \theta_2 \cdot \text{Lean Familiarity}$$

In this multivariate regression analysis, θ_1 quantifies the variation in *Lean Implementation* resulting from an increase in *Degree of Lean Implementation*, while keeping *Lean Familiarity* constant. Likewise, θ_2 represents the change in *Lean Implementation* linked to an increase in *Lean Familiarity*, while holding *Degree of Lean Implementation* steady. Based on these considerations, both θ_1 and θ_2 are hypothesised greater than zero.

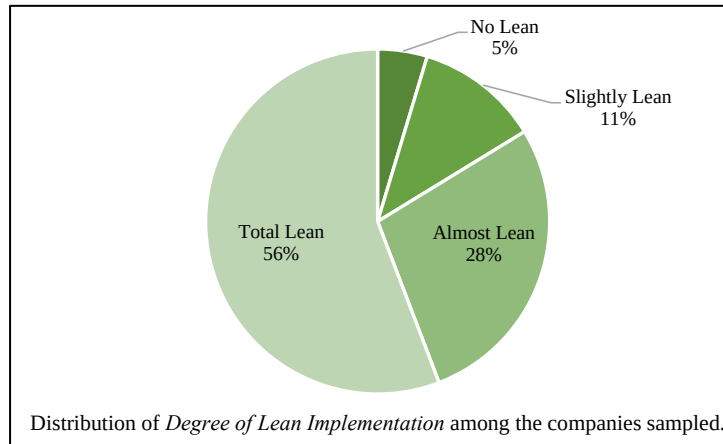
4. Results

4.1. Descriptive Statistics

The sample includes 43 participants. *Graph 5.1* illustrates the distribution of *Degree of Lean Implementation* among the surveyed companies. According to the graph, 56% of respondents

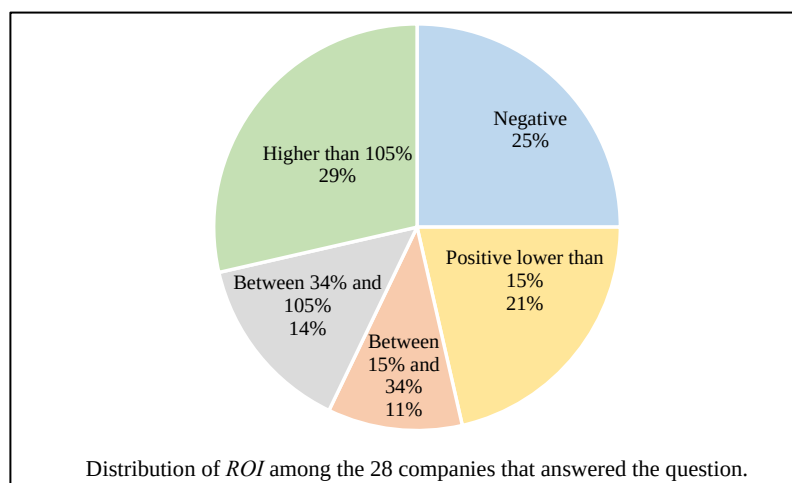
fully embrace Lean practices, while 28% are close to fully align with them. Only a relatively small proportion, just 5%, do not incorporate any Lean-related practices.

Graph 5. 1: *Distribution of Degree of Lean Implementation | Source: Own Elaboration*



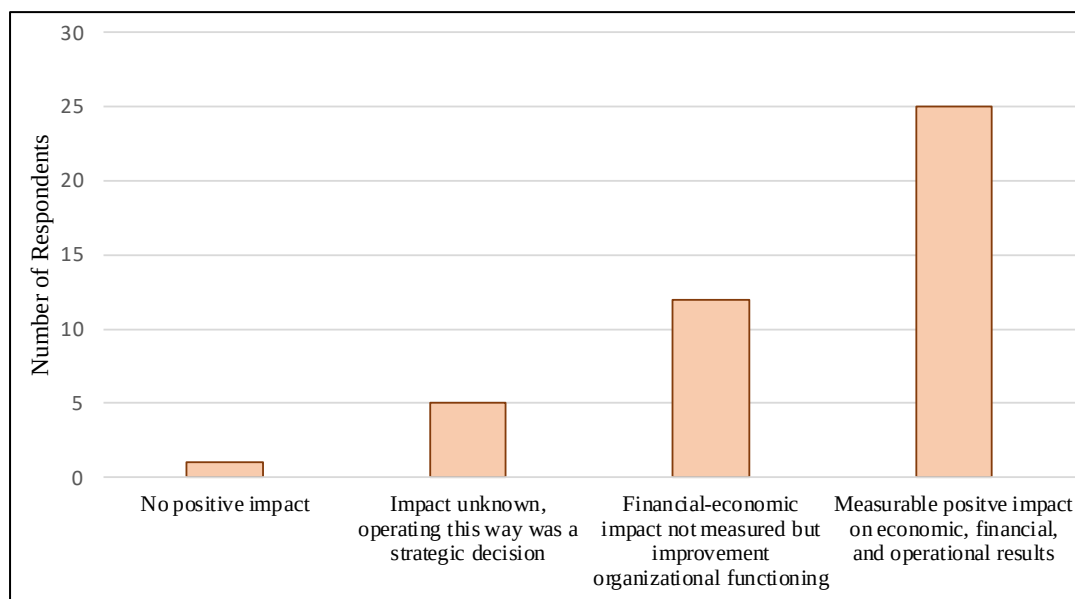
When examining performance statistics, it is relevant to note that only 65% of the sample responded to the ROI-related question (since one response option was "Do not know or prefer not to say"). *Graph 7.2* shows that, of those who did respond, 75% reported having a positive ROI. On average, companies indicated a positive ROI ranging from 15% to 34%. One method for evaluating a company's performance is by comparing its ROI to the average ROI, as suggested by Coda, Invernizzi, & Russo (2017). Knowing this, 43% of the companies outperform the average ROI.

Graph 5. 2: *Distribution of ROI | Source: Own Elaboration*



Moreover, when considering *Competitive Advantage*, it is important to highlight that 72% of the respondents indicated that they consider their operational methods as a differentiating factor from their competitors. Lastly, as shown in *Graph 7.3*, which represents the distribution of *Operational Impact*, only 2% of the sample stated they had no positive impact, while a substantial 86% reported achieving either measurable positive economic, financial, and operational results or, at the least, a positive effect on their organizational functioning.

Graph 5. 3: *Operational Impact Distribution in Absolute Frequencies* | Source: Own Elaboration



Finally, it is worth mentioning that 95% of the respondents stated they are familiar with Lean concepts, while 72% claimed they effectively implement these practices. It is crucial to compare this latter percentage with the statistics on the *Degree of Lean Implementation* which show that, as mentioned earlier, only 56% of respondents actually apply Lean-related practices.

To conclude the section on descriptive statistics, it is relevant to draw attention to specific founder characteristics. Interestingly, 67% of respondents had prior management work experience before launching their start-up, while 53% lacked any formal management training.

4.2. Regression Analysis

H1: The application of Lean practices relates to former training or work experience in management of the founder.

$$(5.1) \text{ Degree of Lean Implementation} = \beta_0 + \beta_1 \cdot \text{Management Experience} + \beta_2 \cdot \text{Management Training} + \mu$$

Table 5. 1: Multivariate Regression of Degree of Lean Implementation on Management Experience and Management Training | Source: Own Elaboration

Variables	Coefficient (β)	Standard Error	Number of Observation	R-Squared
<i>Management Experience</i>	0.018	0.292	43	0.012
<i>Management Training</i>	-0.187	0.274		

*** Significant at 0.01, ** Significant at 0.05, * Significant 0.10

In line with *H1*, it was hypothesized that both $\beta_1 > 0$ and $\beta_2 > 0$. However, the regression results, illustrated in *Table 7.1*, do not support the previously mentioned hypotheses. Specifically, β_1 is found to be 0.018, which is close to zero, and β_2 is calculated as -0.19. Furthermore, the p-values for both *Management Experience* and *Management Training* are higher than 0.05, indicating that neither β_1 nor β_2 are statistically significant. Additionally, the R-Squared is 0.012, implying that only 1.2% of the variation in the *Degree of Lean Implementation* is explained by the model, while the remaining variance is attributed to residuals.

H2: Having some positive impacts on the company, especially on financial performances, relates to the implementation of Lean practices.

$$(5.2) \text{ ROI} = \alpha_0 + \alpha_1 \cdot \text{Degree of Lean Implementation} + \mu$$

Table 5. 2: Linear Regression of ROI on Degree of Lean Implementation | Source: Own Elaboration

Variable	Coefficient (α)	Standard Error	Number of Observation	R-Squared
<i>Degree of Lean Implementation</i>	0.243	0.327	28	0.021

*** Significant at 0.01, ** Significant at 0.05, * Significant 0.10

For the first model of $H2$ it was hypothesized that α_1 would be greater than zero. Table 7.2 shows the results of the regression analysis that support this hypothesis. Specifically, the estimated coefficient, α_1 , is 0.24. However, the associated p-value exceeds 0.05, meaning that α_1 lacks statistical significance. Furthermore, the R-Squared value is equal to 0.021, suggesting that only 2.1% of the variability in ROI can be accounted for by the model, with the remaining variance attributed to residuals.

$$(5.3) \text{ Competitive Advantage} = \delta_0 + \delta_1 \cdot \text{Degree of Lean Implementation} + \mu$$

Table 5. 3: Linear Regression of Competitive Advantage on Degree of Lean Implementation | Source: Own Elaboration

Variable	Coefficient (δ)	Standard Error	Number of Observation	R-Squared
<i>Degree of Lean Implementation</i>	0.068	0.081	43	0.017

*** Significant at 0.01, ** Significant at 0.05, * Significant 0.10

As previously assumed, for this second model δ_1 would be greater than zero. However, the regression results, represented in Table 7.3, do not support this initial hypothesis; in fact, δ_1 equals 0.068, which is quite close to zero. Additionally, the p-value for δ_1 is greater than 0.05, indicating that it lacks statistical significance. The R-Squared value is 0.017, implying that only 1.7% of the variation in *Competitive Advantage* can be explained by this model, while the remaining variation is attributed to residuals.

$$(5.4) \text{ Operational Impact} = \gamma_0 + \gamma_1 \cdot \text{Degree of Lean Implementation} + \mu$$

Table 5. 4: Linear Regression of Operational Impact on Degree of Lean Implementation | Source: Own Elaboration

Variable	Coefficient (γ)	Standard Error	Number of Observation	R-Squared
<i>Degree of Lean Implementation</i>	0.085	0.142	43	0.009

*** Significant at 0.01, ** Significant at 0.05, * Significant 0.10

As previously assumed, for the third and last model of $H2$, $\gamma_1 > 0$. However, the regression outcomes do not support the initial hypothesis; in fact, as shown in Table 7.4, γ_1 is calculated to be 0.085, which is quite close to zero. Furthermore, the p-value exceeds 0.05, indicating a lack of statistical significance for γ_1 . The R-Squared value stands at 0.009, signifying that a mere 0.9% of the variance in *Operational Impact* can be attributed to this model, while the remaining variation is accounted for by residuals.

H3: Affirming that the company successfully adopts Lean-related practices relates with being familiar with those and effectively implementing them.

$$(5.5) \quad \text{Lean Implementation} = \theta_0 + \theta_1 \cdot \text{Degree of Lean Implementation} + \theta_2 \cdot \text{Lean Familiarity}$$

Table 5. 5: Linear Regression of Lean Implementation on Degree of Lean Implementation and Lean Familiarity | Source: Own Elaboration

Variable	Coefficient (θ)	Standard Error	Number of Observation	R-Squared
<i>Degree of Lean Implementation</i>	0.097	0.073	43	0.1783
<i>Lean Familiarity</i>	0.796	0.297		

*** Significant at 0.01, ** Significant at 0.05, * Significant 0.10

As mentioned earlier, it was expected that both θ_1 and θ_2 would be strictly positive. The regression results in Table 7.5 partially confirm the previously mentioned hypotheses. Specifically, θ_1 is estimated at 0.097, which is near zero, while θ_2 stands at 0.796. In terms of

statistical significance, only *Lean Familiarity*, represented by θ_2 , yields a p-value below 0.05. The R-Squared is calculated to be 0.1783. This signifies that the model explains 17.83% of the variation in *Lean Implementation*, leaving the remaining variance attributed to residuals.

5. Interpretation of Findings

It is crucial to note that this study aimed to uncover correlations rather than establish direct causality. Additionally, most of the findings, except for the last model, do not have statistical significance. Nevertheless, there are still valuable insights to be derived from these results. Firstly, management experience or training among founders does not seem to be related to the degree of Lean implementation within a company. This result challenges the hypothesis that expertise or background of founders influence the adoption of Lean practices. Other factors, such as organizational culture or market conditions, may play a significant role in determining the extent of Lean adoption within a company. This represents opportunity for future research. Moreover, the research findings align with existing literature by confirming a positive relation between Lean implementation and company's financial performance. However, this study offers additional insights, by demonstrating that the application of Lean practices may not influence respondents' perception of competitive advantage and organizational impact. This suggests that Lean's impact extends to financial metrics but may not be associated with subjective consideration about competitiveness and organizational effectiveness.

Finally, the only statistically significant result shows that survey respondents tend to affirm their successful implementation of Lean-related practices, even when the actual application may not fully align with these claims. This can largely be attributed to their familiarity with Lean concepts, meaning that respondents' confidence in their Lean implementation may be influenced more by their knowledge of Lean principles than by their practical application.

6. Limitations

In addition to the limitations previously discussed in Chapter IV, another significant constraint arises from using self-reported data from survey participants. In fact, individuals may tend to portray themselves or their organizations in a positive manner. For example, it is possible that people did not respond to the ROI question because their performances were not optimal.

Moreover, the study provides a static snapshot of variable relationships at a specific time, while it does not investigate changes in Lean implementation and its organizational impact over time.

The study focuses on specific factors such as Lean practices and financial performance, while it does not consider a range of potentially influential variables, like organizational culture, external economic conditions, or market dynamics. This limitation arises because the study employed a comprehensive survey for the entire Workproject, rather than a specific survey targeting management practices. This approach facilitated wider circulation but naturally constrained the depth of the investigation since the survey needed to be balanced across all project areas and maintain a reasonable length to incentivize participation.

In conclusion, it is crucial to emphasise that although the study may uncover relationships among variables, it cannot conclusively prove causation. This limitation arises from the possibility of hidden factors that may influence the observed relationships, as mentioned earlier.

7. Recommendations to StartUp Portugal

Based on the study's findings, it becomes evident that StartUp Portugal should take actions to support start-ups in fully leveraging the potential of Lean methodologies, which the study reveals to be widely adopted within the Portuguese start-up ecosystem. These measures include providing specialized training, workshops, and mentorship programs tailored to equip

entrepreneurs with the essential knowledge and skills for effective implementation. Furthermore, encouraging knowledge sharing among start-ups can promote a culture of continuous learning. Lastly, prioritizing the customer-centricity principles of Lean practices should also be a focus. These recommendations stem from the recognition of the substantial potential for enhancing Lean implementation among start-ups in Portugal.

8. Conclusion

This study aimed to identify correlations and found most results to lack statistical significance, except for one model. It discovered that management experience or training among founders does not significantly influence Lean implementation, suggesting the importance of other factors like organizational culture and market conditions. The study aligns with existing literature by confirming a positive link between Lean implementation and financial performance but indicates that Lean practices may not strongly impact respondents' perceptions of competitive advantage and organizational impact. Additionally, a significant finding shows that survey respondents tend to overstate their successful Lean implementation, possibly due to their familiarity with Lean concepts.

Relying on self-reported data introduces potential bias. Moreover, the study does not explore changes in Lean implementation and its impact over time. Also, it primarily focuses on Lean practices and financial performance, omitting other potentially influential variables.

In summary, this study underscores the need for further research to delve deeper into these complexities and understand Lean implementation's effects. Also, it suggests that StartUp Portugal should assist start-ups in Portugal in making better use of Lean methodologies, which are widely adopted in the start-up community.

vi. Common Recommendations to StartUp Portugal

One of the greatest limitations to the study was the lack of entirely reliable secondary data, consequently anyone wishing to conduct a more thorough analysis to focus on the quality of datasets is urged to do so. StartUp Portugal reported to be already working on a merged dataset between different providers which include Dealroom, Crunchbase and Pitchbook. It is imperative that the merging of datasets focuses on granularity and accuracy of information collected, as the cited private providers of data have an interest in inflating numbers of a given ecosystem to attract more subscriptions to their service.

Additionally, StartUp Portugal should explore the creation of entrepreneurial education and management training programs that extend beyond formal channels, ensuring accessibility through non-formal avenues. Furthermore, it should emphasise the establishment of dedicated funding mechanisms and mentorship initiatives tailored explicitly to support young entrepreneurs and early-stage start-ups, enhancing their prospects for success. Moreover, fostering stronger relationships with entrenched start-ups in the ecosystem by actively promoting collaboration, knowledge sharing, and resource pooling is essential.

In light of survey results, Startup Portugal should evaluate the role of incubators in the ecosystem more in depth as they seem to be used only by a minority of the contacted start-ups, unlike its previous estimates (Startup Portugal & IDC, 2022). Moreover, the organizations shall take on more structured efforts to address possible capital constraints causing the heavy gender unbalance in the funders' population; these efforts would be of great support to associations like Women in Tech in pursuing goal 5 of UN SDGs on gender equality. Lastly, if Startup Portugal is interested in evaluating satisfaction of funders regarding investment access should make use of additional data through additional studies.

Moreover, the study's findings indicate that StartUp Portugal should take steps to help start-ups fully utilize the potential of Lean methodologies, which are widely embraced in the Portuguese start-up scene. These actions involve offering customized training, workshops, and mentorship programs to equip entrepreneurs with the necessary expertise for effective implementation. Additionally, fostering knowledge exchange among start-ups can nurture a culture of ongoing learning. Lastly, emphasizing customer-centricity principles in Lean practices should be a priority. These recommendations arise from the recognition of significant opportunities to enhance Lean implementation among Portuguese start-ups.

These efforts will contribute significantly to the growth and enrichment of the Portuguese start-up ecosystem while retaining valuable talent and bolstering the nation's economy as a whole.

vii. Common Conclusion

This study found that management experience or training among founders does not significantly affect Lean implementation, highlighting the role of factors like organizational culture and market conditions. While the study aligns with existing literature by confirming the positive link between Lean implementation and financial performance, it suggests that Lean practices may not strongly influence respondents' perceptions of competitive advantage and organizational impact. Notably, respondents tend to overstate their successful Lean implementation, possibly due to their familiarity with Lean concepts. Relying on self-reported data introduces potential bias, and the study doesn't explore changes in Lean implementation over time. Additionally, it primarily focuses on Lean practices and financial performance, neglecting other influential variables. In conclusion, further research is needed to better understand Lean implementation's effects. Startup Portugal could play a role in helping local start-ups effectively utilize Lean methodologies, which are widely adopted in the start-up community.

Despite challenges, this study contributes valuable insights to the entrepreneurship discourse, emphasising the need for larger, more representative samples for definite conclusions in this dynamic field. Finally, some recommendations to Startup Portugal were elaborated in hope that they can take them into account as they strive to foster the Portuguese start-up ecosystem.

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ix. Appendix

1. Appendix A: Survey - Fostering Start-up Success in Portugal: Exploring Founders, Investors, and Business Practices

Dear Participant,

The survey aims to measure start-up founders' attitudes towards management practices and investment opportunities. The survey is part of three Master Theses inserted in the International Development and Public Policy Master at Nova School of Business and Economics.

The survey takes 4 minutes to complete. To adhere to general data protection rights, all data collected will be anonymized and it will be exclusively used for our dissertation.

We would like to thank you in advance for your participation.

Sincerely,

Angela Salomone (55902@novasbe.pt)

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Are you over 18 and consent to answering the following questionnaire?

- ☐ Yes
- ☐ No

Demographic and Preliminary Questions

What is your gender?

- ☐ Female
- ☐ Male
- ☐ Other
- ☐ Prefer not to say.

What is your highest level of education completed?

- ☐ Less than high school education
- ☐ High school diploma or equivalent
- ☐ Bachelor's degree
- ☐ Master's degree
- ☐ Doctorate degree
- ☐ Other

What is the name of the institution where you completed your highest level of education?

What is your field of study?

In which year was your start-up founded?

What stage is the start-up at?

- ☐ Pre-seed stage
- ☐ Seed stage
- ☐ Early stage
- ☐ Growth stage
- ☐ Later stage
- ☐ Expansion stage

How many employees does the start-up have?

How many founders does the start-up have?

Are you one of the founders of the start-up?

- ☐ Yes
- ☐ No

Did you have any work experience in management before launching the start-up?

- ☐ Yes, I did.
- ☐ No, I did not.

Did you have any formal training in management before launching the start-up?

- ☐ Yes, I did.
- ☐ No, I did not.

Did you have any experience in this specific industry before launching the start-up?

- ☐ Yes, I did.
- ☐ No, I did not.

Do/did your parents own a business?

- ☐ Yes
- ☐ No

What type of customer base does your company serve?

- ☐ Business-to-Business (B2B)
- ☐ Business-to-Consumer (B2C)
- ☐ Both

Which is the MAIN industry in which the start-up operates?

- ☐ Information & Communication Technology (ICT)
- ☐ Medicine & Health Care
- ☐ Automobile & **Mobility/Logistics**
- ☐ Consulting & Agency
- ☐ Media & Creative Industries
- ☐ Tourism
- ☐ Energy & Electricity
- ☐ Industrial Goods
- ☐ Nutrition & Food/Consumer Goods
- ☐ Education
- ☐ Human Resources
- ☐ Leisure, Sports & (online) Gaming
- ☐ Banking & Finance/Insurance
- ☐ Biology Chemicals & Pharmaceuticals
- ☐ Other

Investment Opportunities

Was the start-up launched with the help of an incubator?

- ☐ Yes
- ☐ No

What type of investment did your start-up receive? Select all that apply.

- ☐ Friends and family
- ☐ Personal savings
- ☐ Incubator/company builder and/or accelerator
- ☐ Venture Capital
- ☐ Business Angel
- ☐ Bank loans
- ☐ Government loans/subsidies
- ☐ Crowdfunding
- ☐ Internal financing (operating cash flow)

- ☐ Venture debt/IPO/ICO
- ☐ Vouchers
- ☐ Other

How much do you agree/disagree on a scale from 1 to 5 with the statement "My start-up entered the Startup Portugal network to meet new investors"? If you haven't entered Startup Portugal Network, please leave it blank.

- ☐ 1. Strongly disagree
- ☐ 2. Somewhat disagree
- ☐ 3. Neutral
- ☐ 4. Somewhat agree
- ☐ 5. Strongly agree

How much do you agree/disagree on a scale from 1 to 5 with the statement "Working with Startup Portugal has improved the chances of receiving the needed investment for my start-up"? If you haven't entered Startup Portugal Network, please leave it blank.

- ☐ 1. Strongly disagree
- ☐ 2. Somewhat disagree
- ☐ 3. Neutral
- ☐ 4. Somewhat agree
- ☐ 5. Strongly agree

How much do you agree/disagree on a scale from 1 to 5 with the statement "The main barrier that my start-up faced in the early stages of development was a lack of funding"?

- ☐ 1. Strongly disagree
- ☐ 2. Somewhat disagree
- ☐ 3. Neutral
- ☐ 4. Somewhat agree
- ☐ 5. Strongly agree

How much do you agree/disagree on a scale from 1 to 5 with the statement "Public Venture capital funds have helped me secure private investment"?

- ☐ 1. Strongly disagree
- ☐ 2. Somewhat disagree
- ☐ 3. Neutral
- ☐ 4. Somewhat agree
- ☐ 5. Strongly agree
- ☐ Never interacted with a publicly participated VC

Management Practices

Rank the top 3 sentences that better describe how your company operates before launching a new product. 1st choice being the most representative of all

- ☐ Conducting small-scale experiments to test ideas before investing resources.
- ☐ Ensuring flawless product even if it means longer development cycles.
- ☐ Involving customers to activate feedback loops.
- ☐ Long-term planning and minimizing changes based on customer feedback.
- ☐ Working in small cross-functional teams.
- ☐ Adopting a linear project management approach.
- ☐ Making decisions based on actionable metrics (e.g. conversion rate).
- ☐ Making decisions based on long extensive analyses.

According to the top choice selected in the previous question, have you been operating this way since the company was founded?

- ☐ Yes
- ☐ No

Do you consider that this way of operating had positive impacts on the company?

- ☐ Yes, it contributed to the achievement of measurable positive economic, financial, and operational results.
- ☐ Yes, although the financial-economic impact cannot be measured, this way of operating contributed to an overall improvement of the organizational functioning.
- ☐ Do not know, choosing to operate this way is part of a strategic decision.
- ☐ No, no positive impacts.

Do you consider your operating method to be a differentiating factor from your competitors?

- ☐ Yes
- ☐ No

Please rate the Return on Investment (ROI) of your company (according to the latest filed financial statement).

- ☐ Negative.
- ☐ Positive, lower than 15%.
- ☐ Positive, between 15% and 34%.
- ☐ Positive, between 34% and 105%.
- ☐ Higher than 105%.
- ☐ Do not know or prefer not to say.

What is approximately your annual revenue? *Please express in euros or leave blank if you wish not to say.*

Are you familiar with at least one of the following concepts: Lean techniques, Lean Start-up, Lean transformation, Agile?

- ☐ Yes
- ☐ No

Do you consider that your company successfully implements at least one of these techniques?

- ☐ Yes
- ☐ No

2. Appendix B: Return on Investment – Calculation and Explanation

The concept of Return on Investment (ROI) is crucial in business finance. The simplified formula to calculate it is:

$$ROI = \frac{Total\ Revenue - Investment}{Investment} \times 100$$

It means that for every dollar you invest in assets, you need to match it with a dollar borrowed from financial markets, which you have to pay for at market rates (Walsh, 2003). The money to pay for this borrowing comes from the profit you make by efficiently using these assets. To measure this, the profits are compared to the value of the assets and funds borrowed: if this ROI is equal to or greater than the cost of borrowing, then the business is viable (Walsh, 2003).

Furthermore, ROI serves as an indicator of a company's competitiveness within its market segment. Typically, the company's ROI is compared to the industry average. When the company's ROI surpasses that of the sector, it signifies a distinct competitive advantage in the market (Coda, Invernizzi, & Russo, 2017).