INSTITUTO
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Essays on human capital acquisition, entrepreneurial motivation and interventions for startup success

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PhD Economics

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Resumo

Esta tese visa responder a três questões: (i) como é adquirido o capital humano necessário para empreendedorismo?; (ii) o que leva os empreendedores a adquirir capital humano?; (iii) existem intervenções possíveis para melhorar o sucesso das iniciativas empreendedoras? Estas questões são essenciais devido à importância do capital humano no processo de empreendedorismo e à necessidade de aumentar o desempenho dessas empresas.

Num primeiro estudo, realizamos uma revisão sistemática da literatura sobre a aquisição de capital humano para empreendedorismo. São identificadas limitações na atual conceptualização, sendo proposto um novo quadro de análise. Concluímos que a aquisição de capital humano para empreendedorismo é um constructo multidimensional e holístico. O segundo estudo visa compreender os determinantes da aquisição de capital humano para empreendedorismo. Usando dados secundários da Global Accelerator Learning Initiative (GALI), a motivação empreendedora é identificada como um determinante potencial da aquisição de capital humano para empreendedorismo. Mediante análise econométrica, a relação entre as diferentes dimensões da motivação empreendedora e da aquisição de capital humano para empreendedorismo é testada e confirmada. No último estudo, as aceleradoras de startups são identificadas como mecanismos de intervenção que podem melhorar o desempenho, o capital humano e a motivação empresarial. Recorre-se a dados primários obtidos através de questionário a 90 startups e entrevistas a 5 equipas de startups que participaram anteriormente em programas de aceleração. Estes programas influenciam todas as dimensões da motivação empreendedora, do desempenho e do capital humano. Propomos recomendações quanto à forma como o programa "ideal" de aceleração deve ser concebido.

Palavras-chave: Empreendedorismo; capital humano; startups; aceleradoras.
Códigos JEL: J24, L26

Abstract

This thesis aims to answer three broad questions: (i) how is human capital acquired for entrepreneurship?; (ii) what drives entrepreneurs to acquire human capital?; (iii) are there possible interventions to improve startup success? These questions are critical because of the importance of human capital in the entrepreneurship process and the need to increase startup performance.

In a first study, we conduct a systematic literature review on human capital acquisition for entrepreneurship. The limitations of the current conceptualization of human capital acquisition for entrepreneurship are uncovered and a new framework is proposed. We conclude that human capital acquisition for entrepreneurship is a multidimensional and holistic construct. The second study takes an empirical approach to understand the drivers of human capital acquisition for entrepreneurship. The study relies on secondary data from the Global Accelerator Learning Initiative (GALI). Entrepreneurial motivation is identified as a potential driver for human capital acquisition for entrepreneurship. Using econometric analysis, the relationship between the different dimensions of entrepreneurial motivation and human capital acquisition for entrepreneurship is examined and confirmed. In the last study, startup acceleration programs are identified as intervention mechanisms that could increase firm performance, human capital, and entrepreneurial motivation. The study relies on primary data obtained through the survey of 90 startups and interviews with 5 startup teams that previously participated in startup acceleration programs. Startup acceleration programs influence all dimensions of entrepreneurial motivation, firm performance, and human capital. We produce a set of recommendations on how the “ideal” startup acceleration program should be designed.

Keywords: Entrepreneurship; human capital; startups; accelerators.
JEL Codes: J24, L26

Table of Contents

List of tables viii
List of figures ix
List of abbreviations xi
Introduction 1
1. Motivation 1
2. Objectives of the study 3
3. Overview of the thesis 4

References 4
Article 1. Re-thinking human capital acquisition for entrepreneurship: A holistic multidimensional approach 7
1. Introduction 7
2. Human capital acquisition for entrepreneurship as a holistic multi-dimensional construct 10
3. Drivers of human capital acquisition for entrepreneurship 18
4. Linking entrepreneurial motivation and human capital acquisition for entrepreneurship 25
5. Conclusion 26

References 28
Article 2. Examining the relationship between entrepreneurial motivation and human capital acquisition for entrepreneurship 34
1. Introduction 34
2. Data and method 39
3. Results and discussion 47
4. Conclusions 65

References 67
Article 3. Does startup acceleration really matter? Evaluating its impact on human capital, entrepreneurial motivation, and firm performance 76
1. Introduction 76
2. Startup acceleration programs 79
3. Data and methodology 87
4. Results and discussion 95
5. Conclusions and recommendations 125

References 129
Appendix 1: Survey questions 138

Appendix 2: Interview questions 141
Appendix 3: Other demographic data 142
Conclusions 143
1. Overall conclusions 143
2. Theoretical implications 145
3. Practical implications 147

List of Tables

Chapter 1: Re-thinking human capital acquisition for entrepreneurship: A holistic multidimensional approach

Table 1: Differences in antecedents, mediators, moderators, and outcomes of entrepreneurial motivation in each entrepreneurial phase ……...…22

Chapter 2: Examining the relationship between entrepreneurial motivation and human capital acquisition for entrepreneurship

Table 1: Survey components that simulate components of Human Capital Acquisition for Entrepreneurship (HCaqE) …… 40

Table 2: Survey components that simulate the multiple dimensions of Entrepreneurial Motivation ……...…. 41

Table 3: Definition of the dependent variables ……..….... 42

Table 4: Definition of the explanatory variables ……..…. 43

Table 5: Descriptive statistics of the sample ……..... 46

Table 6: Entrepreneurial motivations ……...…… 47

Table 7: Estimation results of the ordered logit models (Models 1 and 4) ……...……. 48

Table 8: Estimation results of the logit models (Models 2 and 4) ……...…… 50

Table 9: Matrix of importance - relationship between entrepreneurial motivation and human capital acquisition for entrepreneurship ……..... 56

Chapter 3: Does startup acceleration really matter? Evaluating its impact on human capital, entrepreneurial motivation, and firm performance

Table 1: Types of startup acceleration programs …… 86

Table 2: Survey questions ……..…. 88

Table 3: Overview of participants in the structured interviews ……..…. 94

Table 4: Phases of acquiring human capital through startup acceleration program ....…. 100

Table 5: SAP tools that impact entrepreneurial motivation ……..…… 109

Table 6: Different dimensions of firm performance ……..…… 112

Table 7: SAP tools that impact firm performance ……...…… 115

List of Figures

Chapter 1: Re-thinking human capital acquisition for entrepreneurship: A holistic multidimensional approach

Figure 1: A holistic and multidimensional view of human capital acquisition for entrepreneurship 10
Figure 2: A view of the entrepreneurial learning process 16
Figure 3: Drivers of human capital acquisition for entrepreneurship 18
Figure 4: Entrepreneurial motivation as a holistic and multidimensional process 19
Figure 5: How entrepreneurial motivation and human capital acquisition for entrepreneurship impacts firm growth 26

Chapter 2: Examining the relationship between entrepreneurial motivation and human capital acquisition for entrepreneurship

Figure 1: A holistic and multidimensional view of human capital acquisition for entrepreneurship 36
Figure 2: Entrepreneurial motivation as a driver of human capital acquisition for entrepreneurship 37
Figure 3: Hypothesis (H) and model (M) specification for EM and HCaqE 45
Figure 4: Factors that influence human capital acquisition for entrepreneurship 66

Chapter 3: Does startup acceleration really matter? Evaluating its impact on human capital, entrepreneurial motivation, and firm performance

Figure 1: Relationship between Startup Acceleration Programs and outcomes 79
Figure 2: Core elements of Startup Acceleration Programs 81
Figure 3: Distribution of Survey 90
Figure 4: Survey participants by region 91
Figure 5: Survey participants by year of foundation 91
Figure 6: Survey participants by industry 91
Figure 7: Survey participants by number of employees 91
Figure 8: Survey participants by growth stage 91
Figure 9: Average age of founders 91
Figure 10: Highest education level of founders 91
Figure 11: Average years of entrepreneurship experience of founders 91
Figure 12: Impact of SAPs on human capital 95
Figure 13: Type of KSAs acquired from SAPs 95

Figure 14: Type of KSA by growth stage 98
Figure 15: Type of KSA by region 98
Figure 16: How SAPs impact human capital 103
Figure 17: Impact of SAPs on need for achievement and learning 104
Figure 18: Impact of SAPs on need for independence and autonomy 104
Figure 19: Impact of SAPs on need for company growth 104
Figure 20: Impact of SAPs on need for recognition and status 104
Figure 21: Impact of SAPs on need for social and community improvement 104
Figure 22: Impact of SAPs on need for income security and financial success 104
Figure 23: How SAPs impact entrepreneurial motivation 111
Figure 24: How SAPs impact Firm performance 116
Figure 25: Areas for improvement in SAPs 121
Figure 26: The "perfect" startup acceleration program 127
Figure 27: Startup needs from SAPs by growth stage 128

Appendix 3

Figure A3.1: Number of founders per startup 142
Figure A3.2: Number of team members with STEM backgrounds 142
Figure A3.3: Number of team members with business/management backgrounds 142
Figure A3.4: Proportion of male founders 142
Figure A3.5: Proportion of female founders 142
Figure A3.6: Avg. years of professional experience 142
Figure A3.7: Program duration 142
Figure A3.8: SAP format 142

Conclusions

Figure 1: Dynamic interactions of different variables along the entrepreneurship process 145

List of Abbreviations

ANDE	Aspen Network of Development Entrepreneurs
BSc	Bachelor of science
COVID-19	Coronavirus disease
EL	Entrepreneurial learning
EM	Entrepreneurial motivation
FP	Firm performance
GALI	Global Accelerator Learning Initiative
HCaqE	Human capital acquisition for entrepreneurship
HCEL	Human capital entrepreneurship literature
HC	Human capital
HCI	Human capital investment
KSA	Knowledge, skills and abilities
MBA	Master's in business administration
MEA	Middle east and Asia
MSc	Master of Science
PhD	Doctor of Philosophy
SAP	Startup acceleration program
STEM	Science, technology, engineering, and mathematics
VCs	Venture capital investors

Introduction

1. Motivation

The human capital theory (Schultz, 1961; Becker, 1964) was developed aiming to improve the understanding of the value of education on economic development. This theory suggests that people possess and acquire knowledge, skills, and abilities that translate into economic value (Schultz, 1961; Becker, 1964). Over the last three decades, human capital research has evolved tremendously, incorporating a variety of dimensions and links (Unger et al., 2011). One of the links commonly discussed in human capital literature is related to the entrepreneurship process (Unger et al., 2011). There are several arguments justifying the importance of this link. Alvarez and Barney (2007), Bruns et al. (2008), and Marvel (2013) show that human capital is critical to opportunity recognition, creation, and exploitation in the context of the entrepreneurship process. Other studies, such as Dimov (2010) and Unger et al. (2011), indicate that human capital plays a key role in venture emergence and performance. Moreover, human capital is vital for the acquisition of additional human capital and setting a competitive advantage for firms (Corbett et al., 2007; Bradley et al., 2012).

Taking these studies into consideration, there appears to be a consensus that human capital has a positive relationship with entrepreneurship success – whichever way success is defined (Unger et al., 2011; Marvel et al., 2016). This sentiment mirrors the practice of venture capital investors (VC's), using human capital as an important evaluation criterion to determine the success of startups (Stuart & Abetti, 1990; Zacharakis & Meyer, 2000).

In a survey of 885 venture capital investors at 681 VC firms, 95% mentioned that the management team was an important factor, while 47% mentioned it as the most important factor when evaluating a company (Gompers et al., 2020). This pattern emerges because venture capital investors operate in a landscape of uncertainty, investing in high-risk high-growth companies (i.e., startups) that are in essence seeking out or creating disruptive scalable business models. These types of companies often have uncertain future cash flows, a dearth in historical operating information, and are therefore ineligible to receive financing from traditional banks (Gompers et al., 2020). In most cases, the only readily accessible information that startups can present is the human capital of the founders.

In spite of the importance of human capital in evaluating startups within the VC community, its assessment can be challenging due to several reasons. First, there is no definite or elaborate model provided to successfully evaluate human capital when Venture Capital investors perform due diligence (Bontis & Fitz-enz, 2002). Second, novice VC Investors rely purely on the qualifications or the human capital investments of founders (Franke et al., 2008).

Nevertheless, current research shows that these investments in some instances have no significant impact on entrepreneurship success in comparison to the outcomes of human capital investments (Unger et al., 2011). Even when they focus on the outcomes of human capital investments, they focus purely on their relevance "today", thereby ignoring unexpected changes that can render such outcomes irrelevant in the future (Davidsson & Honig, 2003; Dimov & Shepherd, 2005). Some studies (e.g., Davidsson & Honig, 2003; Dimov & Shepherd, 2005) argue that it is widely acknowledged that human capital is critical to all phases of the entrepreneurial process. However, a particular type of human capital may be more beneficial in one phase but redundant, and in some cases disadvantageous, in another phase (Davidsson & Honig, 2003; Dimov & Shepherd, 2005). Third, it takes a lot of time to assess human capital (Smart, 1999), which may have implications such as losing an investment deal to competitors. A fourth aspect to highlight is that VC investors have biases when evaluating startups, and there is empirical evidence that they are not as objective as often presumed (Franke et al., 2006). This is particularly true when VCs attempt to evaluate other factors associated with human capital such as personality traits, motivation, etc. using their "gut" feeling (Hisrich & Jankowicz, 1990; Proimos & Murray, 2006; Levie & Gimmon, 2008; Huang & Pearce, 2015; Šarić, 2015). The reliance of “gut” feeling can have significant implications. For example, the over-reliance on this type of assessment may have contributed to one of the largest financial failures in venture capital history – the collapse of FTX in which over $32 billion was lost in less than 10 days (Ugeux, 2022).

These problems of evaluating human capital are not exclusive to the venture capital community but are also evident in job recruitment (Beattie & Johnson, 2012; Russell et al., 2019; Veluchamy et al., 2021). Several studies (e.g., Beattie & Johnson, 2012; Heilman et al., 2015; Russell et al., 2019; Veluchamy et al., 2021; Koval & Rosette, 2021) have indicated that job recruitment is prone to bias and discrimination, especially because of the inherent methods of evaluating human capital. Seeing that VCs can lose significant amounts of money when they make the wrong investment decisions, it is imperative to widen our understanding of human capital and its role in the entrepreneurship process. It is critical to understand what metrics investors overlook when evaluating human capital while performing due diligence. Furthermore, it is essential to assess if greater objectivity can be incorporated into the decisions VCs and even job recruiters make when evaluating human capital.

Moreover, startups in general have a higher probability of failure because of how risky they are. Some studies suggest that 50% of startups fail in the first three to five years, others suggest that 90% will fail after 10 years (Startup Genome, 2022). It is therefore imperative to find ways of reducing the risk of startup failure by increasing our understanding of the factors that determine their success, especially those related to their human capital. Expanding on this understanding will contribute to existing literature that suggests there is a link between human

capital and entrepreneurial success (Davidsson, 2004; Unger et al., 2011; Marvel et al., 2016). Furthermore, the future of work will consist of increasing knowledge-intensive activities, for which human capital plays an essential role (Bosma et al., 2004; Honig, 2001; Pennings et al., 1998; Sonnentag & Frese, 2002). This further emphasises the importance of expanding our knowledge on human capital and how it is created in the entrepreneurship process.

2. Objectives of the study

The challenges highlighted above inspire three broad questions or objectives this study aims to address. The first broad question we aim to answer is "*How do entrepreneurs acquire entrepreneurial knowledge, skills and abilities? or how do entrepreneurs accumulate human capital?"* The main goal of answering this question is to give us a better understanding of new ways of assessing human capital. Our goal is to move beyond the static view of human capital into a more pragmatic and dynamic view of the concept. The first study, titled *"Re-thinking human capital acquisition for entrepreneurship: A holistic multidimensional approach"* answers this question by providing insights into how human capital acquisition is conceptualised today, and how it ought to be conceptualised. Our assumption is that, by addressing the shortcomings of the current conceptualization of human capital acquisition for entrepreneurship, we may set the foundation for proper evaluation of human capital.

The second broad question to be addressed by this study is: *"what drives entrepreneurs to acquire human capital?"* or *"why do they acquire human capital for entrepreneurship?"* Our goal here is to explore alternative drivers of human capital acquisition for entrepreneurship. Our second study, titled *"Examining the relationship between entrepreneurial motivation and human capital acquisition"* answers these questions by elaborating on the importance of variables such as the entrepreneurial motivation in the entrepreneurship process. Our goal is also to bring objectivity into the evaluation of (hard to measure) variables like motivation at the firm level.

The final question this study aims to address is: *"Are there interventions to minimise startup failure?"* Our goal in this study is to understand how we can improve the chances of startup success. The third study, titled *"Does startup acceleration really matter? Evaluating its impact on human capital, entrepreneurial motivation, and firm performance"* answers this question by elaborating on interventions such as startup acceleration programs.

Through the development of these three studies, we are able to develop approaches that set the foundation to help venture capital investors and job recruiters go beyond their "gut" feelings. Similarly, we are able to expand on how to improve startup acceleration programs to improve performance in startups.

3. Overview of the thesis

This dissertation consists of five chapters, three of which constitute the main body of the thesis. We begin the thesis with an introductory chapter explaining the motivation behind the studies. The introductory chapter is followed by Article 1, which provides a deeper understanding of human capital acquisition. Article 2 provides insights on the drivers of human capital acquisition, while Article 3 elaborates on interventions that can help to achieve firm growth. We end the thesis by presenting some conclusions, as well as some theoretical and practical implications of this research.

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ARTICLE 1

Re-thinking human capital acquisition for entrepreneurship: A holistic multidimensional approach

Abstract:
Given the substantial interest around the study of entrepreneurship, understanding the intricate network of factors that explain the decisions about human capital is of critical importance. Decisions concerning knowledge, skills and abilities are multidimensional since there are many modes, categories, and components of human capital acquisition. Human capital may come from a set of choices or a set of processes. The choices and processes are disaggregated into four categories: (i) what human capital entrepreneurs choose to acquire; (ii) where they want to acquire such human capital; (iii) how they want to acquire the human capital; (iv) when they want to acquire human capital. Furthermore, it is also important to understand the drivers/motivations of entrepreneurs regarding human capital acquisition. This paper is an in-depth organization and review of the existing literature. We present a roadmap connecting the points that remain disperse and fragmented. In addition, suggestions for future research are provided.

Keywords: Entrepreneurship, human capital; learning; choices; investment; knowledge.

JEL Codes: J24, L26

1. Introduction

1.1. Background

For over a decade, the human capital entrepreneurship literature (HCEL) has benefited from multi-disciplinary and multi-theoretical approaches. However, the contribution of economic theory to human capital entrepreneurship literature is much scarcer (Marvel et al., 2016; Dimov, 2017). In a critical review of HCEL, Marvel et al. (2016) show that articles using economic theory account for no more than 5.6%, and that there are considerable gaps in research on how entrepreneurs acquire human capital for entrepreneurship and what

motivates them to acquire specific types of human capital (Marvel et al., 2016; Dimov, 2017; Arshed et al., 2021). These research gaps deserve to be addressed for two main reasons. First, understanding how entrepreneurs acquire human capital for entrepreneurship provides useful insights on how entrepreneurs recognize opportunities in new circumstances, or how they cope/adapt to liabilities of newness (Alvarez & Barney, 2007; Marvel, 2013). This is especially important because knowledge, skills, and abilities (KSAs) may be critical in one period but irrelevant in another one. The COVID-19 pandemic is a perfect example of how circumstances can change dramatically, relegating some KSAs to the sideline (World Bank, 2020). Second, motivation pushes entrepreneurs to take entrepreneurial actions (including acquiring more human capital) and these actions may greatly affect firm growth (Locke, 2000; Marvel et al., 2016; Vaz, 2021).

The challenge with studying how entrepreneurs acquire human capital – human capital acquisition for entrepreneurship (HCaqE) – is that there are different perspectives about this topic. A first view understands human capital acquisition for entrepreneurship to be synonymous with human capital investment (HCI). In this perspective it is assumed that some entrepreneurial KSAs are innate to the "choice" of human capital investment that entrepreneurs make, which is not always the case. This is because some KSAs may not be a direct outcome of a specific human capital investment, as a variety of factors (e.g., personal traits) also contribute to the development of these outcomes. For this reason several empirical studies advocate using outcomes of human capital investment as direct measures of entrepreneurial KSAs instead of human capital investment variables themselves (e.g., Moog, 2002; Unger et al., 2011; Marvel et al., 2016). A different way of perceiving HCaqE is viewing it as a "continuous process" of entrepreneurial learning as opposed to the static view of human capital investment (e.g., Minniti & Bygrave, 2001; Politis, 2005; Wang & Chugh, 2014).

With these two approaches in mind, the HCaqE literature suggests that human capital acquisition can be represented as either a set of "choices" or a set of "processes", but not both. Studies on this topic therefore usually follow one of these two lines of reasoning. Also, the trend found in scientific research toward the specialization of knowledge aggravates this conceptualization because each study usually fails to show that there are several dimensions overlapping in each context. For example, in addition to choosing human capital investments, entrepreneurs also have to make choices on the content of their learning, as well as on how much effort they want to put into learning a specific content. Therefore, it seems clear that the literature on human capital acquisition for entrepreneurship has a very limited vision. In order to understand how entrepreneurs acquire human capital and what motivates them to acquire specific portfolios of KSAs, it is therefore vital to re-think the concept by moving toward a more holistic and multidimensional perspective.

1.2. Objectives

The main goal of this study is to review the empirical and theoretical literature that identifies the different concepts (and consequently components) of human capital acquisition for entrepreneurship. Based on this review, we propose a new multidimensional framework that brings together the "choices" entrepreneurs have to make and the "processes" they have to go through in order to reach a given level of KSAs. This framework is based on four questions that summarize the scope of decision required at the individual level. Entrepreneurs must choose: (i) *what* human capital they want to acquire; (ii) *where* they want to acquire that human capital; (iii) *how* they acquire the human capital; and (iv) *when* they want to acquire human capital.

Another goal of this research is to understand *why* entrepreneurs want to acquire human capital. More specifically, we focus on entrepreneurial motivation (EM) as a critical driver for human capital acquisition for entrepreneurship. While some authors argue that the relationship between entrepreneurial motivation and firm growth is significant, others find that this relationship is less critical than other factors of firm growth. Considering these findings, we provide a survey of the literature regarding the link between EM and its relationship with HCaqE.

This study extends the literature on the determinant factors of firm growth by elaborating on the idiosyncratic factors of entrepreneurs (Vaz, 2021). This is important because not all of the variables identified in the empirical literature of firm growth are direct factors, but instead have underlying variables that also influence growth. Therefore, the re-conceptualization of human capital acquisition for entrepreneurship and its drivers may lead us to expand the set of variables considered when studying this topic.

1.3. Methodology

A survey of the empirical and theoretical literature on human capital acquisition and its drivers was used to build this paper. In August 2021, a search was conducted in the Scopus Database using the terms "human capital acquisition", "knowledge acquisition and entrepreneurship", "knowledge and skill acquisition", "entrepreneurial learning", and "entrepreneurial motivation". The search parameters were set to find these terms in the Title, Abstract, and/or Keywords of documents in the Scopus Database. A list of 1,448 publications including journal articles, books, theses, and conference papers was obtained from the first search. The breakdown of the overall results is the following: (i) "human capital acquisition" was found in 105 publications; (ii) "knowledge acquisition and entrepreneurship" in 93 publications; (iii) "knowledge and skill

acquisition" in 223 publications; (iv) "entrepreneurial learning" in 615 publications, and (v) "entrepreneurial motivation" in 412 publications.

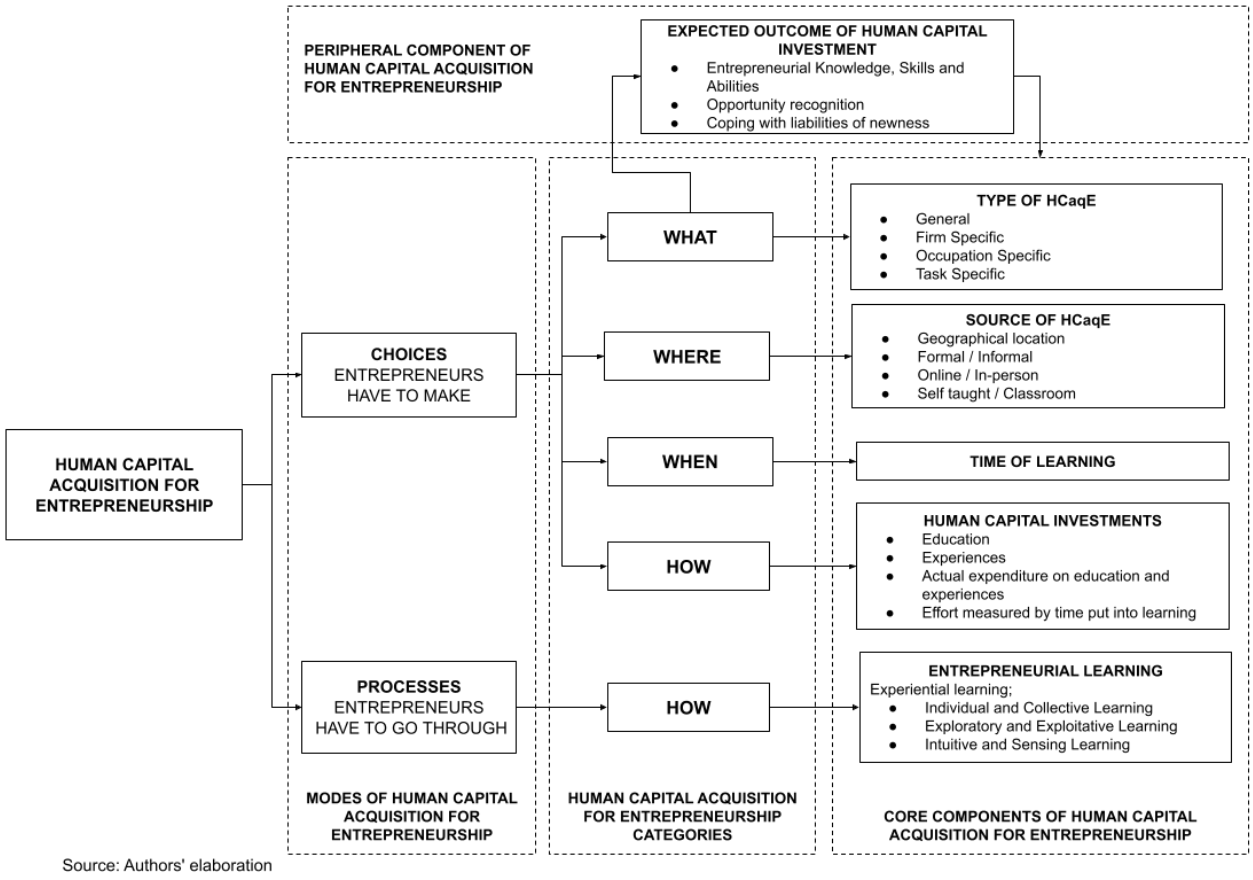
Following this search we applied a hierarchical screening procedure to decide which studies to include in the review. In the first step we adjusted the search parameters by filtering according to "subject area". We excluded publications with subject areas from Life Sciences, Engineering, Computer Science, Arts, and Psychology. With this procedure we retained 902 publications. The results of the first step are as follows: (i) "human capital acquisition" generated 82 publications; (ii) "knowledge acquisition and entrepreneurship" generated 41 publications; (iii) "knowledge and skill acquisition" generated 50 publications; (iv) "entrepreneurial learning" generated 449 publications; and (v) "entrepreneurial motivation" generated 280 publications. In the second step we excluded all studies that were not directly related to the subject area of Economics, Econometrics, and Finance, by filtering further by subject area. This step led to a shorter list, with 363 publications. The results of the second step are as follows: (i) "human capital acquisition" generated 70 publications; (ii) "knowledge acquisition and entrepreneurship" generated 18 publications; (iii) "knowledge and skill acquisition" generated 4 publications; (iv) "entrepreneurial learning" generated 139 publications, and (v) "entrepreneurial motivation" generated 132 publications. As a final step we identified publications that directly discussed concepts of human capital acquisition and entrepreneurial motivation. We accomplished this by reviewing the abstract of each publication generated from the second step and excluding publications for which human capital acquisition and entrepreneurial motivation seemed not to be the main topic. We arrived at a final list of 120 publications.

2. Human capital acquisition for entrepreneurship as a holistic multi-dimensional construct

Figure 1 illustrates a holistic multidimensional view of human capital acquisition for entrepreneurship, including the modes, categories, and components of human capital acquisition. The literature on HCaqE shows that human capital may come from: (i) a set of choices that entrepreneurs make; or (ii) a set of processes they go through. These choices and processes are disaggregated into four major categories: (i) *what* human capital entrepreneurs choose to acquire; (ii) *where* they want to acquire that human capital; (iii) *how* they want to acquire the human capital; and (iv) *when* they want to acquire human capital. Based on this categorization, HCaqE can be perceived as having five core components and one peripheral component: (i) type of human capital acquisition for entrepreneurship; (ii) human capital investments; (iii) sources of human capital acquisition for entrepreneurship; (iv) entrepreneurial learning; (v) time of learning; and (vi) expected outcomes of human capital

acquisition for entrepreneurship (as the peripheral component) (Figure 1). This framework will be explored in detail below.

Figure 1: A Holistic and Multidimensional View of Human Capital Acquisition for Entrepreneurship



Source: Authors' elaboration

2.1. Core components of human capital acquisition for entrepreneurship

2.1.1. Types of human capital acquisition for entrepreneurship

Several studies suggest that human capital acquisition can be categorized into different types based on the relevance of the human capital directly related to an industry, firm, or task. The two major types of human capital acquisition commonly described in literature are:

(i) General human capital: this includes knowledge, skills, and abilities that are equally valued across firms, industries, or occupations (Gibbons & Waldman, 1999; Ost, 2014; Kinsler & Pavan, 2015).

(ii) Specific human capital: this refers to knowledge, skills, and abilities that are relevant to a firm, industry, or task (Gibbons & Waldman, 2004). Specific human capital can be further subcategorized into firm-specific (Lazear, 2009), occupation-specific

(Neal, 1995; Sullivan, 2010), and task-specific (i.e., process specific and/or content specific) (Gibbons & Waldman, 2004).

The expected return determines the type of human capital that the entrepreneur chooses. For example, if entrepreneurs perceive that a specific human capital will generate a given level of return, this will dictate the amount of investments they will make to acquire that human capital. Many studies that compare the effects of the two types of human capital show that specific human capital leads to higher productivity or entrepreneurial success than general human capital (Gibbons & Waldman, 1999; Gibbons & Waldman, 2006; Unger et al., 2011). This is because human capital can only lead to entrepreneurial success if it is successfully transferred or applied to a specific task that needs to be done. The successful application of human capital is easier if the human capital is related to a firm, industry, process, or task (Unger et al., 2011). Some studies show that entrepreneurs with specific human capital (in particular, task-specific human capital) had better knowledge of their customers, products, and services, implying that they were more likely to succeed in their businesses (Gimeno et al., 1997).

2.1.2. Human capital investments

From a theoretical point of view, knowledge, skills, and abilities are the result of investments in human capital, such as education, training, and work experience (for seminal contributions on this topic, see Schultz, 1961; Becker, 1964; Blundell et al., 1999). For this reason, most researchers have relied on human capital investments as a proxy of human capital acquisition (Reuber & Fischer, 1994). However, human capital investment is an indirect indicator of human capital and may not always lead to the acquisition of a specific knowledge, skill, or ability. For example, two individuals with the same experience and education can have different entrepreneurial outcomes based on the knowledge, skills, and abilities they have acquired (Quiñones et al., 1995). This is because there are a variety of other factors such as the environment (e.g., learning environment or available resources) that also influence whether human capital investments will lead to the effective acquisition of KSAs (Reuber & Fischer, 1994; Quiñones et al., 1995; Paulsen, 2001; Coleman & DeLeire, 2003). Moreover, there are several individual characteristics that may affect how experience and education are transformed into relevant KSAs (Keith & Frese, 2005). These variables may include individuals' cognitive capabilities, their understanding of ideas and situations (i.e., reflective orientation), and/or personal motivations. Hence, experience or education should not be expected to be the same as knowledge, skills, and abilities acquired (Sonnentag, 1998).

Entrepreneurs choose the type of investment they want to make to acquire human capital. They choose the type of education, training, or work experience they believe will give them the knowledge, skills, and abilities they want. Similarly, they choose the level of investment they want to make to acquire human capital. The level of investment goes beyond the idea of financial cost, also including the opportunity cost or amount of effort (often measured by time) required to obtain knowledge, skill, and ability.

2.1.3. Sources of human capital acquisition for entrepreneurship

Knowledge, skills, and abilities are “containers of entrepreneurial information” that can be found in a variety of places (Cooper et al., 1995; Varis & Littunen, 2010). Entrepreneurs thus have to search for the location(s) of these and determine which of these sources are best suited for their needs. The concept of sources of human capital has been widely used in macroeconomics, with several studies describing it as human capital investments (Garavan et al., 2001; Oketch, 2006; O'Mahony, 2012). A criticism of this perspective is that it does not differentiate among the factors, namely the environment in which these containers of entrepreneurial information exist. Hence it downplays the role of the location or context in which knowledge, skills, and abilities can be explored.

It is important to take a different approach to understanding sources of HCaqE because in addition to deciding on human capital investments, entrepreneurs are also making decisions on their environment and format of learning. By viewing KSAs as containers of entrepreneurial information it becomes clear that they can be encountered in a variety of environments and formats. These are described as follows:

(i) *Offline and online environments* (Roper, 2007; Littenberg-Tobias & Reich, 2020). Offline environments are the physical or geographical locations where a training or experience occurs or is domiciled (e.g., continent, country, city, neighborhood, building, classroom, etc.). Online environments, on the other hand, refers to digital/virtual environments where training or experiences occur or are domiciled (e.g., internet, educational software, teleworking, etc.).

(ii) *Formal and informal environments* (Folkestad, 2006; Salas-Velasco, 2007). Formal environments are those in which entrepreneurial information is distributed in a structured manner, while informal environments are unplanned and allow for a flexible distribution of information.

(iii) *Self-learning and collective environments* (Dabbagh & Kitsantas, 2012). Self-learning environments allow for individuals to transform education or experiences without external support, while collective learning environments create

circumstances under which individuals learn in groups or with the inputs of other individuals.

These sources of HCaqE are not mutually exclusive. Entrepreneurs can choose a combination of these sources to acquire the knowledge, skills, and abilities they need. For example, an entrepreneur may choose an environment that is online, formal, and resorts to self-learning, while another may choose an environment that is offline, informal, and benefits from collective learning. The variations of the source of HCaqE appear to be limitless.

2.1.4. Time of learning

Although human capital acquisition is often viewed in the literature as a static process (i.e., void of the impact of time), there are several studies that show otherwise and that adopt an intertemporal framework (e.g., Swanson & Kopecky, 1999; Cervellati & Sunde, 2005; Wang & Zatzick, 2019). Swanson and Kopecky (1999) and Cervellati and Sunde (2005) show that the level of human capital acquisition achieved is determined by time or the duration of the lifespan of the individual. These studies show that if individuals have more time available they tend to invest more in learning. Moreover, according to Chaudhuri and Sethi (2008, p. 580), "the treatment that individuals anticipate in the labor market does influence their perceived benefits of acquiring human capital". This could imply that individuals may determine if and probably when they would acquire human capital based on their perceived view and assessment of the labor market.

The labor mobility literature also adds to the research on this question. According to Dolton and Kidd (1998), individuals scan job opportunities, and based on this scan determine if they would invest in acquiring human capital for a given period in order to obtain benefits of a career change (which could also imply a change toward entrepreneurship).

Using a different angle of analysis, Wang and Zatzick (2019) argue that innovation is influenced by the decisions of firms regarding the moment/time they choose to acquire more and new human capital. They find that "organizations benefit from hiring evenly over time, as it ensures a continuous inflow of new knowledge and perspectives and enhances collaboration between new and incumbent employees" (Wang & Zatzick, 2019, p. 30). The idea of "*learning by hiring*" is implicit in this argument (Nahapiet & Ghoshal, 1998).

2.1.5. Entrepreneurial learning (EL)

One of the major perspectives within entrepreneurial learning research suggests that learning is experiential (Rae, 2000; Minniti & Bygrave, 2001; Sarasvathy, 2001; Corbett et al., 2007; Dimov, 2007). In more specific terms, this experiential learning is described in a variety of concepts including *learning-by-doing* (Balasubramanian, 2011), *learning from success and failure* (Minniti & Bygrave, 2001), *learning from past business and life experiences* (Sardana & Scott-Kemmis, 2010), and *learning vicariously through the experiences of others* (Lévesque et al., 2009). Despite the theoretical depth of entrepreneurial learning research, a common flaw of these theories is that it is presumed that entrepreneurial knowledge is innate to the experience, which might not always be the case. Another criticism of the majority of the research on entrepreneurial learning is the assumption that experience automatically leads to the acquisition of entrepreneurial knowledge. Reuber and Fischer (1994) suggest that a distinction between the entrepreneurial knowledge acquired and the entrepreneurs' experience is needed to properly understand entrepreneurial learning. Taking a step forward, Politis (2005) proposes a well-known conceptual framework about this topic based on the following reasoning: "in addition to investigating the direct link between entrepreneurs' career experiences and the development of entrepreneurial knowledge, we also need a better understanding of how the entrepreneurs' predominant mode of transforming an experience into knowledge influences the specific type of knowledge developed, and, additionally, also the factors that influence the entrepreneurs' predominant mode of transforming an experience into knowledge" (Politis, 2005, p. 401). These arguments present a cycle of entrepreneurial learning in which something has to be done to convert experiences to knowledge (Rae & Carswell, 2001; Politis, 2005).

2.1.5.1. Modes of entrepreneurial learning

The modes of entrepreneurial learning refer to the process of transforming experience into knowledge. The literature suggests that there are three distinct pathway pairs:

(i) *Individual and collective learning*. Wang and Chugh (2014, p. 34) define individual learning as "the process in which individuals acquire data, information, skill or knowledge", while Capello (1999, p. 354) defines collective learning as a "social process of cumulative knowledge, based on a set of shared rules and procedures which allow individuals to coordinate their actions in search for problem solutions". What differentiates these two types of learning is that collective learning is cumulative, interactive, and public in nature (Hayes & Allinson, 1998; Capello, 1999;

Fenwick, 2008). This characteristic enables the transmission of temporal and spatial knowledge (Andreu & Sieber, 1999; Capello, 1999).

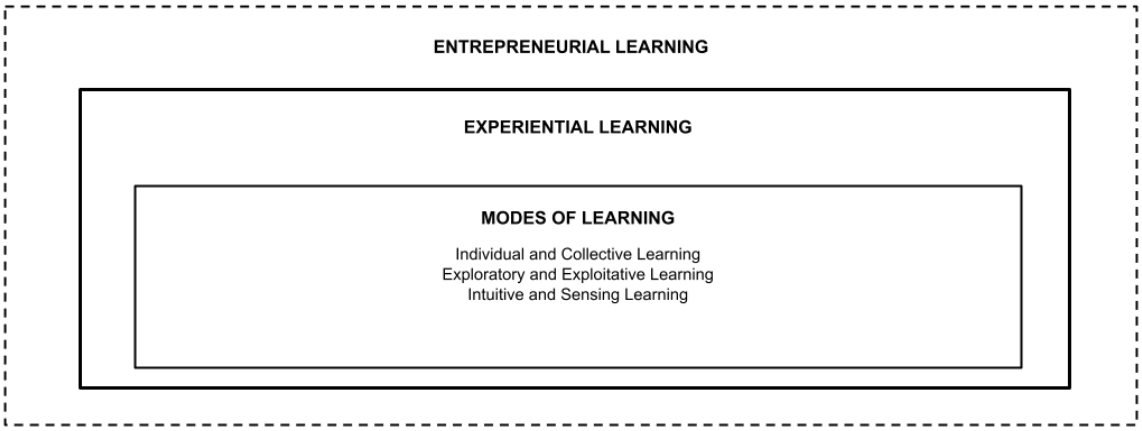
(ii) *Exploratory and exploitative learning*. Politis (2005) describes exploratory learning as "learning from experiences by exploring new possibilities including issues such as variation, experimentation, discovery, and innovation" (Politis, 2005, p. 408), and exploitative learning as being related to learning from experience by exploiting previous certainties, convictions, or validations (Politis, 2005). Exploratory learning is also known as variance-seeking learning or experimental learning and often develops new knowledge that influences entrepreneurs to make certain decisions (e.g., decisions to pivot their business model) (Zhao et al., 2011; Bingham & Davis, 2012). On the other hand, exploitative learning is also known as acquisitive learning and often comes from gathering and incorporating existing knowledge (Brady & Davies, 2004; Zhao et al., 2011; Bingham & Davis, 2012).

Some studies have sought to link these two types of learning with entrepreneurial outcomes. McGrath (2001), for example, suggests that exploratory learning increases performance variance, which implies large variations between success and failures, while exploitative learning improves mean performance, which may imply suboptimal stable equilibrium. March (1991, p. 71) suggests that exploration involves "search, variation, risk taking, experimentation, play, flexibility, and discovery," while exploitation involves "refinement, choice, production, efficiency, selection, implementation, and execution". Politis (2005) argues that although these learning processes have implications on entrepreneurs' behaviors or strategic decisions, one process is not better than the other. In the same vein, March (1991) and Sirén et al. (2012) suggest that there are benefits emerging from a balanced mix of exploratory and exploitative learning, as choosing one process exclusively over the other has negative implications. For example, an entrepreneur who is totally focused on exploration may have many new ideas that are underdeveloped due in part to the inability to develop expertise relevant for each idea, while a total focus on exploitation may lead to being trapped in a stable equilibrium that is suboptimal (Kim & Atuahene-Gima, 2010).

(iii) *Intuitive and Sensing Learning*. Felder and Silverman (1988) describe sensing learning as learning by the knowledge of facts, which involves an entrepreneur's observation (i.e., through the five senses) of his/her environment, while intuitive learning refers to learning by "knowing relationships of facts" (Wang & Chugh, 2014). This entrepreneurial learning mode originates from theories in the field of psychology (Jung, 1971), and finds relevance in education research (Wang & Chugh, 2014).

Due to the presumed objectivity of sensory learners, it is argued that they are more prone to discover opportunities based on observable information from the environment (Baldwin & Sabry, 2003; West et al., 2007). On the other hand, intuitive learners tend to be abstract thinkers, and are thus able to create opportunities based on their ability to connect the dots between observable data points (Cook et al., 2009).

Figure 2: A View of the Entrepreneurial Learning Process



Source: Authors' elaboration

2.2. Peripheral component of human capital acquisition for entrepreneurship

The process of acquiring knowledge, skills, and abilities requires a clear distinction between human capital investments, outcomes of human capital investments, and expected outcomes of human capital investments (Reuber & Fischer, 1994; Unger et al., 2011). Outcomes of human capital investments are considered direct indicators of human capital. Several studies have shown that outcomes of human capital investments have a greater impact on entrepreneurial success than human capital investment indicators (Crook et al., 2011; Martin et al., 2013).

Since human capital investment is not a direct predictor of a specific outcome, individuals can know the outcome of an investment only after they have made the investment. As a result, individuals have to make assumptions and form expectations in order to make choices. For instance, an individual can decide to invest in a training program with the hope of achieving a specific outcome (e.g., knowledge for starting a business, business management skills, etc.), but cannot be certain that he/she will attain this desired outcome until the training is over. They will therefore choose to invest based on the expectation that they will receive the outcomes of their investments. Because there are no guarantees that individuals will receive these outcomes, they have at best a variety of mechanisms that validate their expectations and that

can be used to support their decisions. These validation mechanisms could include track record of education program, feedback from the market, prior experience, etc.

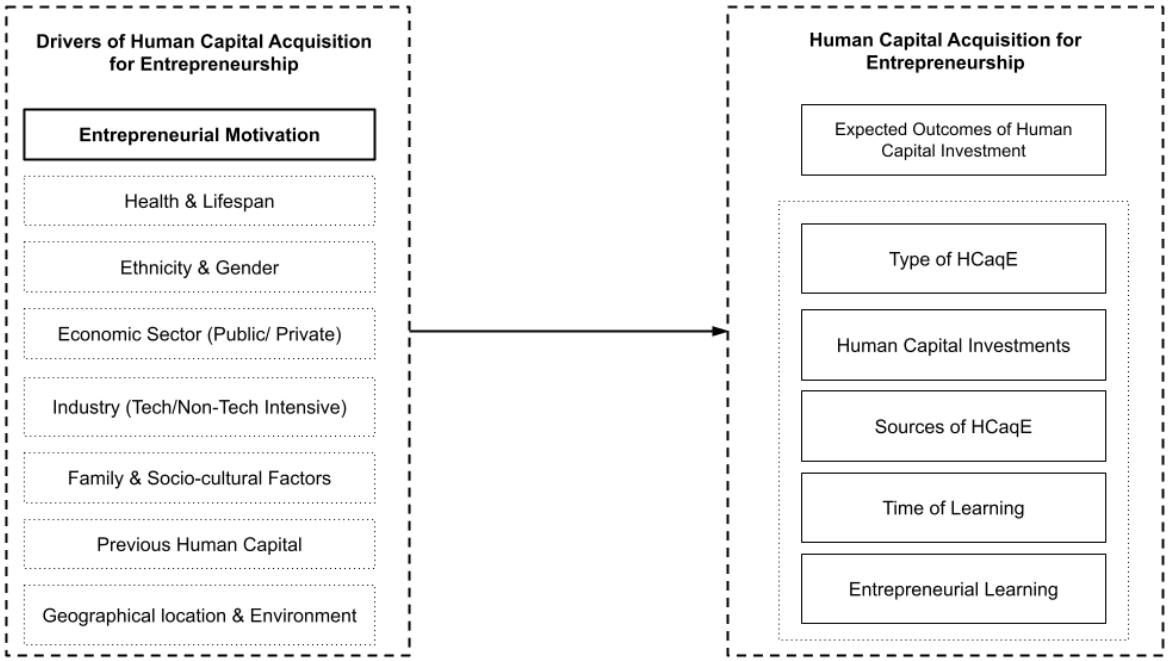
In conclusion, individuals often choose investments based on expected outcomes (Jacobs, 2007; Wiswall & Zafar, 2021). These outcomes can include future labor income, additional job features, marriage prospects, family wellbeing, knowledge on fundraising, and business management skills, among others. Because expected outcomes of human capital investments are not actual outcomes of human capital investments, there are possible/probable gaps between expected outcomes (*ex ante*) and actual outcomes (*ex post*) of human capital investments.

According to our holistic multidimensional framework for human capital acquisition for entrepreneurship we have positioned expected outcomes of human capital investments as a peripheral component (Figure 1). This is because even though individuals make a choice on what outcome they want to have, their expectations of these outcomes influences or informs other decisions about the type of human capital, source of human capital, time of learning, human capital investments, and entrepreneurial learning (Figure 1). Hence, the expected outcome of human capital investments could be seen as the first decision that entrepreneurs have to make, which then influences other choices and processes relevant for acquiring human capital for entrepreneurship.

3. Drivers of human capital acquisition for entrepreneurship

There are multiple determinant factors of entrepreneurs' decisions to acquire human capital (Figure 3). The list of key drivers includes ethnicity and gender (Chaudhuri & Sethi, 2008), previous human capital (Corbett et al., 2007; Marvel et al., 2016), health and lifespan (Swanson & Kopecky, 1999; Cohen-Cole, 2006), economic sector (De Fraja, 2008), industry (Zábojník & Bernhardt, 2001), geographical location and environment (Cohen-Cole, 2006), family and socio-cultural factors (Jayawarna et al., 2014), and entrepreneurial motivation (Arocena & Villanueva, 2003). However, substantial research gaps remain regarding the link between entrepreneurial motivation and human capital acquisition for entrepreneurship (Marvel et al., 2016). Therefore, the main goal of this section is to provide a better understanding of EM and its relationship with HCaqE.

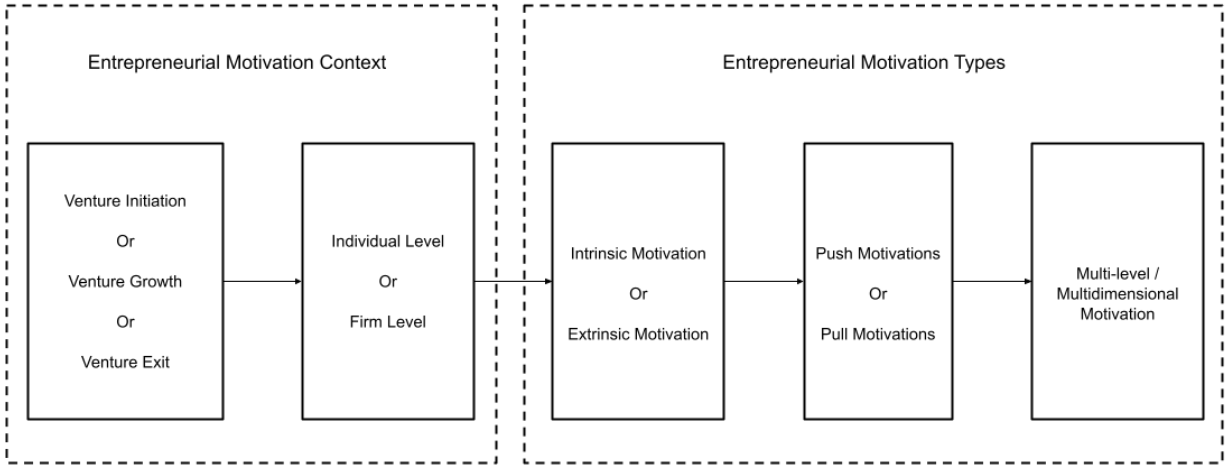
Figure 3: Drivers of Human Capital Acquisition for Entrepreneurship



Source: Authors' elaboration

Motivation is defined as the "set of energetic forces that originate within as well as beyond individuals to initiate behavior and determine its form, direction, intensity, and duration" (Murnieks et al., 2020, p. 115). Another definition, advanced by Stephan et al. (2015), describes motivation as "the entrepreneur's willingness to expend effort to achieve certain goals that are important to him/her" (Stephan et al., 2015, p. 41). Following these definitions, motivation influences how people behave and how much of a particular behavior they exhibit. Motivation has been studied as a core theme in the domains of psychological science and organizational behavior for many years (Shane et al., 2003; Murnieks et al., 2020). However, during this period several subdomains have emerged discussing motivation theories in specific contexts. One of the most important contexts in this regard is entrepreneurship, linking motivation to behaviors of starting, growing, and exiting a venture (Robichaud et al., 2001; Shane et al., 2003; Murnieks et al., 2020). From this literature, it is clear that the concept of EM is dynamic and can be fully understood only by using a multidimensional and contextual lens. Figure 4 illustrates the main categories or perspectives used by the main scientific contributions in this field of study. As seen below, it is interesting that although these perspectives of motivation differ, they often have similarities, some of which characterize them as subsets of the other.

Figure 4: Entrepreneurial Motivation as a Holistic and Multidimensional Process



Source: Authors' elaboration

3.1. Entrepreneurial motivation types

3.1.1. Internal and external motivations

Internal and external motivations are the broadest perspective in the entrepreneurial motivation literature. In fact, other entrepreneurial motivation perspectives can, in some sense, be seen as extensions or subsets of this perspective. External motivations refer to forces that stem from the environment or the circumstances of the entrepreneur or the firm. Economic incentives and social equity are examples of external motivations (Renko, 2013). Among all external motivations, financial/economic incentives have received great attention, especially in the economic, management, and finance literature (Shane et al., 2003; Renko et al., 2012; Dobryagina, 2020). Internal motivations, on the other hand, refer to forces that originate from the entrepreneur, such as his/her emotions, which could consist of his/her passions or fears (Morgan & Sisak, 2016), identity (Farmer et al., 2011), and value system (Weber et al., 2008). Internal motivations are a core topic in the field of psychology, while external motivations have deeper roots in economics, management, and related areas of study. Nevertheless, the consideration of internal and external motivations as separate areas of study can be misleading, given that entrepreneurial motivation research suggests that both motives influence entrepreneurial behavior (Powell & Baker, 2014).

3.1.2. Push and pull motivations

Push and pull motivations (also known as necessity and opportunity motivations) can be viewed as a sub-perspective of the internal and external motivation perspective because it is

often based on the entrepreneur's environment and circumstances. Push motivations are considered as "necessity" motivations, which refer to negative motivations that influence a person to start, grow, and exit a venture (Turnbull & Uysal, 1995; Baloglu & Uysal, 1996; Dawson and Henley, 2012). On the other hand, pull motivations are considered "opportunity" motivations, referring to positive motivations that influence a person to become an entrepreneur (Turnbull & Uysal, 1995; Dawson & Henley, 2012; Győri et al., 2019).

The push versus pull concept of motivation is not only the earliest but also the predominant conceptualization of entrepreneurial motivation (Dawson and Henley, 2012; Stephan et al., 2015, Murnieks et al., 2020). In their review of the literature on entrepreneurial motivation, Stephan et al. (2015) report that 65% of all studies focus on the push versus pull dichotomy of motivation. A major reason for this observation is the relative ease of accessing large population-representative surveys (e.g., Global Entrepreneurship Monitor (GEM) Survey) that include push and pull motivation questions (Bosma, 2013; Hechavarria & Ingram, 2014). However, relying on these types of surveys has limitations regarding the capture of complexities of entrepreneurial motivation due to constraint in the surveys' responses.

3.1.3. Multilevel / multidimensional motivations

With the aim of overcoming the limitations of the push versus pull motivation conceptualization, several studies provide an alternative (and more detailed) perspective, using multidimensional or multilevel approaches that combine micro-perspectives. This approach is more adequate to capture entrepreneurial motivations (Robichaud et al., 2001; Shane et al., 2003; Stephan et al., 2015; Murnieks et al., 2020), and usually relies on factor analysis techniques (Morales-Gualdrón et al., 2009).

Let us briefly explore the most common dimensions included in the multidimensional approach.

(i) *Need for achievement and learning.* This dimension refers to an individual's desire to attain significant accomplishments, high standards, or to overcome some challenges (Shane et al., 2003; Edelman et al., 2010; Jayawarna et al., 2011; Stephan et al., 2015). This dimension shares some similarities with the need to follow role models.

(ii) *Need for independence and autonomy.* This dimension refers to an individual's desire to be in control of their work, time, and decisions. It also refers to the desire for flexibility in managing their work life balance (Shane et al., 2003; Edelman et al., 2010; Giacomin et al., 2011; Friedman et al., 2012).

(iii) *Need for income security and financial success.* This dimension is often assumed to be the primary motivation for entrepreneurship, namely in the area of Economics. It captures the desire to benefit from the financial incentives obtained from participating in entrepreneurship (Shane, 2003; Edelman et al., 2010; Giacomin et al., 2011; Friedman et al., 2012).

(iv) *Need for recognition and status.* This dimension refers to an individual's desire to receive acknowledgement, respect, and/or validation within social constructs such as friends, family, and community (Shane et al., 2003; Morales-Gualdrón et al., 2009; Edelman et al., 2010; Giacomin et al., 2011; Friedman et al., 2012).

(v) *Need for social and community improvement.* This dimension refers to the desire to solve socio-economic and environmental challenges within the entrepreneur's community (Levie & Hart, 2011; Jayawarna et al., 2011; Estrin et al., 2013).

(vi) *Growth motivations or need for company/firm growth.* This dimension refers to the entrepreneur's desire to increase the size of his/her business in terms of number of employees and sales (Robichaud et al., 2001; Morales-Gualdrón et al., 2009; Stephan et al., 2015).

3.2. Entrepreneurial motivation contexts

The perspectives explored in Section 3.1 (i.e., internal and external; push and pull; multidimensional motivations) provide a great deal of insight about entrepreneurial motivation. However, in a recent systematic literature review on this topic, Murnieks et al. (2020) argue that entrepreneurial motivation should not be studied in generic terms but instead in the context of three entrepreneurial phases: (i) venture initiation; (ii) venture growth; and (iii) venture exit. Although most literature focuses on the first of these stages (venture initiation), there are clear differences of entrepreneurial motivation in each entrepreneurial phase (Table 1). As suggested by several authors, these differences are accentuated by differences in their antecedents, mediators, moderators, and outcomes (Morales-Gualdrón et al., 2009; Mahto & McDowell, 2018; Murnieks et al., 2020).

Table 1: Differences in antecedents, mediators, moderators, and outcomes of entrepreneurial motivation in each entrepreneurial phase

	Antecedents	Mediators	Moderators	Outcomes
Venture Initiation	● ethnicity ● personal circumstances ● fear of failure ● self-efficacy ● goal commitment ● entrepreneurial passion	● self-efficacy ● affective commitment ● bricolage	● prior startup experience ● aspiration level ● economic turbulence ● income loss ● gender ● access to resources ● aspiration level	● start venture ● discovery behaviour ● opportunity recognition ● exploitation behaviour ● opportunity evaluation
Venture Growth	● self-efficacy ● entrepreneurial passion ● tenacity ● identity centrality ● legacy	● positive effect ● goal clarity ● goal commitment ● goal challenge ● grit ● locomotion ● assessment	● self-control ● risk taking climate ● cognitive style ● personality ● regulatory focus ● age ● entrepreneurial experience	● venture growth ● firm performance ● team performance ● persistence ● venture funding potential
Venture Exit	● task conflict ● goal conflict		● goals ● firm performance	● sell venture ● shut down venture ● stewardship exit ● persistence with failing firm

Source: Murnieks et al. (2020, p. 130)

Beyond the study of entrepreneurial motivation within the context of entrepreneurial phases, entrepreneurial motivation has been studied using different lenses. In this case, two areas of interest seem to emerge: (i) the individual; and (ii) firm/team (Vijaya & Kamalanabhan, 1998; Stephan et al., 2015; Chedli & Kchaich, 2016; Murnieks et al., 2020).

Studies of entrepreneurial motivation at the individual level seek to understand the individual motivations and the strategic decisions and behaviors (Malebana, 2014; Stephan et al., 2015; Farhangmehr et al., 2016). On the other hand, studies at the firm/team level focus on the motivations of firms as a whole and not as an aggregation of individual motivations and behaviors (Chedli & Kchaich, 2016).

Entrepreneurial motivation at the individual level has been the major focus of most entrepreneurial motivation literature for a variety of reasons, including the fact that it is easier to gain access to individual data than to firm data. In many cases researchers argue that individual motivations can be taken as representative of firm/team level motivations. Nevertheless, since individuals are not homogeneous there might be some level of inaccuracy emerging from this assumption, especially if individual entrepreneurial motivations are grouped together to represent a single unit such as a team or firm (Stephan et al., 2015; Murnieks et al., 2020).

3.3. Linking entrepreneurial motivations

Studying each entrepreneurial motivation perspective or dimension independently can be misleading since current research suggests that motivations interact with one another to influence entrepreneurial behaviour (Powell & Baker, 2014). For instance, several studies explore the links/interactions between growth motivations and other motivations. Levie and Autio (2013) show that need for financial success or wealth-seeking motivations are linked to growth motivations, while need for independence motivations are not linked. This observation was contrary to the findings of a report by the Centre for High-Impact Entrepreneurship (2011), which suggest that there is a positive relationship between the need for independence motivations and growth ambitions in high-income countries. Moreover, Reynolds and Curtin (2008) show that there is a negative relationship between growth ambitions and necessity or push motivations, while observing positive relationships between growth motivations and opportunity or pull motivations.

Kuhn and Galloway (2015) suggest that internal and external motivations drive venture initiation, but also have joint implications on venture performance. They show that business performance was higher when internal and external motives were combined than when business performance stems from internal motives alone (Kuhn & Galloway, 2015). On the other hand, Cruz and Justo (2017) and Westhead and Wright (1998) find that the combination of internal (e.g., passion), economic (e.g., need for financial success), and fear of failure motives can lead entrepreneurs to participate in portfolio entrepreneurship, in which they own multiple businesses at the same time.

Despite the diverse conclusions regarding the interactions between motivations, these linkages are nonetheless vital in impacting entrepreneurial behaviour. These studies therefore show that each motivation may be dependent on other motivations and that these dependencies should be considered to paint a less fragmented picture between entrepreneurial motivation and behaviour.

4. Linking entrepreneurial motivation and human capital acquisition for entrepreneurship

The most prevalent link between entrepreneurial motivation and human capital acquisition for entrepreneurship in the field of Economics is the link between need for income security and financial success (or financial motivations) and acquiring education and/or new experiences (Robichaud et al., 2001; Shane et al., 2003; Edelman et al., 2010; Giacomin et al., 2011; Friedman et al., 2012; Murnieks et al., 2020). Several empirical studies suggest that economic agents acquire knowledge, skills, and abilities based on the expected financial return of acquiring those KSAs (Robichaud et al., 2001; Shane et al., 2003; Murnieks et al., 2020). In particular, financial motives seem to have strong implications on the type of HCaqE (i.e., general, firm specific, occupational specific, and task specific) that agents choose to acquire (Dolton & Kidd, 1998; Gibbons & Waldman, 1999; Robichaud et al., 2001; Shane et al., 2003; Gibbons & Waldman, 2006; Edelman et al., 2010; Unger et al., 2011; Giacomin et al., 2011; Friedman et al., 2012; Murnieks et al., 2020). Similarly, financial motivations determine not only what an individual learns but also the timing of learning (Swanson & Kopecky, 1999; Wang & Zatzick, 2019). Economic agents receive signals from the labor market (e.g., income levels associated with different occupational pathways), which influence when to acquire KSAs. Moreover, motivations help agents to rank or determine which KSAs are the most important to them. Having information on which KSAs are expected to give them the highest economic reward provides agents the incentives to choose what KSAs they opt to acquire.

Politis (2005) suggests that entrepreneurs' career orientation (or direction), which is a function of their motivations, affects entrepreneurial learning, or in other words, the mode of transforming their experience to knowledge. One justification for this reasoning is that entrepreneurs are not homogenous. They have different characteristics and career motivations (Rosa, 1998; Westhead & Wright, 1998), which may influence them to seek out different entrepreneurial experiences and learning processes (Ronstadt, 1988; Minniti & Bygrave, 2001). Further justification for this argument is advanced by Block and Sandner (2009), who classify entrepreneurial motivation based on career history recorded in the German Socio-Economic Panel Study (GSOEP). Entrepreneurs who left paid jobs on their own initiative are classified as being opportunity entrepreneurs (i.e., having pull motivations), whereas entrepreneurs who were dismissed are classified as necessity entrepreneurs (i.e., having push motivations).

Following these arguments, Brousseau et al. (1996) developed a model that identified four career orientations with different underlying motivations. The key implication of this model is that we can predict that entrepreneurs or individuals who differ in terms of career orientation

also differ in work and career related motivations (Brousseau et al., 1996). Let us discuss each of these career orientations:

(i) *Linear career.* This pathway is characterized by infrequent but progressively upward hierarchical movements (e.g., managerial hierarchy) in a career field (Buzzanell & Goldzwig, 1991; Larsson et al., 2001; Baruch, 2004). Entrepreneurs with this career orientation are motivated by opportunities to accomplish important things, implying that personal wealth is not their main driver. They are usually driven by the need for achievement and satisfaction. Politis (2005) suggests that entrepreneurs with this career orientation skew toward exploitative learning processes.

(ii) *Expert career.* This career orientation is characterized by an entrepreneur's lifelong commitment to further develop and refine their knowledge within a specific area (Politis, 2005). They are presumed to have underlying motivations of need for achievement and/or need for recognition and are more likely to exploit pre-existing knowledge (Molander, 1993).

(iii) *Spiral career.* This career orientation is characterized by periodic and significant changes across disciplines that are strongly related. This implies that they are influenced by knowledge from previous roles to develop new knowledge in new roles (Larsson et al., 2001). Entrepreneurs with this career orientation are motivated by creativity and personal development and are inclined toward exploratory processes.

(iv) *Transitory career.* This career orientation is characterized by frequent changes between unrelated fields, roles, and organizations. Brousseau et al. (1996) suggest that individuals with this type of career orientation are motivated by the need for independence. This type of entrepreneur is more likely to use exploratory mechanisms to acquire entrepreneurial knowledge (MacMillan, 1986; Westhead & Wright, 1998; McGrath, 1999).

5. Conclusion

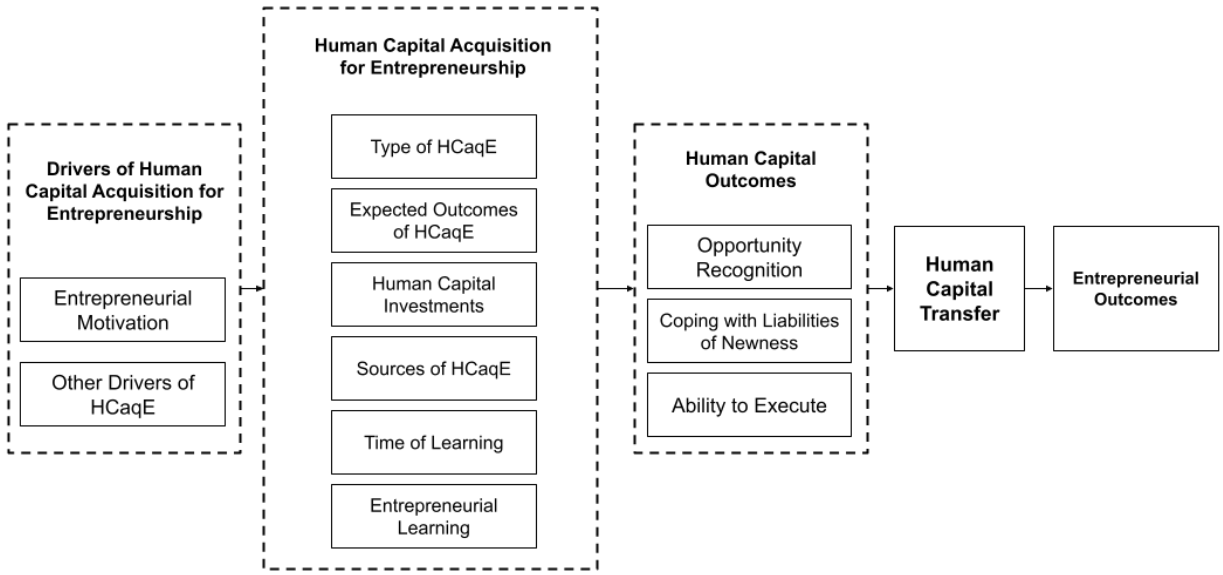
The survey on the human capital acquisition for entrepreneurship literature developed in this study provides a deeper understanding of the process that transforms experiences and education into entrepreneurial knowledge, skills, and abilities. This literature helps us to re-think current conceptualizations of human capital acquisition, leading to a new definition of human capital acquisition for entrepreneurship (HCaqE).

We can define HCaqE as the choices and processes that entrepreneurs must make and go through (at a certain period and circumstance) that lead to the assimilation of

entrepreneurial knowledge, skills, and abilities relevant to that period or circumstance. This definition represents a holistic view of HCaqE, which takes into consideration the different components that make up human capital acquisition. It shows that HCaqE depends on the choices that entrepreneurs make to acquire certain KSAs. It also highlights that it is a process and that in some way entrepreneurs must go through all the “steps” to acquire certain KSAs. Moreover, this emphasizes that HCaqE is contextual and temporal and should be viewed as such because since KSAs often change due to circumstances, the choices entrepreneurs must make are expected to change too. This is particularly important in the different entrepreneurial phases. For example, studies have shown that KSAs needed in the venture initiation phase might not be the ones needed at the venture growth or exit phase. Therefore, entrepreneurs have to make new choices on what KSAs they need in each phase. They also would likely go through different processes to acquire the KSAs they need in order to perform optimally at a particular entrepreneurial phase.

This study creates new opportunities for empirical research as it emphasizes variables (such as time of learning) that have been ignored due to their implicit nature. The re-conceptualization of the HCaqE also presents the bigger picture of how human capital impacts firm growth or venture performance (Figure 5).

Figure 5 How Entrepreneurial Motivation and Human Capital Acquisition for Entrepreneurship Impacts Firm growth



Source: Authors' elaboration

Human capital acquisition plays an important role both in the human resource management and venture capital industry. Investors have traditionally attached a high importance to the experiences of entrepreneurs in their evaluation of firm potential (Stuart &

Abetti, 1990). This trend is similar in the hiring processes of companies, in which great importance is placed on the educational and work experience backgrounds of employment candidates. In fact, management skills and experience are the most frequently used selection criteria of venture capitalists (Zacharakis & Meyer, 2000). Moreover, researchers have argued that human capital may play an even larger role in the future because of the constant growth of knowledge-intensive activities in most work environments (Yeo & Lee, 2020; Olopade et al., 2020; Kurantin & Osei-Hwedie, 2021).

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ARTICLE 2

Examining the relationship between entrepreneurial motivation and human capital acquisition for entrepreneurship

Abstract:
What drives entrepreneurs to acquire knowledge, skills and abilities? This study aims to answer this broad question by examining the relationship between entrepreneurial motivation and human capital acquisition for entrepreneurship. The study relies on the holistic multidimensional view of human capital acquisition for entrepreneurship as the framework for how entrepreneurs acquire knowledge, skills and abilities. It also relies on the multidimensional view of entrepreneurial motivation. Using logit and ordered logit models, we show that all dimensions of entrepreneurial motivation influence human capital acquisition, namely entrepreneurial learning, human capital investment, type of human capital acquisition for entrepreneurship, and an expected outcome of human capital. Our results also show that other factors affect human capital acquisition for entrepreneurship.

Keywords: Entrepreneurship program; entrepreneurship education; motivation; human capital; GALI Database.

JEL Codes: M13, L26

1. Introduction

1.1. Background

How do entrepreneurs acquire knowledge, skills, and abilities (KSAs) for entrepreneurship? This is a critical question in the area of entrepreneurship economics. Several reasons could be advanced justifying this importance. A central element is the link, strongly debated in the literature, between entrepreneurship and some other key economic dimensions, such as economic growth (Hoselitz, 1952; Wennekers & Thurik, 1999; Audretsch et al., 2006; Carree & Thurik, 2010; Bosma et al., 2018), inclusive growth (Abosede & Onakoya, 2013; Škare &

Hasić, 2016; Aparicio et al., 2020; Ajide et al., 2021), poverty and inequality reduction (Sutter et al., 2019; Bruton et al., 2021), employment (Fritsch & Mueller, 2004; Baptista et al., 2008), innovation and technological change (Acs & Audretsch, 2005), territorial competitiveness (Audretsch & Keilbach, 2007), and women's empowerment (Datta & Gailey, 2012; Al-Dajani & Marlow, 2013). Therefore, understanding how entrepreneurs obtain entrepreneurial KSAs can be a powerful tool to help relevant stakeholders foster more and better entrepreneurship.

A second reason is that traditional entrepreneurship education programs (e.g., MBAs) are losing relevance, because of the quick change in the business environments (Byun et al., 2018; Freire et al., 2022). In this context, there appears to be insufficient knowledge about how entrepreneurs can acquire the necessary KSAs to adapt quickly to these changes (Alberti et al., 2004; Hahn et al., 2017; Byun et al., 2018).

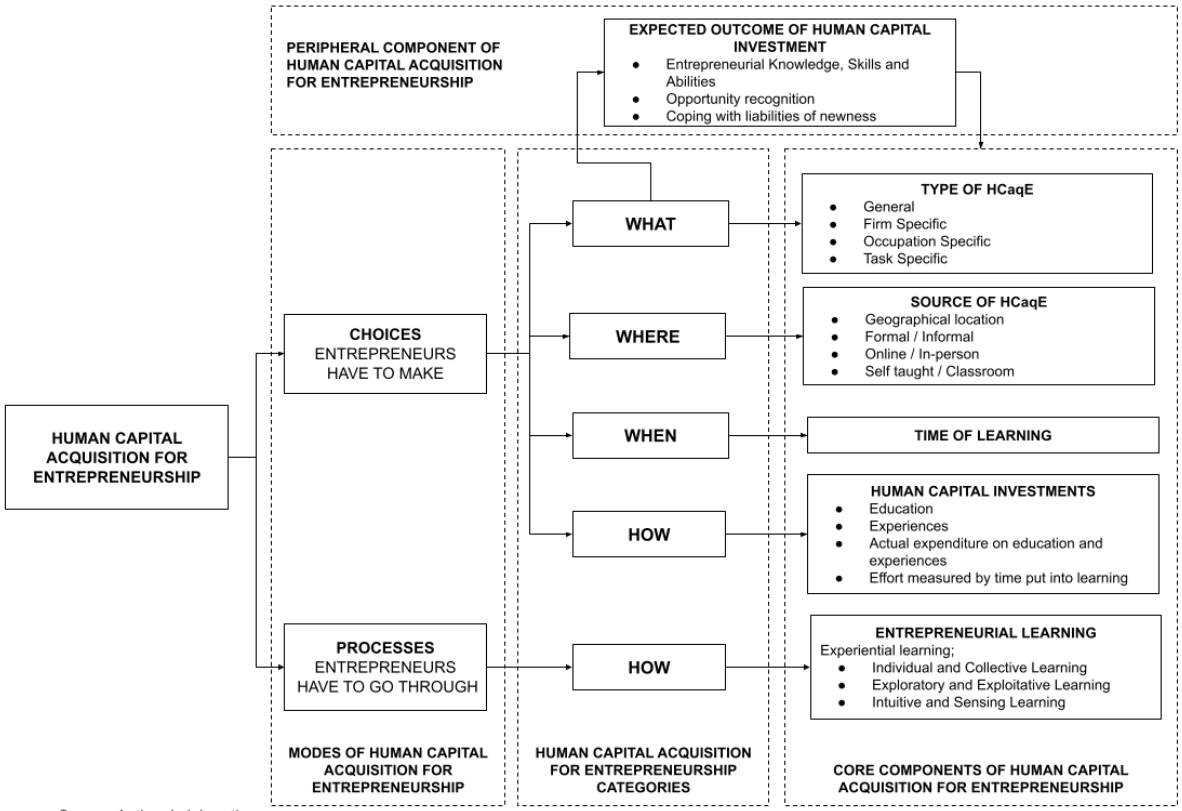
Although the benefits of understanding how entrepreneurs acquire human capital for entrepreneurship are diversified and evident, the studies explicitly elaborating on its importance in the context of the entrepreneurial process are still insufficient. In previous studies, the role of human capital acquisition for entrepreneurship (HCaqE) has been assumed to be an innate attribute of the entrepreneurship process, especially regarding the achievement of entrepreneurial outcomes. Several studies have shown, for example, a strong link between human capital and entrepreneurial outcomes.

However, human capital does not simply appear from out of nowhere, it has to be acquired. Current literature suggests there are still many questions surrounding the concept of human capital acquisition, due especially to the challenge of settling on a consensual representation of what it actually is. This challenge has been exacerbated because human capital acquisition for entrepreneurship has previously been studied as a variety of mutually exclusive single constructs. While isolating the study of various representations of HCaqE might have the advantage of simplicity, in practical terms it is, in fact, a complex multidimensional construct (Dosumu et al., 2022). This multidimensional construct consists of choices entrepreneurs have to make, as well as processes they must go through. Entrepreneurs intending to acquire human capital for entrepreneurship have to make choices pertaining to *"what"* human capital they want to acquire, *"where"* they want to acquire human capital, *"how"* they acquire the human capital, and *"when"* they want to acquire it. While making these choices, they must also go through the experience of transforming the outcomes of their choices to become actionable knowledge, skills, and abilities.

In Figure 1, we illustrate the holistic multidimensional view of human capital acquisition for entrepreneurship. Following this perspective, human capital acquisition for entrepreneurship can be defined as the "set of choices and processes that entrepreneurs have to take and go through (at a certain period and circumstance) that lead to the assimilation of entrepreneurial knowledge, skills and abilities relevant to that period or circumstance" (Dosumu et al., 2022,

p. 18). It is, therefore, clear that in order to have a broader understanding of the impact of human capital on entrepreneurial outcomes, there is a need for a clearer discussion on how human capital is acquired.

Figure 1: A Holistic and Multidimensional View of Human Capital Acquisition for Entrepreneurship



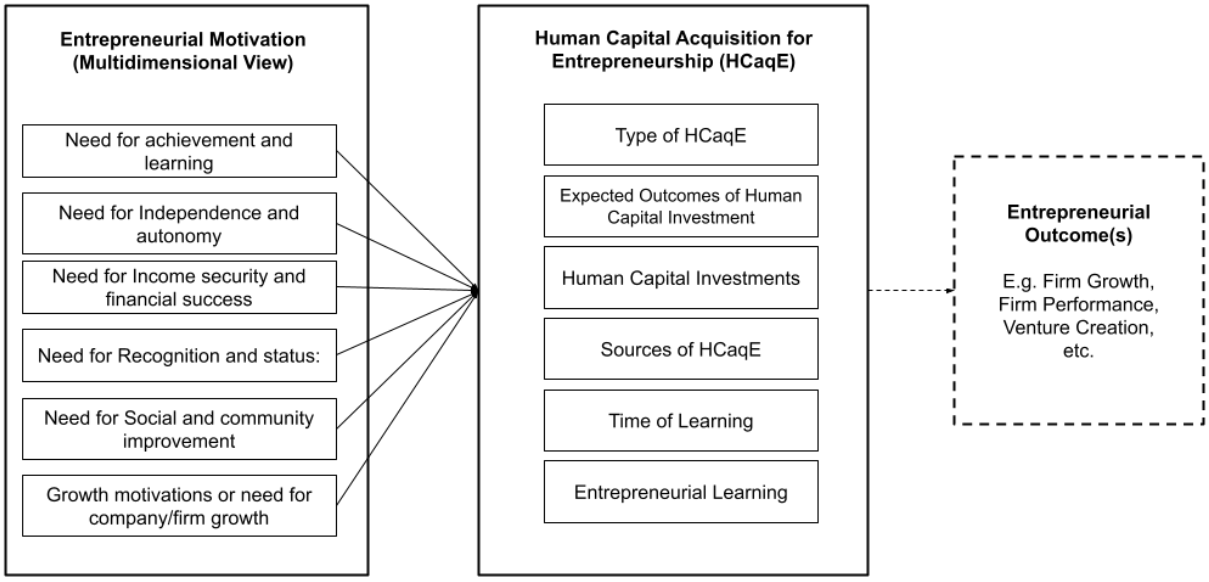
Source: Authors' elaboration

What then drives entrepreneurs to acquire knowledge, skills, and abilities? This is another critical question in this field of research. Understanding what motivates entrepreneurs to take certain entrepreneurial actions, including acquiring KSAs, can help relevant stakeholders to design interventions that could improve or foster more entrepreneurial outcomes (e.g., firm growth, firm performance, venture creation, and economic growth). There are several factors affecting these entrepreneurial outcomes. Among others, this group of factors includes health, lifespan, ethnicity, gender, economic sector, industry, family, socio-cultural factors, previous human capital, physical environment, and entrepreneurial motivation. Answering to an obvious scarcity in terms of research in previous years, entrepreneurial motivation, in particular, is increasingly becoming an area of interest, especially concerning its link with human capital acquisition for entrepreneurship (Marvel et al., 2016).

There is indeed a relevant gap in this field because a substantial portion of the current entrepreneurship literature assumes the existence of a direct link between entrepreneurial motivation and entrepreneurial outcomes (Shane et al., 2003; Zhou & De Wit, 2009; Eijdenberg

et al., 2015; de Vries et al., 2020; Murnieks et al., 2020; Cueto et al., 2021; Vaz, 2021; Queiró, 2022). However, there are underlying factors or actions behind this link that the current literature has largely ignored (Clark et al., 1984; Segal et al., 2005; Delmar & Wiklund, 2008; Dawson & Henley, 2015; Eijdenberg et al., 2015; Murnieks et al., 2020). Closing this gap would be important because entrepreneurial outcomes depend on entrepreneurial actions, and motivation leads entrepreneurs to take entrepreneurial actions. This implies that entrepreneurial motivation can influence an entrepreneurial outcome only through an entrepreneurial action, such as the acquisition of human capital. Figure 2 illustrates this perspective.

Figure 2: Entrepreneurial Motivation as a Driver of Human Capital Acquisition for Entrepreneurship



Source: Authors Illustration

Some studies are emerging to address this gap, showing that knowledge can motivate individuals to acquire more knowledge that links to an entrepreneurial outcome, such as firm performance (Murnieks et al., 2020). These studies implicitly suggest that human capital acquisition for entrepreneurship is, indeed, a potential mediator to achieve entrepreneurial outcomes. However, there is as yet no overwhelming empirical evidence of the interactions or the relationship between entrepreneurial motivation and human capital acquisition for entrepreneurship (or human capital acquisition in general). This study aims to fill this gap.

Despite the increasing relevance of entrepreneurial motivation research within Economics, current entrepreneurship literature has focused predominantly on perspectives that have been either too broad (i.e., internal and external motivations) or too simple (i.e., push and pull motivations) to capture the complexities of entrepreneurial motivation (Murnieks et al., 2020). In response to these drawbacks, multidimensional motivations were developed, providing

additional detail on entrepreneurial motivation. Multidimensional motivations are considered more practical because they capture the complexities of what drives entrepreneurs to take certain entrepreneurial actions (Robichaud et al., 2001; Shane et al., 2003; Stephan et al., 2015; Murnieks et al., 2020).

Multidimensional motivations include the following dimensions (Dosumu et al., 2022): (i) need for achievement and learning; (ii) need for independence and autonomy; (iii) need for income security and financial success; (iv) need for recognition and status; (v) need for social and community improvement; and (vi) growth motivations or need for company/firm growth. Among the studies focusing on multidimensional motivations, few investigate the interactions between these different dimensions (Stephan et al., 2015). Even when the interactions between these dimensions are investigated, there is an overwhelming focus on the financial motivations (i.e., need for income security and financial success), as if it were the most important motivation entrepreneurs have when making a decision. In light of these gaps and limitations, it is fair to say that there are more questions than answers surrounding the impact of entrepreneurial motivation on entrepreneurial outcomes and everything that lies in between (Clark et al., 1984; Segal et al., 2005; Delmar & Wiklund, 2008; Dawson & Henley, 2015; Eijdenberg et al., 2015; Murnieks et al., 2020).

Finally, regardless of the important contributions that have been made in the human capital entrepreneurship literature, most (especially in the entrepreneurial motivation and human capital acquisition literature) have focused on the analysis at the individual level, leaving many unanswered questions at the firm level.

1.2. Objectives of the study

Taking the previous considerations into account, this study aims to answer two main questions:

(i) How do entrepreneurs acquire knowledge, skills, and abilities (KSAs) for entrepreneurship?

(ii) What drives/motivates them to acquire those KSAs?

To answer these questions, we build on the work of Dosumu et al. (2022), in which the relationship between EM and HCaqE was theorized. We provide empirical evidence to support (or contradict) the existence of the relationship between entrepreneurial motivation and human capital acquisition for entrepreneurship (HCaqE). More specifically, we aim to contribute to the entrepreneurial motivation literature by providing empirical evidence that explores the multidimensional view of entrepreneurial motivation, and thus explore its interactions with HCaqE decisions. Understanding these interactions allows us to look beyond the impact of

financial motivations, providing additional insights into entrepreneurial profiling. Finally, we extend the human capital and entrepreneurship literature by looking beyond the individual level of analysis, providing empirical evidence on parts of the entrepreneurship process at the firm level.

2. Data and method

2.1. Data source

The data used in this study were obtained from the Global Accelerator Learning Initiative (GALI). GALI is a collaborative project between the Aspen Network of Development Entrepreneurs (ANDE) and Emory University (Atlanta, United States). The initiative was designed to study early-stage entrepreneurship and acceleration programs (which are a type of entrepreneurship program). Between 2013 and 2020 the project was partnered with over 360 acceleration programs and surveyed over 23,000 entrepreneurs who had either submitted an application to or participated in one of these programs. Entrepreneurs self-reported through an online survey before knowing the status (i.e., acceptance/rejection) of their application to a program. These entrepreneurs were then re-surveyed annually to gather valuable follow-up data, regardless of their participation status (acceptance/rejection or participated/did not participate).

This data source is particularly interesting for studying this topic for at least four reasons. First, the survey includes information about entrepreneurship program characteristics that simulate the components of the holistic multidimensional view of human capital acquisition for entrepreneurship suggested by Dosumu et al. (2022) (Table 1). Second, the GALI database includes questions directly related to the different dimensions of entrepreneurial motivation (Table 2). Third, there is information about other factors that could influence human capital acquisition for entrepreneurship. Finally, data is collected at a firm level with a significant number of observations. Hence, this source appeared to be the most complete data set to help us to examine the relationship between entrepreneurial motivation and human capital acquisition at the firm level.

Table 1: Survey components that simulate components of human capital acquisition for entrepreneurship (HCaqE)

Components of human capital acquisition for entrepreneurship (HCaqE)	**Relevant survey components / questions / variables / proxies from the GALI database**
Type of HCaqE: refers to knowledge, skills, and abilities that could be general or specific to an industry, occupation, firm, or task (Dolton & Kidd, 1998; Gibbons & Waldman, 1999, 2006; Unger, 2011).	**Program had sector focus:** this variable captures information about the knowledge, skills, and abilities that entrepreneurs could acquire specific to a sector. This reflects specific human capital, which is a type of HCaqE.
Expected outcome of human capital investment: refers to the knowledge, skills, and abilities expected to be obtained after investing in human capital (Jacobs, 2007; Wiswall & Zafar, 2021).	**Expected benefits of acceleration:** this variable captures what entrepreneurs perceive will be the outcome of participating or investing in an entrepreneurship program. Business skills development was chosen as variable of analysis because these skills are essential to keep an organization running smoothly.
Human capital investment: refers to the tangible and intangible costs of acquiring human capital (Schultz, 1961; Becker, 1964; Blundell et al., 1999).	**Program duration:** this variable captures the amount of time spent or invested in learning. This time also represents the opportunity cost of doing other things, including generating additional revenues, and the effort the entrepreneurs put into learning.
Entrepreneurial learning: refers to the process of transforming entrepreneurial experiences (e.g., attending business school) into entrepreneurial knowledge, skills, and abilities (Politis, 2005a).	**Program had a demo day**: this variable captures information about collective learning, which is a mode of entrepreneurial learning. Demo days are social settings where companies highlight their innovations to a set of stakeholders (e.g., investors, peers, customers, etc.) and receive feedback.

Although we found sufficient proxies or variables to capture the majority of the components of HCaqE and dimensions of entrepreneurial motivation, the survey lacked variables that were good enough to capture some components of HCaqE such as “source of HCaqE” and “time of learning”. Similarly, it was challenging to determine variables closely related to growth motivations. Hence, our analysis is based on four (out of six) components of HCaqE and five (out of six) dimensions of EM.

Table 2: Survey components that simulate the multiple dimensions of entrepreneurial motivation

Dimensions of entrepreneurial motivation (EM)	Applicable survey components / questions / variables / proxies from the GALI database
Need for income security and financial success: refers to the "desire to benefit from the financial incentives obtained from participating in entrepreneurship" (Dosumu et al., 2022, p. 14)	**Target profit margins:** this variable captures information about whether the company has goals of making profit. We assume that aspirations or plans to make profit are closely related to having the desire to be financially secure.
Need for recognition and status: refers to the "desire to receive acknowledgement, respect and/or validation within social constructs such as from their community" (Dosumu et al., 2022, p. 14)	**Company has a website:** this variable captures information about a company's visibility to the public. A website is often a company's online resume. Websites contain everything from product information to social media information, to company news, to public relations bulletins. We assume therefore that having a website is closely related to the desire to receive recognition and status from relevant stakeholders (customers, competitors, etc.).
Need for social and community improvement: refers to the "desire to solve socio-economic and environmental challenges within the entrepreneurs community" (Dosumu et al., 2022, p. 14)	**Whether the venture has a social / environmental objective:** this variable captures information about a company's goal or plans for the environment and community. We assume that having aspirations to address problems in the environment and community is closely related to desire for social and community improvement.
Need for achievement and learning: refers to the "desire to attain significant accomplishments, high standards or overcome certain challenges" (Dosumu et al., 2022, p. 14)	**Participation in prior accelerator programs:** this variable captures information about entrepreneur's previous participation in entrepreneurship programs. We assume that entrepreneurs who have participated in previous programs and are seeking to participate in new ones are also intending to learn more in order to tackle new challenges. We also assume that similar to having education degrees, which serve as milestone achievements (at the individual level), participating in new programs can serve as new milestones or achievements for entrepreneurship at the firm level.
Need for independence and autonomy: refer to the desire to have flexibility and to be in control of work, time, and decisions (Dosumu et al., 2022, p. 14)	**Venture has equity:** this variable captures information about the ownership status of the company. Companies that give up some equity decrease their ownership of the company. We assume that companies that did not give up equity have a strong desire to have full control of their company. Having full control implies that founders have complete autonomy regarding business decision making.

2.2. Hypothesis development and estimation strategy

As explained above, in this study we consider four components of HCaqE. The questions selected from the GALI database to capture each of these dimensions are identified in Table 3.

Table 3: Definition of the dependent variables

Variable	Proxy	Definition	Type of variable	Econometric approach
Human capital investment	program_duration	Variable that captures the duration of the accelerator program. This variable assumes the following values: 1 (less than 3 months), 2 (3-6 months); and 3 (more than 6 months).	Categorical variable (ordered)	Ordered Logit model
Type of HCaqE	sector_focus	Dummy with value 1 if the program has sector focus.	Dummy	Logit model
Entrepreneurial learning	demo_day	Dummy with value 1 if the program includes a demo day.	Dummy	Logit model
Expected outcome of human capital investment	business_skills	Ranking variable that reflects the importance that the venture attaches to the benefits in terms of business skills development emerging from the participation in the accelerator. The variable assumes values between 1 (minimum importance) and 7 (maximum importance).	Categorical variable (ranking)	Ordered Logit model

These variables vary in terms of their nature. This factor is particularly important in the definition of the econometric approach. On the one hand, we have *sector_focus* and *demo_day*, which are binary variables, assuming value 1 when the program to which the ventures are applying to is dedicated to acquiring knowledge specific to a sector or include a demo day, respectively. On the other hand, we have two ordered discrete variables: *program_duration* with values increasing with the duration of the program; and *business_skills* assuming increasing values between 1 and 7 when ventures attach higher relevance to acquiring business skills from the program.

In order to assess the effects of the entrepreneurial motivation and other control variables on the decisions related to human capital acquisition, we will base the analysis on econometric models that have in consideration the type of dependent variable in each case. For this reason, logit models will be estimated to analyze the likelihood of ventures choosing programs with a sector focus (Model 2) or a demo day (Model 3), and ordered logit models will be used to study the choice of programs with a longer duration (Model 1) or targeting the development of business skills (Model 4).

In Table 4 we present the set of explanatory variables included in the four models. The explanatory variables are divided into two groups: variables related to entrepreneurial motivation and control variables. The GALI database allows us to cover five types of entrepreneurial motivations (need for income security and financial success, need for recognition and status, need for social and community improvement, need for achievement and learning, and need for independence and autonomy). In addition, we include control variables related to the venture (i.e., legal status, company sector, location of main activities,

innovativeness, defensibility, firm size, and company age) and related to the founding team (i.e., number of founders, founding experience, educational background, gender ratio, and managerial experience). Concerning the founding team, it is important to mention that the GALI database includes questions that allow the identification of the total number of founders but in terms of their detailed characteristics, these are available concerning a maximum of only three founders (this occurs concerning all relevant variables).

Table 4: Definition of the explanatory variables

Variable	Proxy	Definition
Variables related to entrepreneurial motivation		
Need for income security and financial success	has_targetmargin	Dummy with value 1 if the venture has a specific target margin in mind
Need for recognition and status	has_website	Dummy with value 1 if the venture has an active website
Need for social and community improvement	has_socialmotives	Dummy with value 1 if the venture reports to have explicit intent of creating social or environmental impacts
Need for achievement and learning	has_prior_accelerator	Dummy with value 1 if the founders of the venture participated in prior accelerator programs
Need for independence and autonomy	has_fullautonomy	Dummy with value 1 if the venture has not received investments from outside
Control Variables		
Legal Status	for_profit nonprofit other_venture undecided_venture	Dummies for the legal status of the venture: for-profit company (for_profit), nonprofit company (nonprofit), other (other_venture), undecided (undecided_venture)
Company sector	agriculture artisanal culture education energy environment financialservices health housing_devel ict infrastructure_devel other supply_chain tech_assistance_serv tourism water	Dummies for the primary sector impacted by the venture's activities (self-reported): Agriculture (*agriculture*); Artisanal (*artisanal*); Culture (*culture*); Education (*education*); Energy (*energy*); Environment (*environment*); Financial services (*financialservices*); Health (*health*); Housing development (*housing_devel*); Information and communication technology (*ict*); Infrastructure/facilities development (*infrastructure_devel*); Other (*other*); Supply chain services (*supply_chain*); Technical assistance services (*tech_assistance_serv*); Tourism (*tourism*); Water (*water*)
Company location	Africa America Asia Europe Oceania	Dummies for the continent in which the venture's main operations take place: Africa; America; Asia; Europe; Oceania

Table 4: Definition of the explanatory variables (cont.)

Variable	Proxy	Definition
Control Variables		
Innovativeness	invention_based	Dummy with value 1 if the venture is invention-based (i.e., the company builds upon newly created technology owned by the venture and/or its founders)
Defensibility	patents	Dummy with value 1 if the venture has patents
Firm size	micro_venture small_venture medium_venture large_venture	Dummies for the size of the venture: 1 to 9 employees (*micro_venture*); 10 to 49 employees (*small_venture*); 50 to 249 employees (*medium_venture*); more than 249 employees (*large_venture*).
Company age	<2 years 2-9 years 10-29 years 30 or more years	Dummies to capture the age of the venture (since the founding year): less than 2 years *(<2 years*); 2 to 9 years (*2-9 years*); 10 to 29 years (*10-29 years*); 30 or more years (*30 or more years*).
Founders' age group	founders_age(<26years) founders_age(26-30years) founders_age(31-35years) founders_age(36-40years) founders_age(>40years)	Dummies to reflect the average age of the founders: 25 or less years (*founders_age<26years*); between 26 and 30 years (*founders_age26-30years*); between 31 and 35 years (*founders_age31-35years*); between 36 and 40 years (*founders_age36_40years*); more than 40 years (*founders_age>40years*)
Number of founders	n_founders	Total number of founders of the venture
Founding experience	founding_experience	% of founders that have founding experience of any type of organization
Founders' educational background	sum_education_dummy	Dummy with value 1 if at least one of the founders has a higher education degree (honors degree; some graduate degree; bachelor degree; master's degree; PhD)
Proportion of women in founding team	ratio_women	% of founders from the female gender
Founders' managerial experience	managerial_experience	% of founders with previous managerial experience (CEO/Executive Director; Senior management)
Year of application	2013.application_year 2014.application_year 2015.application_year 2016.application_year 2017.application_year 2018.application_year 2019.application_year	Dummies for the application year: 2013; 2014; 2015; 2016; 2017; 2018; 2019

Since the current study aims to expand the knowledge about the relationship between entrepreneurial motivation and human capital acquisition for entrepreneurship at the firm level, four key hypotheses are established:

Hypothesis 1: There is a relationship between entrepreneurial motivation and human capital investment at the firm level.

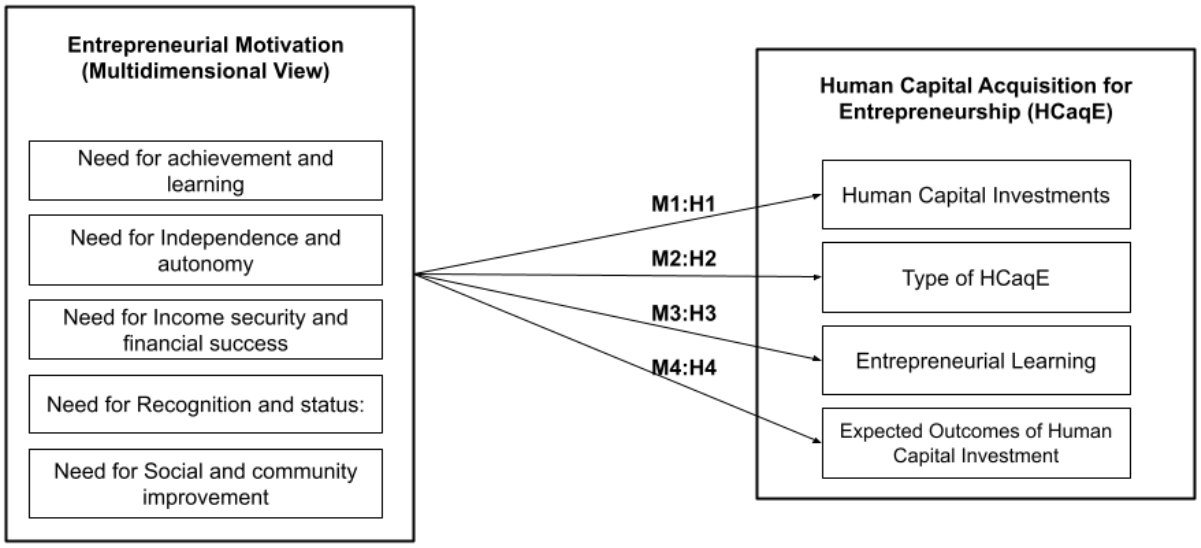
Hypothesis 2: There is a relationship between entrepreneurial motivation and type of human capital acquisition for entrepreneurship (type of HCaqE) at the firm level.

Hypothesis 3: There is a relationship between entrepreneurial motivation and entrepreneurial learning at the firm level.

Hypothesis 4: There is a relationship between entrepreneurial motivation and expected outcome of human capital investment at the firm level.

Figure 3 summarizes the empirical strategy defined to address the research questions.

Figure 3: Hypothesis (H) and model (M) specification for EM and HCaqE.



Source: Authors Illustration

2.3 Sample

Table 5 presents the descriptive statistics of the sample drawn from the GALI database. The sample consists of 23,364 companies. Most of these ventures have a for-profit legal status (79.49%) and self-identify a primary industry sector in which Agriculture (14.12%), Education (14.89%), Financial services (8.42%), and Health (10.60%) are of particular relevance. The firms usually identify two continents as the base of their main operations: America (55.95%) and Africa (26.12%). Most firms have nine or fewer employees (91.61%) and nine or fewer years of age (93.24%). The characteristics of the founding team show that the average number of founders is 2.18. The survey contains a set of traits of up to three founders. Based on this evidence, 27.75% of the startups report that the founding team is aged over 40 years and 60.70% have leaders between 26 and 40 years. Another characteristic of these teams is that 81.70% have at least one member with a higher education degree, 49% have elements with founding experience, and 63.69% have managerial experience.

Table 5: Descriptive statistics of the sample

Variables	n	%	Mean
Entrepreneurial motivations			
has_website	16,259	69.59%	
has_socialmotives	20,910	89.50%	
has_fullautonomy	19,406	83.06%	
has_targetmargin	13,964	59.77%	
has_prior_accelerator	1,092	4.67%	
Venture related variables			
Legal status			
for-profit	18,557	79.49%	
nonprofit	2,51	10.75%	
other_venture	1,366	5.85%	
undecided_venture	913	3.91%	
Company sector			
agriculture	3,276	14.12%	
artisanal	571	2.46%	
culture	442	1.90%	
education	3,455	14.89%	
energy	951	4.10%	
environment	1,296	5.58%	
financial services	1,953	8.42%	
health	2,459	10.60%	
housing_devel	286	1.23%	
ict	2,15	9.26%	
infrastructure devel	294	1.27%	
other	4,447	19.16%	
supply_chain	483	2.08%	
tech_assistance_serv	254	1.09%	
tourism	540	2.33%	
water	350	1.51%	
Company location			
Africa	6,073	26.12%	
America	13,009	55.95%	
Asia	3,405	14.65%	
Europe	613	2.64%	
Oceania	150	0.65%	
Innovativeness	12,777	54.69%	
Defensibility	2,972	12.72%	
Firm size			
micro_venture	21,404	91.61%	
small_venture	1,740	7.45%	
medium_venture	187	0.8%	
large_venture	33	0.14%	
Company age			
(<2 years)	11,365	48.64%	
2-9 years	10,421	44.60%	
10-29 years	971	4.16%	
30 or more years	607	2.60%	

Variables	n	%	Mean
Founders related variables			
Founders agegroup			
founders_age<26years	2,568	11.55%	
founders_age(26-30years)	5,512	24.80%	
founders_age(31-35years)	4,733	21.30%	
founders_age(36-40years)	3,245	14.60%	
founders_age(>40years)	6,167	27.75%	
no_founders			2.18
ratio_founding_experience			0.49
sum_education_dummy	19,088	81.70%	
ratio_women			0.32
managerial_experience	14,880	63.69%	

Source: Own elaboration

In terms of entrepreneurial motivations, there are interesting aspects that must be highlighted. First, all firms in the sample have at least one of the five motivations we are analyzing, while 436 firms respond positively for all of them. Most of the ventures report having the need for social and community improvement (89.50%) or the need for independence and autonomy (83.06%). Only 4.67% of the ventures report having previously participated in an accelerator program. Table 6 shows information concerning the most frequent pairs of motivations. In the top positions we find the needs for independence and autonomy and social and community improvement (74.20% of the firms in the sample report these two motivations), the needs for social and community improvement and recognition and status (61.69%), and the needs for social and community improvement and income security and financial success (54.56%).

Table 6: Entrepreneurial motivations

Need for…	Income security and financial success	Recognition and status	Social and community improvement	Achievement and learning	Independence and autonomy
Income security and financial success	13,964 (59.77%)				
Recognition and status	9,835 (42.09%)	16,259 (69.59%)			
Social and community improvement	12,748 (54.56%)	14,414 (61.69%)	20,910 (89.50%)		
Achievement and learning	720 (3.08%)	824 (3.53%)	1,039 (4.45%)	1,092 (4.67%)	
Independence and autonomy	11,266 (48.22%)	12,864 (55.06%)	17,335 (74.20%)	962 (4.12%)	19,406 (83.06%)

Source: Own elaboration

3. Results and discussion

The results for the effects of entrepreneurial motivation variables on the dimensions of human capital acquisition for entrepreneurship are discussed in Section 3.1 and the effects of other explanatory variables in Section 3.2. Tables 7 and 8 report the estimation results of the coefficients and odds ratios of the four models under analysis.

Table 7: Estimation results of the ordered logit models (Models 1 and 4)

	Model 1: Human capital investment (*program_duration*)		Model 4: Expected outcomes of human capital investment (business_skills)	
VARIABLES	Coefficients	Odds ratios (OR)	Coefficients	Odds ratios (OR)
Entrepreneurial motivations				
has_website	-0.0682 **	0.934 **	-0.307 ***	0.735 ***
	(0.0337)	(0.0314)	(0.0291)	(0.0214)
has_socialmotives	0.0425	1.043	-0.0650	0.937
	(0.0516)	(0.0538)	(0.0450)	(0.0422)
has_fullautonomy	0.0910 **	1.095 **	0.242 ***	1.274 ***
	(0.0386)	(0.0423)	(0.0346)	(0.0441)
has_targetmargin	0.0209	1.021	0.0701 ***	1.073 ***
	(0.0304)	(0.0310)	(0.0266)	(0.0286)
has_prior_accelerator	-0.0804	0.923	-0.0163	0.984
	(0.0797)	(0.0735)	(0.0657)	(0.0646)
Other variables				
Legal status (reference: for-profit)				
nonprofit	0.594 ***	1.811 ***	-0.000557	0.999
	(0.0496)	(0.0899)	(0.0435)	(0.0434)
other_venture	0.292 ***	1.339 ***	0.178 ***	1.195 ***
	(0.0621)	(0.0832)	(0.0543)	(0.0649)
undecided_venture	0.00737	1.007	0.122 *	1.130 *
	(0.0739)	(0.0744)	(0.0658)	(0.0743)
Company sector (reference: agriculture)				
artisanal	0.121	1.129	0.193 **	1.213 **
	(0.0996)	(0.113)	(0.0859)	(0.104)
culture	0.00877	1.009	-0.0258	0.975
	(0.111)	(0.112)	(0.0960)	(0.0936)
education	0.0439	1.045	-0.292 ***	0.746 ***
	(0.0549)	(0.0574)	(0.0475)	(0.0354)
energy	0.242 ***	1.274 ***	-0.0291	0.971
	(0.0796)	(0.101)	(0.0685)	(0.0666)
environment	0.351 ***	1.420 ***	0.0272	1.028
	(0.0727)	(0.103)	(0.0618)	(0.0635)
financial services	-0.0797	0.923	-0.513 ***	0.599 ***
	(0.0604)	(0.0558)	(0.0555)	(0.0332)
health	0.155 ***	1.168 ***	-0.154 ***	0.858 ***
	(0.0590)	(0.0689)	(0.0510)	(0.0437)
housing_devel	0.235 *	1.265 *	-0.134	0.875
	(0.132)	(0.167)	(0.113)	(0.0992)
ict	-0.0335	0.967	-0.138 **	0.871 **
	(0.0630)	(0.0609)	(0.0541)	(0.0471)
infrastructure_devel	0.366 ***	1.442 ***	0.171	1.186
	(0.135)	(0.195)	(0.115)	(0.137)
other	0.136 **	1.145 **	-0.0565	0.945
	(0.0528)	(0.0605)	(0.0449)	(0.0424)
supply_chain	-0.0881	0.916	-0.0148	0.985
	(0.106)	(0.0972)	(0.0902)	(0.0889)
tech_assistance_serv	0.207	1.230	-0.0980	0.907
	(0.137)	(0.168)	(0.123)	(0.112)
tourism	-0.249 **	0.780 **	0.0302	1.031
	(0.109)	(0.0852)	(0.0903)	(0.0930)
water	0.102	1.108	-0.0740	0.929
	(0.125)	(0.139)	(0.107)	(0.0992)
Company location (reference: Africa)				
America	-0.420 ***	0.657 ***	-0.361 ***	0.697 ***
	(0.0369)	(0.0243)	(0.0320)	(0.0223)
Asia	0.0748	1.078	-0.495 ***	0.609 ***
	(0.0487)	(0.0524)	(0.0421)	(0.0256)
Europe	-0.111	0.895	-0.555 ***	0.574 ***
	(0.0948)	(0.0849)	(0.0832)	(0.0478)
Oceania	-1.755 ***	0.173 ***	-0.216	0.806
	(0.195)	(0.0337)	(0.152)	(0.122)
invention_based	-0.0735 **	0.929 **	-0.175 ***	0.840 ***
	(0.0298)	(0.0276)	(0.0261)	(0.0219)

Table 7: Estimation results of the ordered logit models (Models 1 and 4) (cont.)

	Model 1: Human capital investment (*program_duration*)		Model 4: Expected outcomes of human capital investment (business_skills)	
VARIABLES	Coefficients	Odds ratios (OR)	Coefficients	Odds ratios (OR)
patents	-0.0251	0.975	-0.138 ***	0.871 ***
	(0.0440)	(0.0430)	(0.0381)	(0.0332)
Firm size (reference: micro_venture)				
small_venture	0.164 ***	1.178 ***	0.159 ***	1.172 ***
	(0.0545)	(0.0642)	(0.0483)	(0.0566)
medium_venture	0.227	1.255	-0.0142	0.986
	(0.155)	(0.195)	(0.137)	(0.135)
large_venture	-0.321	0.726	-0.104	0.901
	(0.404)	(0.293)	(0.316)	(0.285)
Company age (<2 years)				
2-9 years	0.0881 ***	1.092 ***	0.106 ***	1.111 ***
	(0.0310)	(0.0339)	(0.0272)	(0.0302)
10-29 years	0.302 ***	1.353 ***	0.406 ***	1.500 ***
	(0.0773)	(0.104)	(0.0666)	(0.0999)
30 or more years	1.470 ***	4.351 ***	0.325 **	1.384 **
	(0.126)	(0.548)	(0.136)	(0.188)
Founders' agegroup (reference: founders_age<26years)				
founders_age(26-30years)	0.0707	1.073	-0.0158	0.984
	(0.0501)	(0.0538)	(0.0438)	(0.0431)
founders_age(31-35years)	0.123 **	1.131 **	-0.104 **	0.901 **
	(0.0522)	(0.0590)	(0.0456)	(0.0411)
founders_age(36-40years)	0.0554	1.057	-0.142 ***	0.867 ***
	(0.0564)	(0.0596)	(0.0495)	(0.0429)
founders_age(>40years)	-0.0138	0.986	-0.252 ***	0.777 ***
	(0.0529)	(0.0522)	(0.0464)	(0.0361)
no_founders	-0.0366 **	0.964 **	0.0151	1.015
	(0.0185)	(0.0178)	(0.0162)	(0.0164)
ratio_founding_experience	0.0122	1.012	-0.0968 ***	0.908 ***
	(0.0356)	(0.0360)	(0.0310)	(0.0281)
sum_education_dummy	-0.382 ***	0.682 ***	-0.201 ***	0.818 ***
	(0.0407)	(0.0278)	(0.0348)	(0.0285)
ratio_women	0.0682 *	1.071 *	0.309 ***	1.363 ***
	(0.0403)	(0.0432)	(0.0354)	(0.0482)
managerial_experience	0.108 ***	1.114 ***	-0.112 ***	0.894 ***
	(0.0339)	(0.0377)	(0.0292)	(0.0261)
Year of application	Yes		Yes	
/cut1	1.255 ***	3.509 ***	-2.753 ***	0.0637 ***
	(0.145)	(0.508)	(0.118)	(0.00752)
/cut2	2.389 ***	10.90 ***	-1.853 ***	0.157 ***
	(0.145)	(1.584)	(0.117)	(0.0184)
/cut3			-1.158 ***	0.314 ***
			(0.117)	(0.0366)
/cut4			-0.518 ***	0.596 ***
			(0.116)	(0.0694)
/cut5			0.107	1.113
			(0.116)	(0.130)
/cut6			1.049 ***	2.856 ***
			(0.117)	(0.334)
Number of observations	19,028		20,723	
Log likelihood	-19,200.11		-39,566.06	

Notes: Standard errors in parentheses; *, **, *** significant at 10%, 5%, and 1%, respectively.

Table 8: Estimation results of the logit models (Models 2 and 4)

	Model 2: Type of HCaqE (*sector_focus*)		Model 3: Entrepreneurial learning (*demo_day*)	
VARIABLES	Coefficients	Odds ratios (OR)	Coefficients	Odds ratios (OR)
Entrepreneurial motivations				
has_website	0.0841 **	1.088 **	0.175***	1.191 ***
	(0.0403)	(0.0438)	(0.0436)	(0.0519)
has_socialmotives	0.159 **	1.172 **	-0.0201	0.980
	(0.0637)	(0.0746)	(0.0702)	(0.0688)
has_fullautonomy	-0.272 ***	0.762 ***	0.0222	1.022
	(0.0455)	(0.0346)	(0.0519)	(0.0531)
has_targetmargin	-0.104 ***	0.901 ***	-0.114***	0.893 ***
	(0.0364)	(0.0328)	(0.0414)	(0.0369)
has_prior_accelerator	0.107	1.112	0.627***	1.872 ***
	(0.0919)	(0.102)	(0.182)	(0.340)
Other variables				
Legal status (reference: for-profit)				
nonprofit	-0.916 ***	0.400 ***	0.0385	1.039
	(0.0645)	(0.0258)	(0.0660)	(0.0686)
other_venture	-0.494 ***	0.610 ***	0.0670	1.069
	(0.0760)	(0.0464)	(0.0824)	(0.0881)
undecided_venture	-0.243 ***	0.785 ***	0.513***	1.670 ***
	(0.0908)	(0.0713)	(0.114)	(0.191)
Company sector (reference: agriculture)				
artisanal	-1.219 ***	0.296 ***	0.0346	1.035
	(0.123)	(0.0364)	(0.126)	(0.130)
culture	-1.343 ***	0.261 ***	0.439***	1.552 ***
	(0.144)	(0.0375)	(0.159)	(0.247)
education	-0.440 ***	0.644 ***	0.262***	1.299 ***
	(0.0622)	(0.0400)	(0.0700)	(0.0910)
energy	-0.533 ***	0.587 ***	0.164	1.178
	(0.0888)	(0.0521)	(0.104)	(0.123)
environment	-1.039 ***	0.354 ***	0.346***	1.413 ***
	(0.0841)	(0.0298)	(0.0948)	(0.134)
financial services	0.260 ***	1.297 ***	0.411***	1.508 ***
	(0.0720)	(0.0934)	(0.0846)	(0.128)
health	-0.791 ***	0.453 ***	0.391***	1.479 ***
	(0.0674)	(0.0306)	(0.0785)	(0.116)
housing_devel	-1.790 ***	0.167 ***	0.449**	1.567 **
	(0.186)	(0.0311)	(0.190)	(0.297)
ict	-1.377 ***	0.252 ***	0.275***	1.317 ***
	(0.0764)	(0.0193)	(0.0842)	(0.111)
infrastructure_devel	-1.093 ***	0.335 ***	0.159	1.172
	(0.158)	(0.0530)	(0.180)	(0.211)
other	-1.291 ***	0.275 ***	0.0342	1.035
	(0.0621)	(0.0171)	(0.0649)	(0.0672)
supply_chain	-1.072 ***	0.342 ***	-0.241*	0.786 *
	(0.125)	(0.0429)	(0.128)	(0.101)
tech_assistance_serv	-1.240 ***	0.290 ***	-0.0417	0.959
	(0.175)	(0.0507)	(0.172)	(0.165)
tourism	-1.965 ***	0.140 ***	0.327**	1.387 **
	(0.153)	(0.0214)	(0.149)	(0.206)
water	-1.085 ***	0.338 ***	0.788***	2.200 ***
	(0.146)	(0.0495)	(0.194)	(0.426)
Company location (reference: Africa)				
America	0.402 ***	1.496 ***	0.552***	1.736 ***
	(0.0458)	(0.0684)	(0.0487)	(0.0845)
Asia	1.385 ***	3.996 ***	-0.259***	0.772 ***
	(0.0579)	(0.231)	(0.0588)	(0.0453)
Europe	0.673 ***	1.961 ***	2.160***	8.671 ***
	(0.118)	(0.231)	(0.253)	(2.190)
Oceania	-0.983 ***	0.374 ***	2.595 ***	13.39 ***
	(0.324)	(0.121)	(0.588)	(7.876)

Table 8: Estimation results of the logit models (Models 2 and 4) (cont.)

VARIABLES	Model 2: Type of HCaqE (*sector_focus*)		Model 3: Entrepreneurial learning (*demo_day*)	
	Coefficients	Odds ratios (OR)	Coefficients	Odds ratios (OR)
invention_based	0.287 ***	1.332 ***	0.151 ***	1.164 ***
	(0.0356)	(0.0475)	(0.0398)	(0.0463)
patents	0.359 ***	1.432 ***	0.0112	1.011
	(0.0505)	(0.0723)	(0.0596)	(0.0602)
Firm size (reference: micro_venture)				
small_venture	-0.0147	0.985	0.0854	1.089
	(0.0657)	(0.0648)	(0.0714)	(0.0778)
medium_venture	-0.222	0.801	0.581 ***	1.787 ***
	(0.185)	(0.148)	(0.222)	(0.397)
large_venture	0.623	1.864	1.511 **	4.533 **
	(0.455)	(0.848)	(0.751)	(3.403)
Company age (<2 years)				
2-9 years	0.0284	1.029	0.0836 **	1.087 **
	(0.0370)	(0.0380)	(0.0416)	(0.0452)
10-29 years	-0.145	0.865	-0.0125	0.988
	(0.0911)	(0.0788)	(0.0990)	(0.0978)
30 or more years	-0.930 ***	0.394 ***	0.166	1.180
	(0.192)	(0.0759)	(0.193)	(0.228)
Founders' agegroup (reference: founders_age<26years)				
founders_age(26-30years)	-0.0156	0.984	-0.153 **	0.858 **
	(0.0611)	(0.0602)	(0.0699)	(0.0600)
founders_age(31-35years)	0.0203	1.021	-0.256 ***	0.774 ***
	(0.0634)	(0.0647)	(0.0718)	(0.0556)
founders_age(36-40years)	0.134 **	1.143 **	-0.150 *	0.861 *
	(0.0680)	(0.0777)	(0.0777)	(0.0669)
founders_age(>40years)	0.375 ***	1.455 ***	-0.333 ***	0.717 ***
	(0.0636)	(0.0925)	(0.0729)	(0.0523)
no_founders	0.0357	1.036	0.137 ***	1.147 ***
	(0.0222)	(0.0230)	(0.0247)	(0.0284)
ratio_founding_experience	0.300 ***	1.350 ***	0.158 ***	1.172 ***
	(0.0425)	(0.0574)	(0.0466)	(0.0546)
sum_education_dummy	0.313 ***	1.368 ***	-0.383 ***	0.682 ***
	(0.0495)	(0.0677)	(0.0585)	(0.0399)
ratio_women	-0.296 ***	0.744 ***	0.0666	1.069
	(0.0488)	(0.0363)	(0.0537)	(0.0574)
managerial_experience	-0.00193	0.998	-0.0693	0.933
	(0.0404)	(0.0403)	(0.0453)	(0.0423)
Year of application	Yes		Yes	
Constant	-1.611 ***	0.200 ***	0.124	1.132
	(0.166)	(0.0332)	(0.143)	(0.161)
Number of observations	19,256		18,261	
Log likelihood	-10,672.79		-8,812.32	

Notes: Standard errors in parentheses; *, **, *** significant at 10%, 5%, and 1%, respectively.

3.1. Impact of entrepreneurial motivations on human capital acquisition for entrepreneurship

Need for recognition and status

The need for recognition and status influences all components of HCaqE (Tables 7 and 8). This motivation influences HCaqE in several ways. First, when compared to other motivations, the need for recognition and status is the motivation with the highest impact on the expected outcome of human capital investment, even though this influence is negative (Model 4). Model 4 shows that companies motivated by the need for recognition and status are less likely to participate in programs that are directed toward business skills development as an expected outcome of human capital investment than companies without this motivation. These results are not surprising since companies with this motivation may perceive other skills, such as social skills, to be more important in achieving recognition and status. Baron and Markman (2000) argue that social skills influence social capital, which can lead to a variety of non-financial benefits, including building a good reputation or having good first impressions.

A second conclusion emerging from our results is that companies that are motivated by a need for recognition and status are less likely to invest in programs with a longer duration (Model 1). This can be seen as resulting from general barriers to investing in more human capital, especially for smaller companies (Stanfield et al., 2009; Stone, 2012). Earlier studies have revealed that costs can play an important role in the investment decisions of smaller companies because they have to choose between investing more in human capital or deploying resources to other activities perceived to be more important (Shury et al., 2008; Stanfield et al., 2009; Stone, 2012). Furthermore, smaller companies often lack information on what training is available to them, as well as the benefits of these training possibilities. Hence, they cannot make decisions on the investment needed (Stone, 2012). Moreover, as suggested by Stanfield et al. (2009), they find it challenging to access training tailored to their specific needs, which also influences their decision on investment. Larger companies, on the other hand, may have other strategies of incorporating human capital by attracting (i.e., using their recognition and status) talent that possesses all the knowledge, skills, and abilities needed to be productive in the organization (Wilden et al., 2010).

Contrary to its role in predicting other components of HCaqE, a third conclusion is that companies motivated by the need for recognition and status are more likely to choose collective learning as their entrepreneurial learning process (Model 3). A possible reason for this is that companies can use collective learning to obtain information that can help them to provide better products or services to their customers, and consequently receive more recognition and status (Mitra, 2000). Furthermore, collective learning mechanisms can help

companies to stay competitive by observing what their peers do (Cotic-Svetina et al., 2008; Garavan & Carbery, 2012). Moreover, companies can use the settings of collective learning to highlight their strengths and seek validation from peers, their community, and other stakeholders included in the collective learning process (Peters et al., 2010; Garavan & Carbery, 2012; Heikkila & Gerlak, 2013).

Need for independence and autonomy

This motivation affects three components of HCaqE. When compared to other motivations, the need for independence and autonomy is the most important driver of the decision about the type of HCaqE that companies choose to acquire (Model 2). Firms motivated by the need for independence and autonomy are less likely to choose programs targeting specific human capital than companies without this motivation. Our results show that the odds of a program with a sector focus being selected decreases by 23.8% in the case of firms with full autonomy. Probably this happens because companies with specific human capital are more likely to receive investments, often in exchange for partial ownership of the company. Venture capital investors, in particular, invest in companies they perceive to have specialized knowledge, skills, and abilities in an industry, technology, or market (Fried & Hisrich, 1994; Baum & Silverman, 2004; Franke et al., 2008; Šimić, 2015; Sharma, 2015; Ko & McKelvie, 2018). In a bid to maintain full autonomy, there is therefore a strong incentive for companies motivated by the need for independence and autonomy not to choose specific human capital. This implies that companies that are open to giving up some ownership (i.e. not motivated by the need for independence and autonomy) are more likely to choose programs targeting specific human capital in the hope of attracting venture capital investment.

Although our results show that companies motivated by the need for independence and autonomy are less likely to choose specific human capital, they are more likely to invest more in human capital (Model 1). Companies that give up some ownership in exchange for investment often receive additional support from investors. In addition to providing capital to companies in exchange for equity, venture capital investors often bring knowledge, skills, and abilities that the companies need in order to grow (Rosa et al., 2019). On the other hand, companies that maintain their autonomy intact and thus decline the opportunity to receive additional investment in exchange for ownership may need to compensate for the KSAs they are not obtaining from investors by investing in human capital.

Similar to investing in more human capital, Model 4 shows that companies motivated by the need for independence and autonomy are more likely to choose to acquire more business skills development as an expected outcome of human capital investment than are companies without this motivation. The odds of giving more importance to the program component of

business skills development is 27.4% higher in the case of companies with full autonomy in terms of their capital. As mentioned earlier, companies with this motivation must compensate for KSAs they would be giving up by not receiving investments in exchange for giving up ownership. Moreover, independence and autonomy motivations can be influenced by factors such as company financial performance, customer demands, and the business life-cycle phase (Van Gelderen & Jansen, 2006). If these factors pose restrictions to the company, having business skills will be relevant to addressing them (Van Gelderen, 2016; 2010).

Need for income security and financial success

This motivation affects three components of HCaqE included in our analysis. From Model 2 it is possible to conclude that companies motivated by the need for income security and financial success (having a target margin) are less likely to choose specific human capital than companies that do not have this motivation. A possible reason resides in the fact that acquiring specific or specialized knowledge, skills, and ability can be more expensive than general human capital (Watson, 1994; Jacobs, 1996; Christensen & Eyring, 2011). Some studies also show that there are benefits to general human capital or being a generalist (Lazear, 2004).

Similarly, companies motivated by the need for income security and financial success are less likely to choose collective learning as their entrepreneurial learning process than companies without this motivation (Model 3). This may be because collective learning is not focused on financial gains, generating benefits such as increasing social capital and increasing trust among peers and/or relevant stakeholders (Inkpen, 2000; Gubbins & MacCurtain, 2008; Laal & Ghodsi, 2012). Hence, choosing collective learning as a mechanism to achieve financial gain may not be a priority for companies with this motivation.

Finally, Model 4 shows that companies motivated by the need for income security and financial success are more likely to choose to acquire more business skills development as an expected outcome of human capital investment. This occurs because there is a widely recognized positive link between business skills and firm performance (Tamkin, 2005; Dickson et al., 2008; Erzetic, 2008; Thang & Buyens, 2008; Thang et al., 2010; Liu et al., 2019; Kryscynski et al., 2021; Siepel et al., 2021). For example, business knowledge and skills can help company managers to manage their teams, organization structures, and processes better, which can have a positive impact on key metrics such as sales, customer acquisitions, etc. (Tamkin, 2005; Dickson et al., 2008; Erzetic, 2008; Thang & Buyens, 2008; Thang et al., 2010; Liu et al., 2019; Kryscynski et al., 2021; Siepel et al., 2021). All things being equal, improvement in these metrics (e.g., sales, customer acquisition, etc.) can translate into a higher level of financial security.

Need for social and community improvement

In the context of our models, the need for social and community improvement does not have the largest impact on any of the components of HCaqE when compared to other dimensions of entrepreneurial motivation. In Model 2 companies that are motivated by the need for social and community improvement are more likely to choose specific human capital. Specific human capital is linked to company performance and for companies to deliver on their social and community goals they need to acquire the right type of knowledge, skills, and abilities (Seghers et al., 2012; Carvalho et al., 2016; Adil et al., 2021; Venturelli et al., 2021; Bayode & Duarte, 2022). Furthermore, in order to address a particular social or community issue, it is always necessary for companies to be knowledgeable about the issue they want to tackle (Venturelli et al., 2021). There is, therefore, a strong incentive for companies to choose specific human capital to meet their social and community improvement needs.

Model 4 shows that this motivation does not affect the choice to acquire more business skills development as an expected outcome of human capital investment. This is probably because companies may perceive other skills such as leadership and problem solving to be more relevant for community improvement (Rohs & Langone, 1993). Other skills such as analytical and social skills have also been argued to be more relevant for the purpose of community development (Fanslow, 1982; Baron & Markman, 2000; Yli-Renko et al., 2001; Hardina, 2002).

Need for achievement and learning

The need for achievement and learning has the greatest impact on entrepreneurial learning. The relationship between this motivation and entrepreneurial learning (collective learning) is positive. In Model 3, companies that are motivated by the need for achievement and learning are more likely to choose collective learning as their entrepreneurial learning process. This motivation increases the propensity toward programs with demo day by almost twice compared to firms that did not have a prior experience of participating in accelerator programs (OR = 1.872). This is because collective learning can lead to the acquisition of more knowledge and the achievement of certain learning milestones (Chandra, 2015). Collective learning involves the interaction of multiple stakeholders and allows for knowledge exchange between them. As a result of these interactions, stakeholders can learn from the experience of others.

Demo days as a mechanism for achievement and collective learning are unique in three ways: (i) they represent the milestone of completing the accelerator program and can, thus, be seen as a stamp of approval. They often symbolize the fact that participating companies are completing the process of learning and are thus ready to “graduate”, which can give companies

a sense of achievement (Tasic et al., 2015; Ghorashi & Asghari, 2019; Yu, 2020); (ii) they create a unique opportunity to receive specific feedback about their company from relevant stakeholders, such as investors, potential customers, and even the media. As a result, companies can acquire additional knowledge from this feedback, which they can implement later on (Tasic et al., 2015; Ghorashi & Asghari, 2019; Yu, 2020); (iii) specific feedback to companies can also be relevant for other stakeholders participating in the demo day interactions (Tasic et al., 2015; Ghorashi & Asghari, 2019; Yu, 2020). It is for these reasons that companies that have had previous experiences in accelerator programs are more likely to engage in programs with demo days since they represent more achievements and more learning.

Taking stock: the relationship between entrepreneurial motivation and human capital acquisition for entrepreneurship

Our results show that the different dimensions of entrepreneurial motivation affect the components of human capital acquisition in different ways. Table 9 summarizes the effects explored above. The need for recognition and status appears to be the motivation that generates the most effects, followed by need for income security and financial success, and the need for independence and autonomy.

Table 9: Matrix of importance - relationship between entrepreneurial motivation and human capital acquisition for entrepreneurship

	M1	M2	M3	M4	Number positive effects	Number negative effects
	Program duration	Type of Human Capital (specific human capital)	Collective learning	Expected outcomes (business skills development)		
Need for recognition and status	Negative impact	Positive impact	Positive impact	Most important negative impact	2	2
Need for social and community improvement		Positive impact			1	0
Need for independence and autonomy	Most important positive impact	Most important negative impact		Positive impact	2	1
Need for income security and financial success		Negative impact	Negative impact	Positive impact	1	2
Need for achievement and learning			Most important positive impact		1	0

Most important negative impact | Negative impact | Most important positive impact | Positive impact

Source: Own elaboration

3.2. Impact of other factors on human capital acquisition for entrepreneurship

Legal status

A company's legal status plays an important role in human capital acquisition for entrepreneurship, as it influences all the components discussed in the context of our analysis, and affects HCaqE in several ways. First, non-profit companies have the highest likelihood to invest in programs of human capital acquisition with longer duration while for-profit and undecided companies have the least likelihood (Model 1). A possible explanation for this pattern is the fact that non-profit organizations are competing for talent with for-profit companies and thus often use training as an incentive to attract the right talent (DeVaro et al., 2017). In addition, non-profit firms attract volunteers who sometimes do not possess the skills needed to be productive. There is consequently a need to allocate significant resources to the development of its human capital (Carvalho et al., 2016).

Second, for-profit companies have the greatest likelihood of choosing specific human capital while the non-profit companies are the ones least likely to choose it (Model 2). The odds of a choice for a program with sector focus by non-profit, other type of venture, and undecided venture decrease by 60.0%, 39.0%, and 21.5% respectively, compared to for-profit companies. This can be explained by the fact that there is a strong link between specific human capital and firm financial performance (Marimuthu et al., 2009; Fedyk & Hodson, 2020; Andersén, 2021).

Third, companies that are undecided about their legal status are more likely to choose collective learning (Model 3). Companies that are undecided may wish to learn what the most beneficial legal status is based on what their peers are doing or obtain feedback from relevant stakeholders. The legal status of the company is important in determining how the company will operate and what opportunities are available to it, which could decide the success of the company. Similarly, companies with other legal status and companies that are undecided are also more likely to choose to acquire more business skills development as an expected outcome of human capital investment.

Company sector

The sector that the company is operating in also plays an important role in the process of HCaqE. The company's sector affects all components of HCaqE within our analysis. Companies operating in the infrastructure/facilities development sector have the greatest likelihood of investing in human capital programs with longer duration, followed by companies in the environment, energy, and housing development sectors (Model 1). These sectors are capital intensive because they require investments in large and costly items such as

equipment, natural resources, etc. These sectors also influence people's quality of life, especially concerning their health. As a result, they are framed by multiple stringent regulations (Lellis, 2022) to protect human life as well as capital providers (The World Bank Group, 2022), as errors in these sectors may have grave collateral consequences. It is therefore important for companies in these sectors to invest in knowledge, skills, and abilities that enable them to minimize the risks of accidents or mistakes (Vatin et al., 2014, Kane & Tomer, 2016). Furthermore, these industries are complex and require professionals possessing the adequate human capital to navigate the complexities (Kane & Tomer, 2016; Tsaurai & Ndou, 2019). On the other hand, companies in the tourism sector are the least likely to invest more in human capital because, in relative terms this sector is not complex compared to other sectors. It is also important to note that tourism is often enabled by the outputs of infrastructure/facilities development, energy, environment, and housing development sectors (Chambers & Cifter, 2022).

Concerning the choice of the type of HCaqE, companies operating in the financial services sector have the greatest likelihood of choosing specific human capital, while companies operating in the tourism sector have the least likelihood of choosing specific human capital (Model 2). A possible reason for this is the fact that regulations in the financial services sector are significant and often require professionals with specific knowledge, skills, and abilities to be productive. Furthermore, companies in the financial services sector often require specific knowledge of markets and industries for them to be able to operate (Kubo & Saka, 2002; Kend, 2008; Shih et al., 2010). On the other hand, many jobs in the tourism sector require only general human capital.

Company location

Company location also influences HCaqE. Companies located in Oceania, followed by America, have the least likelihood of investing more in human capital (Model 1). Companies located in Europe, Africa, and Asia have similar likelihoods. This is probably because additional investments in human capital could have implications in other related economic activities. For example, companies (especially young companies) that decide to choose programs with longer durations may have to pause the production of their services while they participate in those programs. This pause could lead to a reduction in terms of revenues. Hence, there are no additional incentives for these companies to invest more in human capital.

Although there is a low likelihood for more human capital investment, companies located in Africa and Oceania are the most likely to choose to acquire more business skills development as an expected outcome of human capital investments (Model 4). An explanation for the case of Africa is that entrepreneurship is often constrained by higher levels of

uncertainty due to factors such as limited education, lack of financial resources, corruption, climate change, etc. (Junne, 2018; Meyer & Hamilton, 2020). Hence, companies operating in this landscape acquire business skills in order to use entrepreneurship to survive in the African landscape. In addition, companies led by female entrepreneurs in Africa are more likely to acquire more business skills because of the motivations of female entrepreneurs (Urban et al., 2008; Suárez-Ortega et al., 2016; Arumona et al., 2019; Meyer & Hamilton, 2020). Companies located in Oceania, which is dominated by Australia and New Zealand, choose more business development skills probably to improve their competitive advantage and manage resources more efficiently (Doms et al., 2010; Minai et al., 2018).

Companies located in Asia are more likely to choose specific human capital than are companies located in other locations (Model 2). Companies located in Asia operate in highly competitive global markets. Therefore, having specific human capital is essential to help these companies obtain and sustain a competitive advantage (Romijn & Albaladejo, 2000; Wang et al., 2009; Waychal et al., 2011; OECD, 2013; Ponta et al., 2020; Kryscynski et al., 2021). Asia, especially China, is often termed the “factory of the world” because of its industrialization capacity and its contribution to global demand. In order to be more efficient, companies located in these regions would value specializations over general human capital (Murakami et al., 1996).

Finally, companies located in Oceania and Europe are more likely to choose collective learning as their entrepreneurial learning process (Model 3). In order to remain competitive, companies located in these regions (especially technology companies) operate in regional and networking clusters, which results in collective learning (Keeble & Wilkinson, 2017). The benefits of having a competitive advantage are significant and this encourages companies to choose collective learning as a viable learning option (Keeble & Wilkinson, 2017).

Innovativeness

Companies' innovativeness (*invention_based*) influences all the components of HCaqE. Innovative companies have a lower likelihood of investing in human capital programs with a longer duration (Model 1). Non-innovative companies have a performance disadvantage in comparison to invention-based companies (Carmona et al., 2012; Minola et al., 2021). Therefore, for less-innovative companies to be competitive and to adapt to the changing needs of clients there is a need to increase their human capital (Carmona et al., 2012; Villani et al., 2021). It is also for this reason that non-innovative companies are more likely to choose to acquire more business skills development as an expected outcome of human capital investment.

In contrast, innovative companies are more likely to choose specific human capital than non-innovative companies (Model 2). Innovative companies often require specialized knowledge, skills and abilities that can differentiate them from the competition (Romijn & Albaladejo, 2000; Waychal et al., 2011; OECD, 2013; Ponta et al., 2020; Kryscynski et al., 2021). In addition, innovative companies often require specialized financing such as venture capital. In this context, the preference of venture capitalists to invest in companies that have specialized knowledge, skills, and abilities in a sector, industry, market, or technology is widely documented (Fried & Hisrich, 1994; Baum & Silverman, 2004; Franke et al., 2008; Šimić, 2015; Sharma, 2015; Ko & McKelvie, 2018).

Finally, innovative companies are more likely to choose collective learning as their entrepreneurial learning process than are non-innovative companies (Model 3). This may be explained by the fact that collective learning in entrepreneurship often requires the interaction between subjects, technologies, people, and organizations, which leads to innovative activity (Mitra, 2000; Bui, 2016). When belonging to a cluster, SMEs are able to develop new processes, services, and products because of the networking process and management of externalities (Mitra, 2000; Bui, 2016).

Defensibility

Defensibility (*patents*) affects two components of HCaqE. Companies that have some defensibility attitudes are more likely to choose specific human capital than companies without defensibility (Model 2). The patents that help to protect companies' intellectual property require specialized knowledge, skills, and abilities to be developed. This specialized knowledge gives companies a competitive advantage in the market (Hatch & Dyer, 2004; Campbell et al., 2012; Kryscynski et al., 2021).

In contrast, companies with defensibility, especially regarding the holding of patents, are less likely to choose to acquire more business skills development as an expected outcome of human capital investment than are companies without defensibility (Model 4). Companies that have defensibility relating to patents are typically research heavy or knowledge intensive companies (Dealroom & Sifted, 2021). Depending on the growth stage of the company, business skills development may not be a priority compared to other skills such as research or analytical skills. For example, in the early stages of DeepTech companies, the need for commercialization is low because the focus is usually placed on research and development (Dealroom & Sifted, 2021). However as DeepTech companies start to mature and have intentions to commercialize, there may be an increased need to acquire business skills (Dealroom & Sifted, 2021).

Firm size

Firm size influences HCaqE in different ways, as shown in our models. First, companies with 10-49 employees are more likely to invest more in human capital than companies with 1-9 employees (Model 1). This is probably because the cost (i.e., financial and opportunity cost) associated with investing in human capital can be too high for small companies (1-9 employees) but affordable for large companies (Shury et al., 2008; Stanfield et al., 2009; Stone, 2012). Similarly, companies with 10-49 employees are more likely to choose to acquire more business skills development as an expected outcome of human capital investment than companies with 1-9 employees. Small companies commonly lack information on what training is available to them, as well as evidence of the benefits derived from training. Therefore, it may be challenging to determine what the expected outcome of an investment is (Storey, 2004; Stone & Braidford, 2008; Stone, 2012).

Medium and large companies are more likely to choose collective learning as their entrepreneurial learning process (Model 3), which may be caused by the fact that collective learning encourages diversity, internal competition, and innovation (Camagni & Capello, 2002; Capello & Faggian, 2005; Anderson & Lewis, 2014; Keeble & Wilkinson, 2017; Figueroa, 2021). Moreover, since large companies have more people, it may be efficient to explore the expertise of every stakeholder.

Company age

The results of Model 1 show that the older the company, the greater the likelihood of investing more in human capital. There appears to be a positive correlation between the age of the company and the probability of choice toward programs with longer durations. The analysis suggests that the odds of firms 30 or more years old selecting a longer program increase by over four times in comparison to the case of new firms (<2 years) (OR = 4.351). Some studies suggest that during the life cycle of some companies they reach a threshold at which they stagnate, and if they are able to pass this threshold their performance improves (Haykir & Çelik, 2018). Since, as discussed by Ganotakis (2012), there is an established link between human capital and firm performance, investing more in human capital could be the critical factor helping the companies to surpass that threshold. Additionally, as companies get older there is a tendency for them to innovate at the risk of being irrelevant (Noordin, 2014), and to avoid that, older companies have an incentive to invest more in human capital. Following an investment in human capital, older companies are more likely to choose to acquire more business skills development as an expected outcome of their investment in human capital.

In contrast, younger companies are more likely to choose specific human capital than are older companies (Model 2). This probably occurs because there is a strong link between specific human capital and firm performance (Unger, 2011; Ganotakis, 2012).

Founders' Age

The age of founders affects all components of HCaqE. Companies with founders between 31 and 35 years old are more likely to invest more in human capital because they have higher values of entrepreneurial activity and greater ambition (Bosma & Levie, 2010; Cassia et al., 2012).

Companies with younger founders are more likely to choose to acquire more business skills as an expected outcome of human capital investment than are companies with older founders (Model 4). A possible reason for this is that older founders may have acquired more of this type of knowledge through their previous experiences and would not need to acquire more of these skills for their current venture (Azoulay et al., 2020). Younger founders may not have the same type of experience. Similarly, younger founders (younger than 26 years old) are more likely to choose collective learning (Model 3). Younger entrepreneurs who are part of a family of entrepreneurs are often influenced to go into entrepreneurship through constant socialization with older and more experienced family members (Henderson & Robertson, 2000; Durand, 2008; Hickie, 2013; Ibouder et al., 2021). This constant interaction in the social setting leads to learning.

Finally, companies in which founders are older than 35 are more likely to choose specific human capital. Some studies have shown that the average age of successful founders is 45 years old because many of these founders leverage on the experience they have acquired in their younger years (Azoulay et al., 2020). They also often focus on the areas in which they have previous experience. Their previous experience helps them to determine what specific knowledge they need for their new ventures (Madsen et al., 2003; Jafari-Sadeghi et al., 2019; Azoulay et al., 2020).

Number of founders

The number of founders influences two components of HCaqE. Companies with more founders are less likely to invest more in human capital (Model 1) because they already have complementary knowledge and skills to be productive (Yeager & Nafukho, 2012; Senichev, 2013; Roberts et al., 2013; Pinelli et al., 2020). When the number of founders is high, the network of the founding team is larger, which is important for success (Banerji & Reimer, 2019). Hence, companies with more founders are more likely to rely on the complementary skills of

their co-founders and leverage on their wider network, rather than investing in additional human capital. It is also for this reason that companies with a greater number of founders are more likely to choose collective learning (Model 3).

Previous company founding experience

Previous company experience influences three components of HCaqE. Let us explore some of the channels through which this impact occurs. Companies that have founders with more founding experience are more likely to choose specific human capital than companies that have founders with less founding experience (Model 2). Previous founding experience can serve as signalling to investors that they possess specific human capital (Ko & McKelvie, 2018; Azoulay et al., 2020). Founders with more founding experience can rely on their previous knowledge, skills, and abilities to determine what human capital is needed in their current ventures (Madsen et al., 2003; Jafari-Sadeghi et al., 2019). This is especially true if their previous founding experience is closely related to the venture they are currently developing (Unger, 2011). In the same vein, companies that have founders with more founding experience are more likely to choose collective learning than companies that have built up a large and relevant network based on their previous experience. They can thus leverage their social capital and acquire information relevant for their new ventures.

Companies that have more founders with founding experience are less likely to choose to acquire more business skills development as an expected outcome of human capital investment than other companies (Azoulay et al., 2020).

Founders' educational background

Founders' education background is another dimension affecting HCaqE. Companies in which one founder has at least a higher education degree are less likely to invest in human capital programs with longer duration (Model 1) because they can complement the skills of other founders who may not have this level of education (Yeager & Nafukho, 2012; Senichev, 2013). Some studies show that having more human capital may not always have a positive effect on the company performance (e.g., raising capital) and as a result discourage companies with founders with a higher education to invest more in human capital (Pinelli et al., 2020). However, companies in which no founders have a higher education recognize the need to acquire more knowledge in order to be productive and are more likely to invest more in human capital (Ganotakis, 2012; Protogerou et al., 2017; Kato, 2020; Pinelli et al., 2020).

Companies in which at least one founder has a higher education degree are more likely to choose specific human capital than companies in which no founder has a higher education

(Model 2). Previous educational backgrounds can inform founders on what human capital is needed in their current venture (Jafari-Sadeghi et al., 2019). Founders can evaluate the needs of their venture against the backdrop of their educational experience, and identify gaps in their knowledge, skills, and abilities (Hatch & Dyer, 2004; Unger, 2011; Jafari-Sadeghi et al., 2019).

Companies in which at least one founder has a higher education degree are less likely to choose to acquire more business skills development as an expected outcome of human capital investment (Model 4). Similarly, they are less likely to choose collective learning than companies in which no founders have a higher education (Model 3). In this case, the likelihood of selecting a program with a demo day falls by 31.8%. A possible explanation for this pattern is that companies in which no founders have a higher education are incentivized to close their knowledge gap by searching for and acquiring additional skills even through collective learning mechanisms, thereby making them more competitive.

Proportion of female founders

The proportion of female founders affects three components of HCaqE. Companies with a higher proportion of women are less likely to choose specific human capital than are companies with a lower proportion of female founders (Model 2). Female entrepreneurs are more risk averse than their male counterparts (Brindley, 2005; Iqbal & Baek, 2006; Veena & Nagaraja, 2013; Kappal & Rastogi, 2020) and are, therefore, motivated to acquire balanced skill sets (Tegtmeier et al., 2016; Hsieh et al., 2017) that can help them to run successful companies. While most male entrepreneurs may acquire balanced skills for financial motivations, female entrepreneurs are motivated to acquire balanced skill sets for different motives (Meyskens et al., 2011; Tegtmeier et al., 2016).

Companies with a higher proportion of women founders are more likely to choose to acquire more business skills as an expected outcome of human capital investments (Model 4). The results indicate that a higher proportion of women in the founding team increases the likelihood of a choice toward programs targeting business skills development by 36.3%. The majority of female founders are motivated by the need for independence and autonomy, social and community improvement, and financial motivations. Hence, acquiring business skills is an instrument to achieve their motivation objectives (McClelland et al., 2005; Cavada et al., 2017; Al-Kwifi et al., 2020; Meyer & Hamilton, 2020). Furthermore, because there are fewer female entrepreneurs, female entrepreneurs are also motivated by the need for recognition and status. Hence, acquiring more business skills provides them the opportunity to be competitive and take greater risks, which help them in the entrepreneurship journey (Buttner, 1993).

Founders' managerial experience

The managerial experience of the founders influences two components of HCaqE. Companies that have founders with managerial experience are more likely to invest more in human capital for the team and for themselves (Model 1) because they recognize the importance of human capital to firm performance (Politis, 2005b; Ganotakis, 2012; Azoulay et al., 2020; Neill et al., 2020). In contrast, they are less likely to choose to acquire more business skills development as an expected outcome of human capital investment (Model 4). This may be explained by the fact that they already have managerial experience and may also possess some level of business skills.

4. Conclusions

The goal of this study is to obtain answers to the following questions: how do entrepreneurs acquire KSAs?; and what drives them to acquire those KSAs? Our analysis shows that human capital is acquired through investments in human capital, choosing collective learning, programs targeting general or more specific human capital, and setting expectations of the outcomes they would receive after an investment. These results validate the holistic multidimensional view of human capital acquisition for entrepreneurship (HCaqE) proposed in the previous chapter (Dosumu, 2022).

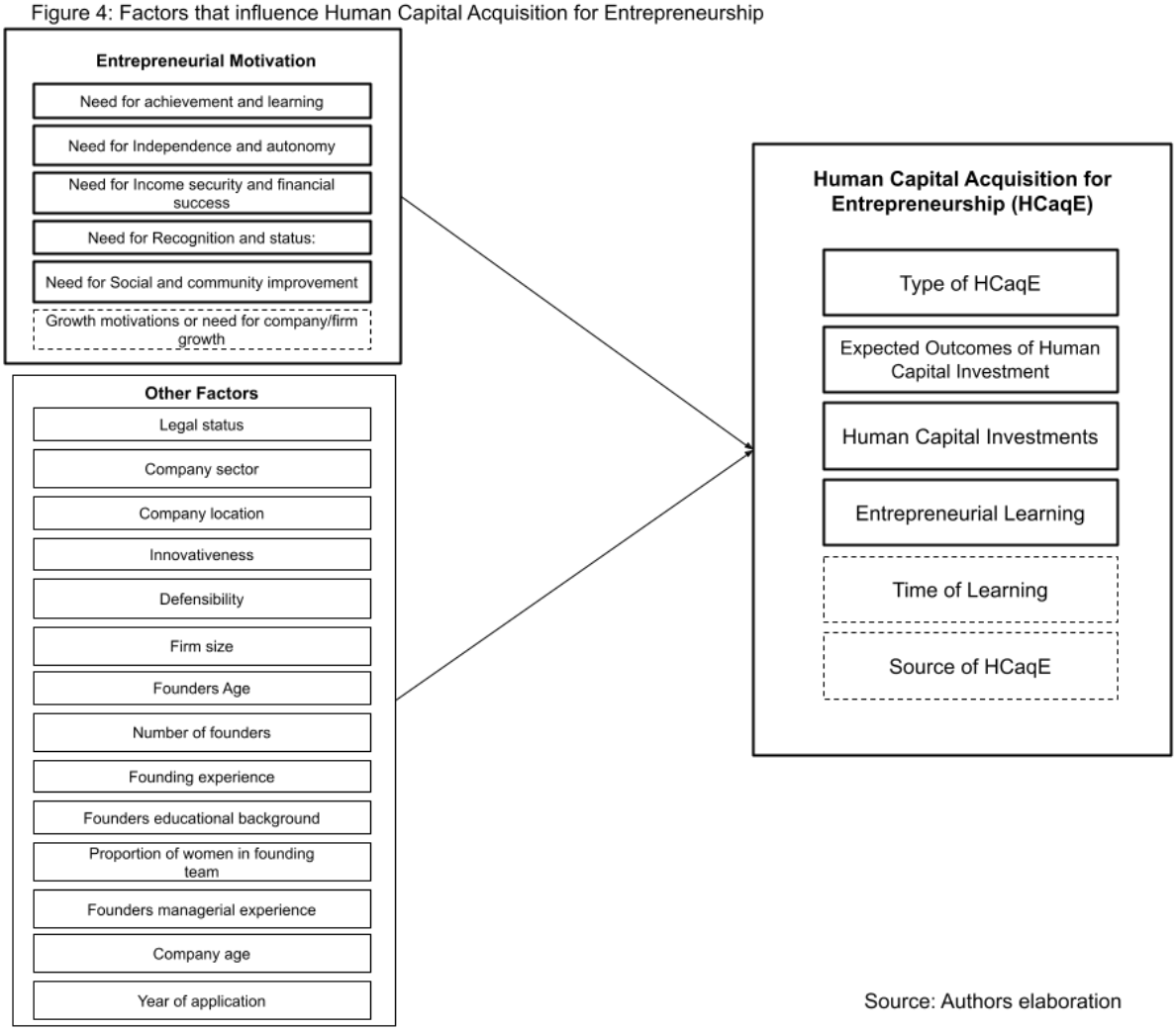
Moreover, the results of our analysis show that there is a relationship between entrepreneurial motivation and HCaqE. The different dimensions of entrepreneurial motivation influence human capital acquisition in a variety of ways. We are able to validate that entrepreneurial motivation does indeed drive entrepreneurs to acquire human capital for entrepreneurship. If HCaqE was assumed to be an aggregate of its components, our results show that the need for recognition and status, the need for income security and financial success, and the need for independence and autonomy generate more effects. Although these are the most important dimensions, it is clear that all dimensions of EM play an important role. Therefore, we conclude that if companies wish to have more HCaqE, every dimension of EM should be considered in isolated terms.

In addition to validating the relationship between EM and HCaqE, this study also shows the importance of other determinant factors. The results show that the following variables have an important impact: company legal status, company sector, company location, innovativeness, defensibility, firm size, company age, number of founders, age of the founders, founders' experience, educational background of the founders, proportion of female founders, and managerial experience of the founders. These factors influence HCaqE to different degrees. Our study has contributed to research by exploring the effects of certain demographic

characteristics such as age and gender, which have previously been understudied. According to Marvel et al. (2016), 66% of human capital research has been focused on education and experience with limited insights on demographic characteristics such as age, gender, and family background.

In contrast to the majority of human capital and entrepreneurship literature, our analysis was conducted at a firm level. We therefore show the role of companies in acquiring human capital, and how this is driven by EM. The summary of our conclusions is illustrated in Figure 4.

Figure 4: Factors that influence Human Capital Acquisition for Entrepreneurship



Source: Authors elaboration

We provide a basis for firm level interventions to foster HCaqE. A major conclusion emerging from the econometric exercise developed in this paper is that companies with different motivations and characteristics seek programs with different characteristics. This means that public policy in this domain of intervention should take into account the heterogeneity between ventures with primary scope of activity in the specific country under analysis and should design policies tailored for groups of companies identified as a priority in

terms of national policy. It is important to note that our analysis explores profiles of demand for human capital development programs but in any case suggests that, for example, a program that is focused on developing general human capital is better than a program focused on specific human capital. However, the results show that firms that have the need for recognition and status or the need for social and community improvement and that apply to accelerator programs are more likely to select more narrowly defined programs.

Along with the contributions of this study to the human capital and entrepreneurship literature, our analysis paves the way for new questions that need to be answered in future research. Indeed, we have validated the link between EM and HCaqE at the firm level, but how do these motivations occur in the first place? There are several studies that have investigated this at the individual level. However, a fundamental question remains open: how can these motivations be developed at the firm level? Additionally, it is interesting to know if there are interventions that can be introduced for companies to have such motivations, which lead to HCaqE and consequently entrepreneurial outcomes? Our study has also created a generalist entrepreneurial profile for companies in which all dimensions of EM play an important role in HCaqE. It would be interesting for future research to further investigate how the role of EM in HCaqE differs between sectors, regions, or types of companies.

In addition, our study excluded some components of the HCaqE (time of learning, and source of HCaqE) and EM (growth motivations) due to lack of data. An interesting research avenue would be to expand the current study by including these variables.

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ARTICLE 3

Does startup acceleration really matter? Evaluating its impact on human capital, entrepreneurial motivation, and firm performance

Abstract:
For public and private institutions, it is a priority to implement interventions fostering entrepreneurship and entrepreneurial success. One of such interventions is the fast-emerging phenomenon of startup acceleration programs. This study evaluates the impact of startup acceleration programs on human capital, entrepreneurial motivation, and firm performance, at firm level. The study was based on a survey of 90 startups that have participated in startup acceleration programs. Data from the survey was complemented with in-depth structured interviews with five startup teams that also participated in these types of programs. The results show that startup acceleration programs had an impact on human capital, entrepreneurial motivation, and firm performance, in different ways. Recommendations are presented on what the ideal startup acceleration program should look like.

Keywords: Entrepreneurship; human capital; entrepreneurial motivation; firm performance; startups; accelerators

JEL codes: M13, L26

1. Introduction

1.1. Background

Many public and private institutions have implemented a variety of interventions designed to facilitate the process of new business creation, development, and prosperity. As discussed in Chapter 2, entrepreneurship generates a myriad of economic and social effects at individual, regional, and national levels, being therefore a critical topic both for research and policy making.

These organizations usually provide access to finance and/or access to business training. The entrepreneurship literature has been covering this topic and empirical studies have been

providing mixed conclusions about the efficiency of these instruments. Some studies show that access to finance has a positive relationship with entrepreneurial outcomes (e.g., Blattman et al., 2014; Banerjee et al., 2015), while others show a negative relationship (e.g., Karlan & Zinman, 2011; Tarozzi et al., 2013). Similarly, some studies suggest that business training has a positive impact on supported ventures (e.g., Klinger & Schundelin, 2011; Field et al., 2014), while other studies show a mixed (e.g., Field et al., 2010), or even negative impact (e.g., Valdivia, 2012; Calderon et al., 2013). Moreover, a major criticism of the literature covering the impact of these forms of intervention is that they largely focus on traditional mechanisms (e.g., provision of business loans/grants, developing training programs in the context of universities, etc.).

Nevertheless, it is important to study emerging entrepreneurship intervention mechanisms because the global entrepreneurial landscape is evolving so rapidly that it is critical to have an in-depth understanding about the most effective factors that help entrepreneurs to adapt to the reality. Merguei (2022, p. 1) summarizes the existing settings in the following way: "programs aiming to support enterprise development range from formal educational programs to entrepreneurial support programs and institutions, such as accelerators and incubators".

In the last decade, one of the most popular emerging entrepreneurship intervention mechanisms has been startup acceleration programs (SAPs) (Naulin, 2021). In fact, startup acceleration programs are a fast-growing phenomenon. Some studies have tried to quantify the number of accelerators with running operations and suggest that most of these can be found in the USA and Europe (although also present in the remaining continents). The most recent estimations suggest that at the global level there are up to 2,000 programs (Cohen & Hochberg, 2014; Naulin, 2021; Merguei & Costa, 2022). Taking into consideration that the roots of this phenomenon are usually traced back to 2005, there has been a wide dissemination of SAPs. In an impactful research paper entitled "The design of startup accelerators", Cohen et al. (2019, p. 1781), who elaborate on these origins: "the most notable accelerator programs include industry pioneers Y Combinator (founded in 2005) and Techstars (founded in 2007), which, in combined terms, have helped launch over 2000 startups that have, in turn, collectively raised more than $16 billion in funding".

Startup acceleration programs are provided by startup accelerators, also known as business accelerators, seed accelerators, or new business incubation models. SAPs are a unique form of entrepreneurship intervention that often combine access to finance with a training component. The increasing popularity of SAPs is making them alternatives to traditional business education programs where human capital related to entrepreneurship can be acquired in a different manner.

Despite the popularity and the increasing demand for SAPs, research on this phenomenon is still emergent and it can be considered an understudied topic (Naulin, 2021; Moritz et al.,

2022). There are only a few studies that empirically investigate the impact of SAPs, and when they do they tend to focus on their direct impact on initial outcomes (Hoffman & Radojevich-Kelley, 2012; Hallen et al., 2020). Among these outcomes, firm performance has received the most attention (Gonzalez-Uribe & Leatherbee, 2016; Yu, 2019; Fehder, 2020; Naulin, 2021). Nevertheless, it is important to stress that limited attention has been given to the underlying mechanisms/connection between participation and outcomes.

This myopic focus prevents researchers from understanding the impact of these emerging intervention mechanisms on other variables of the entrepreneurial process. In addition, studies focusing on the direct impact of SAPs have often focused only on the impact of the finance component, while ignoring the impact of human capital acquisition. Crișan et al. (2021) published very recently a survey of scientific literature on accelerators. A total of 98 articles were published between 2004 and 2019. Around half of these contributions focused on the positive relationship between acceleration and post-financing outcomes. As a result, the impact of SAPs on entrepreneurial human capital has not been sufficiently covered in current literature. Moreover, the majority of studies on SAPs have been descriptive and conceptual, with the primary goal of defining what they are and how they are different from traditional intervention mechanisms (Miller & Bound, 2011; Cohen, 2013b; Caley & Kula, 2013; Cohen & Hochberg, 2014; Fehder & Hochberg, 2014; Pauwels et al., 2016). Considering these gaps, it is clear that there is a need for a better understanding on how SAPs serve as intervention mechanisms to achieve certain outcomes. We thus set out to answer a broad question: does startup acceleration really matter?

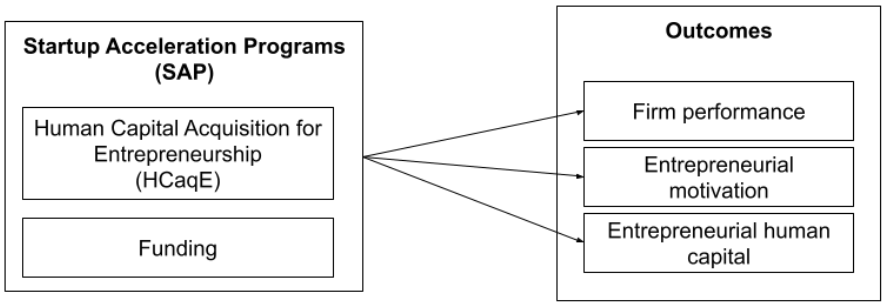
1.2. Goal of the study

This study expands current literature by moving beyond the conceptualization of SAPs toward the analysis of how accelerators actually serve as intervention mechanisms in the entrepreneurship process. We provide empirical evidence about the relationship between participation in startup acceleration programs and the following entrepreneurial variables of interest: firm performance, entrepreneurial human capital, and entrepreneurial motivation. We expand current literature by looking beyond firm performance, considering other variables related to the entrepreneurial process (i.e., entrepreneurial human capital and entrepreneurial motivation). We are also able to compare the magnitude of the impact of this new intervention mechanism across different parts of the entrepreneurship process under different contexts (e.g. location, growth stage, etc.).

In addition, this study aims to clarify the impact of the training (or human capital acquisition) component of SAPs, thereby looking beyond the traditional focus on the financial component. As a result, we will look at the impact of SAPs in a holistic way, creating an opportunity to

compare the magnitude of impact of each component. Moreover, we expand the entrepreneurship literature by focusing on interventions at the firm level. The objectives of this study are illustrated in Figure 1.

Figure 1: Relationship between Startup Acceleration Programs and outcomes



Source: Authors Illustration

Finally, building on the objectives laid out above, this study aims to highlight what the ideal startup acceleration program should look like based on empirical evidence. We develop a framework for SAPs that can have the most impact on our variables of interest (i.e., human capital, entrepreneurial motivation, and firm performance).

2. Startup Acceleration Programs

2.1. Definition

Startup acceleration programs can be defined as “fixed-term, cohort-based programs for startups, including mentorship and/or educational components, that culminate in a graduation event” (Cohen et al., 2019, p. 2) or as “organizations that aim to accelerate early venture gestation by providing cohorts with formal education and mentorship connections during intensive, temporally compressed programs” (Lange & Johnston, 2020, p. 1563). Startup acceleration programs were designed to address deficiencies of startup incubator programs (Pauwels et al., 2016; Mian, 2021).

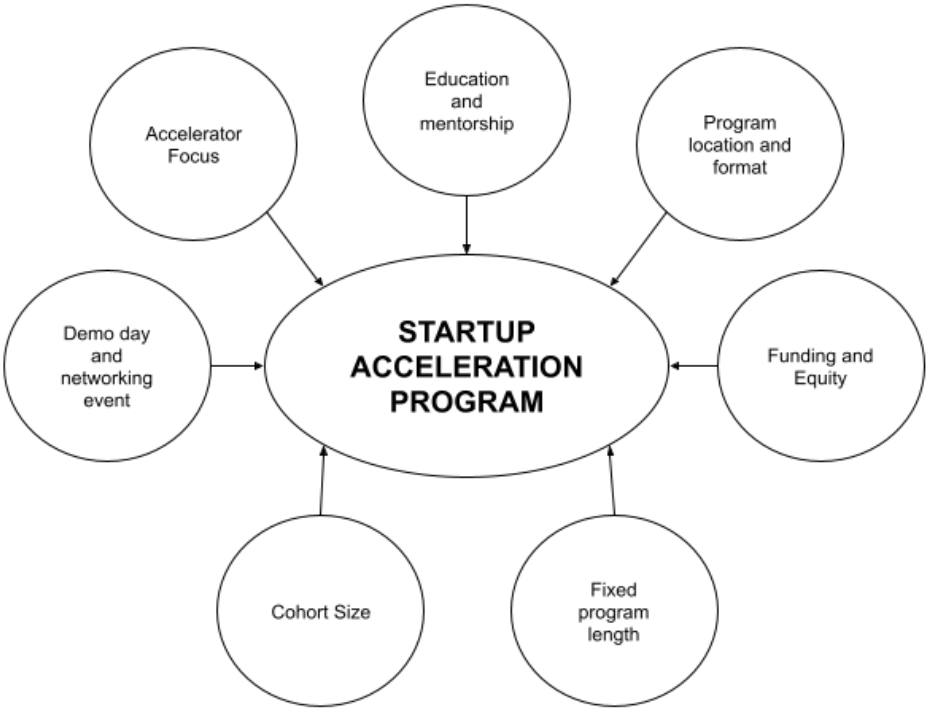
There are important differences between incubators and accelerators. Usually, accelerators are shorter in terms of program length, are cohort-based, include an entrepreneurial training component, are more focused on firm growth, and give more importance to networks (Knopp, 2012; Del Sarto et al., 2022; Avnimelech & Rechter, 2023). Another distinctive characteristic between these forms of organization is that incubators are usually non-profit institutions, while accelerators are for-profit organizations supported by the government, universities, or other corporations (Knopp, 2012).

Accelerators provide tools and resources that startup founders need to de-risk their ventures (Bliemel et al., 2016; Naulin, 2021). They aim to achieve this outcome through capital, financial knowledge, skills, and abilities passed on to entrepreneurs (Cohen & Hochberg, 2014; Cohen et al., 2019). De-risking ventures is critical because startups are high-risk companies with a high likelihood of being unsuccessful. Evidence shows that around 50% of startups fail in a period between three and five years after being founded (Van Praag, 2003; Bartelsman et al., 2005; Baptista & Karaöz, 2011). Several challenges are usually perceived as responsible for this risk of failure: lack of financial resources, limited entrepreneurial/managerial experience, reduced possibilities to recruit employees with adequate skills, and problems in the definition of the strategy to enter the market (Canovas-Saiz et al., 2021). Accelerators are designed to provide direct or specialized focus on entrepreneurs' needs. This level of customization of the contents can be a key explanation for many entrepreneurs to seek entrepreneurial education through acceleration programs rather than traditional business education programs (e.g., MBAs). Hence, entrepreneurs have increasingly relied on startup accelerators as a way to acquire the necessary resources (including human capital) to develop their ventures in accordance with the goals they established (Cohen & Hochberg, 2014; Pauwels et al., 2016; Cohen et al., 2019; Hallen et al., 2016, 2020).

Most of the acceleration literature (especially in the first decade after the emergence of these programs) has treated SAPs as a homogeneous group. Nevertheless, several studies have highlighted that accelerators have a significant degree of heterogeneity, not only in terms of their design features but also in the levels of effectiveness in achieving their goals (Cohen et al., 2019). There is a wide variety of acceleration designs. For example, some programs provide financing and training, others provide training and mentorship, and others offer only mentorship and access to events.

From the analysis of scientific research and the characteristics of a large sample of acceleration programs, we can identify seven core design features that define a startup acceleration program (Figure 2). This group of elements includes the following features: i) accelerator focus; ii) education and mentorship; iii) program location and format; iv) funding and equity; v) fixed program length; vi) cohort size; and vii) demo day and networking event.

Figure 2: Core elements of Startup Acceleration Programs



Source: Authors Illustration

2.2. Core elements of Startup Acceleration Programs

Accelerator Focus: Seeing that the startup accelerator industry is becoming more saturated (Hochberg, 2016; Cohen et al., 2019), startup accelerators or startup acceleration programs often strive to differentiate themselves from the competition by focusing their program on either a specific industry, location, background of founders, or type of impact (Miller & Bound, 2011; Caley & Kula, 2013; Naulin, 2021). Cohen and Hochberg (2014) summarize this evolution:

> *"Initially, many accelerator programs were generalist, accepting entrepreneurs whose businesses were directed at a variety of different industry verticals. Today, accelerator programs have also diversified into industry-vertical focused programs, such as Surge (Houston, TX) which focuses on acceleration of energy start-ups, Kaplan EdTech (New York, NY) which focuses on education-related start-ups, and Healthbox (Chicago and Boston) and Rock Health (San Francisco and Cambridge), which focus on acceleration of healthcare-related start-ups".*

The shift from a more general focus to a specific focus enables accelerators to develop subject matter expertise in a particular area, thus providing more value added to entrepreneurs working in that area.

Entrepreneurial Education and Mentorship: Startup accelerators vary, with programs offering entrepreneurial education (structured or unstructured), mentorship (structured or unstructured), or both (Cohen, 2013a; Yin & Luo, 2018; Hallen et al., 2016, 2020). One of the key elements of startup acceleration programs is that they provide structured training to entrepreneurs on a variety of topics, such as company valuation and help to find the best investor or combination of investors, business model development, and product development in order to equip entrepreneurs with the knowledge, skills, and abilities to minimize risk of venture failure (Cohen, 2013a; Hallen et al., 2016; Yin & Luo, 2018). Some acceleration programs also provide mentorship, which involves pairing an individual with subject matter expertise on a specific issue with startup founders participating in the program, with the goal that there would be some knowledge transferred from the expert to the entrepreneur (Cohen, 2013a; Yin & Luo, 2018; Hallen et al., 2016, 2020).

Funding and Equity: Accelerators help startups in establishing links with potential investors. Nevertheless, they use a different strategy in comparison to incubators by focusing more on informal and individual small-scale investors (Clarysse et al., 2015) and less on venture capitalists as sources of financial resources. In addition, many startup accelerators provide funding to startups that participate in their programs in exchange for equity in the company (Fehder & Hochberg, 2014). There are other acceleration business models in which the startup accelerator invests time in the startup through several hours of training, mentorship, and networking activities in exchange for equity (Miller & Bound, 2011; Fehder & Hochberg, 2014). Giving up equity represents a cost (or an investment) that startups incur to obtain human capital for entrepreneurship (Miller & Bound, 2011; Fehder & Hochberg, 2014). As the popularity of startup acceleration increases, several organizations, especially public organizations, provide non-equity financing to startups (Global Accelerator Learning Initiative, 2019; Cohen et al., 2019).

Fixed Program Length: The length of the program varies across acceleration programs, ranging between four weeks and one year. The average program length of most programs is three months (Amezcua, 2010; Miller & Bound, 2011; Cohen, 2013a; Hallen et al., 2014). This is an important difference in comparison to business incubators, in which participation usually involves a period ranging from one to five years, with an average of 33 months (Amezcua, 2010; Badir, 2013).

There are several reasons explaining this relatively short length of the programs. A first aspect that should be highlighted is the fact that most acceleration programs rely on lean startup methodologies, providing startups with the tools to quickly develop products that meet market needs (Bortolini et al., 2018). This methodology can help to determine if a venture is going to be successful or if there is a need to change direction (Amezcua, 2010; Miller & Bound, 2011; Cohen, 2013a; Bortolini et al., 2018). In the startup world, speed is a critical factor and this short program length pushes entrepreneurs to make critical decisions about their ventures. Second, the length of the program represents the amount of time that startups put into learning or acquiring human capital. This time invested into learning represents an opportunity cost for startups (Amezcua, 2010; Miller & Bound, 2011; Cohen, 2013a). The third aspect is related to the intensity of the programs. These are usually characterized as being extremely demanding in terms of attention, effort, and dedication from founders. Therefore, founders end up working many hours per week at a pace that would not be sustainable if programs had a longer duration. A final advantage of the limited duration of these programs is to reduce the level of dependency of the startups in relation to the intermediary. As summarized by Cohen et al. (2019, p. 1782), "the fixed-term nature of these programs – culminating in a defined graduation event – ensures that startups are forced to contend with market forces, rather than being sheltered (or incubated) from them".

Cohort Size: Another important program element of startup accelerators is that they admit startups in each acceleration cycle in cohorts of varying sizes. The average cohort size is 12.8, with cohort sizes ranging from 4 to 128 startups (Miller & Bound, 2011; Cohen, 2013a; Cohen et al., 2019). The size of a cohort is important because it determines the amount of resources required to provide the service to each cohort. For example, several investors are looking for new deals to invest in and would therefore be more likely to provide mentorship to acceleration services that have a large pool of startups. On the other hand, an overly large cohort size may also be detrimental to the growth potential of each startup (Cohen et al., 2019). For example, startups within a small cohort may receive a larger share of resources as opposed to startups within a large cohort group. In addition, accelerators with smaller cohort sizes can dedicate much time and effort to the support of a small group. That may be more challenging to do with a larger cohort group. Nonetheless, admitting startups in cohorts of different sizes is an important startup design innovation that also has implications for the entrepreneurs' learning process (e.g., individual or collective learning).

The model of offering a program in cohorts has another advantage that has been recognized in the scholarly literature on this phenomenon. Due to the fact that a group of startups enters the program at the same time, this contributes to generate very strong linkages among the participants (Cohen & Hochberg, 2014).

Demo Day and Networking Events: Most startup acceleration programs culminate in an event called demonstration days (or Demo Days), at which startup teams showcase or present their innovations to a large audience of investors, potential clients, and media (Tasic et al., 2015; Ghorashi & Asghari, 2019; Yu, 2020). These events are designed to accomplish several objectives. First, they show how the participating startups have evolved from the moment they joined the acceleration program until the demo day. Second, demo days often represent a simulation of what many entrepreneurs would have to do throughout the life of the venture, which is to make sales and/or investment pitches and network with relevant stakeholders. Third, on many of these demo days entrepreneurs receive feedback on their innovation and how they can improve, which is an important learning opportunity for many entrepreneurs (Tasic et al., 2015; Ghorashi & Asghari, 2019; Yu, 2020). Fourth, demo day events are important networking opportunities for startups as they are exposed to a large network that could help in the development of their venture. Finally, these events help entrepreneurs to learn by doing (Tasic et al., 2015; Ghorashi & Asghari, 2019; Yu, 2020).

Growth Stage: Similar to having a subject matter focus, startup acceleration programs are often focused on supporting entrepreneurs at a certain growth stage (as explored above, this is another pathway toward differentiation among accelerators). Growth stages commonly supported by startup acceleration programs are early stage startups (e.g., Pre-Seed, Seed, Series A, etc.) (Naulin, 2021). At the pre-seed growth stage, companies are still at the idea or prototype stage, with no revenues. In this growth stage startup teams are in the process of finding out if their products or services are good for the market (i.e., product-market fit) (Blank & Dorf, 2020; Naulin, 2021; Rovera, 2022). Accelerators often help startup teams to determine the level of product market fit. At the Seed growth stage, the startup team has a minimum viable product (i.e., a product that has market fit) and has begun to take the product to the market on a small scale (Blank & Dorf, 2020; Naulin, 2021; Rovera, 2022). This means that they are beginning to understand who their customers are, and hence would start to generate some (small) revenues. At this stage, accelerators help startup teams to ramp up the scaling process, usually through finding the right investors to help them to scale. At the series A growth stage, startup teams have a clear pathway for growth and a clear understanding of their position in the market (Blank & Dorf, 2020; Naulin, 2021; Rovera, 2022). At this growth stage, they are already generating revenues, and their goal is to expand into new markets. At this stage, accelerators support their expansion efforts.

Program Location and Format: Startup accelerators are a global phenomenon, being located in different parts of the world. Some startup accelerators have multiple acceleration programs

operating in different parts of the world. The location of these acceleration programs could have an impact on the firm growth and performance, regardless of where the firm is located (Yusubova & Clarysse, 2016). Entrepreneurs have to choose where they want to receive acceleration support, even if they are not from their region. For a variety of reasons including cost, pandemic, and legal restrictions, some acceleration programs are offered online using a host of communication tools (e.g., Zoom, Slack, Skype, etc.). This format gives entrepreneurs, as well as program managers, some degree of flexibility, but many discuss that there is a cost associated with this flexibility.

Some scholars (e.g., Bergiel et al., 2008; Törmänen, 2017; Saliba, 2020; Veselina & Snejana, 2020; Stefanoudis et al., 2021) argue that deep interpersonal connections may be lacking in virtual environments when compared to in-person interactions. This suggest that some value may be lost due to individuals not being able to connect physically (Bergiel et al., 2008; Törmänen, 2017; Saliba, 2020; Veselina & Snejana, 2020; Stefanoudis et al., 2021). This is why during the COVID-19 pandemic, some acceleration programs operated on a hybrid model whereby they delivered their programs in person as well as online. Nonetheless, entrepreneurs have to choose what location or what format they wish for their participation in an acceleration program as it might have an impact on the firm growth or performance.

2.3. Types of Startup Acceleration Programs

Although all SAPs have similar core elements, such as the ones described above, they often exist in different contexts with key differences in purpose (Dempwolf et al., 2014; Crișan et al., 2021). The organization or individuals behind the SAPs dictate these differences through purposes. Some of these organizations do not self-identify as startup accelerators but provide startup acceleration-like services. We have identified four types of SAPs differentiated by their purpose or context (Table 1).

Table 1: Types of startup acceleration programs

Type of program	Description	Ownership	Purpose	Examples
Government Acceleration programs	Government startup accelerators are also known as Venture Development Organizations (VDO). A VDO is usually a public organization that contributes to economic development by delivering a variety of services to startups such as "assisting the creation of high-growth companies", "expert business assistance", "accelerating the commercialization of technology", and direct financial investments in the companies (Dempwolf et al., 2014, p. 21).	Public sector	● Regional or national economic development. ● Usually designed to address problems of the region using innovation.	● JumpStart Inc
University Acceleration programs	These are acceleration programs set up by educational institutions to support innovation developed by students and faculty members of the institution. These accelerators can sometimes be connected to the technology transfer offices (TTOs) of the universities, whose responsibilities include helping students commercialize innovations developed within the university (Dempwolf et al., 2014; Crișan et al., 2021)	Private and/or Public sector	● To commercialize student and faculty innovation. ● To improve universities' overall brand and attract resources.	● StartX (Stanford University)
Corporate Acceleration programs	These acceleration programs are set up by corporations looking to incorporate innovation into their business. SAPs are often one of the strategies corporates can use for their corporate venturing (Dempwolf et al., 2014; Crișan et al., 2021). Corporate accelerators can exist in two approaches: i) to accelerate innovation developed within the organizations; ii) to accelerate innovation external to the organization (Dempwolf et al., 2014; Kohler, 2016; Crișan et al., 2021)	Private sector	● An alternative to traditional R&D ● To incorporate new innovation to help corporations stay competitive ● For-profit	● Siemens Technology Accelerator ● The Microsoft Accelerator ● PwC Scale Accelerator
Innovation acceleration programs	These are the most popular types of SAPs. These acceleration programs were designed primarily for-profit making purposes (Dempwolf et al., 2014; Crișan et al., 2021).	Private sector	● For-profit	● Y Combinator ● Techstars ● Seedstars ● Building Global Innovators

2.4. Impact of Startup Acceleration Programs

The impact of startup acceleration programs has been assessed and measured mostly in quantitative terms. Some examples of metrics used to assess the impact of SAPs include number of startups in the program, startups' operational status, number of customers gained, sales and revenues, stock prices, rate of return to investors, etc. (Lall et al,. 2013; Caley & Kula, 2013). Dempwolf et al. (2014) suggest that these metrics can be categorized into short-term and long-term impact. Crișan et al. (2021) argue, based on systematic literature review of SAPs, that their impact can be categorized in two broad categories: i) soft outcomes; and ii) hard outcomes. Soft outcomes refer to non-economic impacts such as personal skills and knowledge, while hard outcomes refer to economic results, such as revenues (Crișan et al., 2021). Crișan et al. (2021) argue that these impacts of SAPs can exist at three different levels: i) at the startup level, which refers to the outcome SAPs have on startups (e.g., increasing startup revenues); ii) at the accelerator level, which refers to outcomes SAPs have on themselves (e.g., increasing the number of participants); and iii) at the level of the ecosystem, which refers to the outcomes that SAPs have on the wider community (e.g., the number of jobs created).

A criticism to the literature that studies the accelerators programs is that most studies have focused on the economic impacts of SAPs. Another criticism is that studies that have focused on the non-economic impact are ambiguous about the type of knowledge and skills impacted by SAPs. Furthermore, there is little or no coverage of the non-economic impacts such as entrepreneurial motivation, which, as emphasized by Murnieks et al. (2020), is a critical part of the entrepreneurship process.

3. Data and methodology

3.1. Data source

3.1.1. Survey design

This study relies on primary data obtained through a survey (Appendix 1). The central purpose of the survey is to capture information about the impact of startup acceleration programs on human capital, entrepreneurial motivation, and firm performance. The survey includes 31 questions divided across four sections (Table 2).

Table 2: Survey questions

Category	Variables	Type of questions
Startup demographics	Company location	Open ended
	Company age	Open ended
	Industry of operation	Open ended
	Number of employees	Multiple choice
	Growth stage	Multiple choice
Founder demographics	Number of founders	Multiple choice
	Average founder age	Multiple choice
	Highest educational qualification of founders	Multiple choice
	Subject matter expertise	Likert scale
	Gender ratio	Likert scale
	Average years of professional experience	Multiple choice
	Average years of entrepreneurship experience	Multiple choice
SAPs and human capital	SAP location	Open ended
	Year of last participation in SAP	Open ended
	If SAP had program focus	Multiple choice
	Type of program focus	Multiple choice
	If SAP provided KSAs	Multiple choice
	Type of KSAs SAP provided	Multiple choice
	SAP format	Multiple choice
	If SAP had growth stage specialization	Multiple choice
	Duration of SAP	Multiple choice
	If SAP had a demo day	Multiple choice
SAPs and entrepreneurial motivation	Influence of SAP on need for achievement and learning	Likert scale
	Influence of SAP on need for independence and autonomy	Likert scale
	Influence of SAP on need for income security and financial success	Likert scale
	Influence of SAP on need for recognition and status	Likert scale
	Influence of SAP on need for social and community improvement	Likert scale
	Influence of SAP on need for company growth	Likert scale
	SAP's most influential component	Multiple choice
Other topics related to SAPs	Motivation for joining SAPs	Open ended
	Satisfaction level with SAP	Likert scale
	SAP improvement areas	Open ended

The first five questions targeted startup demographics, including company location, company age, company industry, number of employees, and growth stage. A set of multiple-choice questions and open-ended questions is used to capture this information. This section is followed by seven multiple-choice questions that aim to collect data about the founders of each company. This section captures information regarding the number of founders, age for

founders, educational qualification of founders, subject matter expertise of founders, previous professional experience of founders, previous entrepreneurial experience of founders, and gender of founders. The third section consists of multiple choice and open-ended questions to capture information about the startup acceleration programs in which startup teams participated, as well as the impact of these programs on human capital.

Section 3 of the survey captures information including SAP location, last year of participation in a SAP, type of focus of SAP, the type of knowledge, skills, and abilities (KSAs) received from participating in the SAP, the format of the SAP, duration of the SAP, and networking activities available in the SAP (e.g., demo days). The final section of the survey has 10 questions in which we use Likert scale measures and open-ended questions to capture information on the impact of SAPs on the entrepreneurial motivation of startup teams, and additional information about SAPs. The multidimensional approach of entrepreneurial motivation is used to capture the EM of startup teams. The impact of SAPs on each dimension is captured with the use of Likert scales.

The final set of questions (i.e., 3 out of 10) consists of open-ended questions, multiple choice, and a Likert scale measure to capture information including the motivation behind participating in SAPs, level of satisfaction, and current gaps in startup acceleration programs. By using a variety of question techniques, we are able to obtain different types of responses that provide us detailed insights concerning the impact of SAPs on different variables of interest. The multiple-choice questions allow us to obtain information in a structured way, while the Likert scale measure helps us to measure more accurately the impact of certain variables. The use of open-ended questions gives us the opportunity to explore some insights on a deeper level. The survey is designed to be anonymous in order to allow respondents to be as transparent as possible in their responses and to limit the level of bias in the survey.

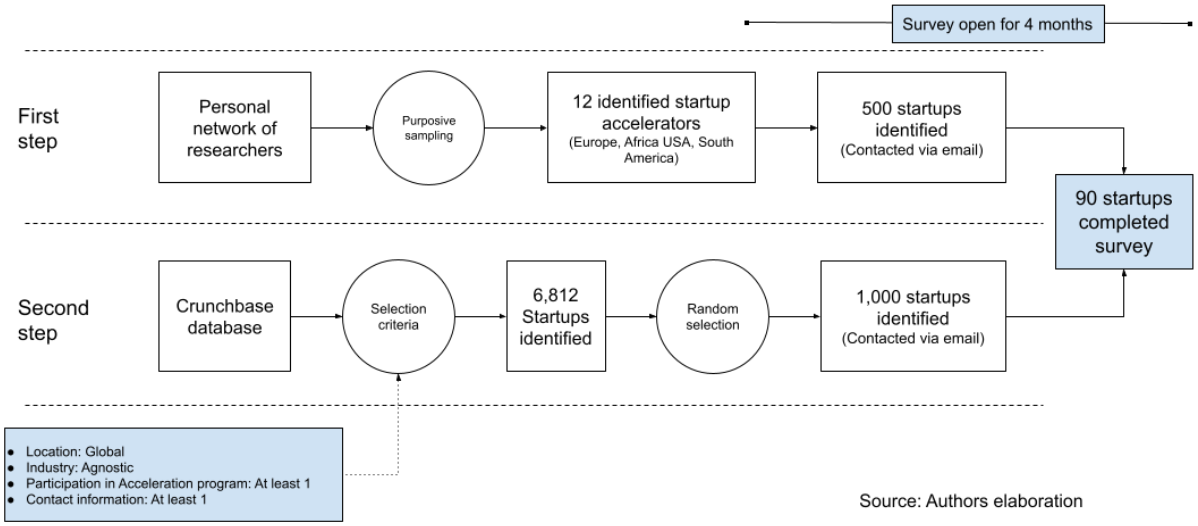
3.1.2. Survey distribution

Figure 3 describes the procedure we followed in order to disseminate the survey, including the activities we undertook during each step. Although the survey was anonymous, it was distributed to startups that participated in at least one acceleration program in any part of the world. Startups that received communication to participate in the survey were identified in two steps:

- In the first step we relied on a purposive sampling, in which we identified startup accelerators through the personal networks of the researchers. A total of 12 startup accelerators spread globally were identified and asked to distribute the survey to the startups in their portfolio. As a result of this process, an estimated total of 500 emails were sent to 500 startups to participate in the survey.

- In the second step, a systematic search was conducted on Crunchbase in order to identify startups that participated in acceleration programs. Crunchbase is a database that contains profiles of technology companies as well as investment deals across the globe. The search criteria included the following five criteria: (i) located in any part of the world; (ii) that were still active; (iii) operating in any industry; (iv) with at least one contact; and (v) that participated in at least one acceleration program.

Figure 3: Distribution of Survey



Based on this search 6,812 company profiles were generated. 1,000 of these profiles were selected randomly and exported into an Excel file. The email contacts of the exported profiles were validated using validation software (hunter.io), after which personalized emails were sent using validated email addresses. Follow up emails were sent after five days of sending the first batch of emails. As a result, a total of 2,500 emails were sent to 1,000 contacts. The survey was open for four months and was completed by 90 startups.

The companies we have interest in studying are a challenging group to target. Nevertheless, the methodology that we just described enabled us to obtain a sample of responses for which no observation was discarded (meaning that the respondents answered to all the questions included in the survey). The descriptive summary of participants is summarized in Figures 4 to 11.

Figure 4: Survey participants by region

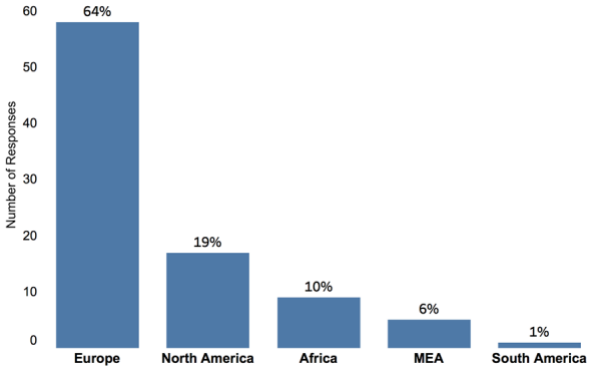


Figure 5: Survey participants by year of foundation

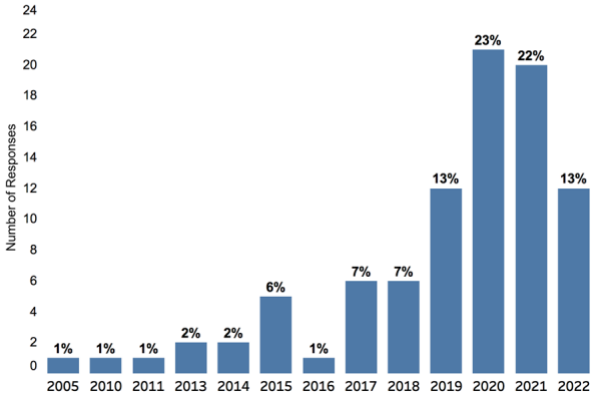


Figure 6: Survey participants by industry

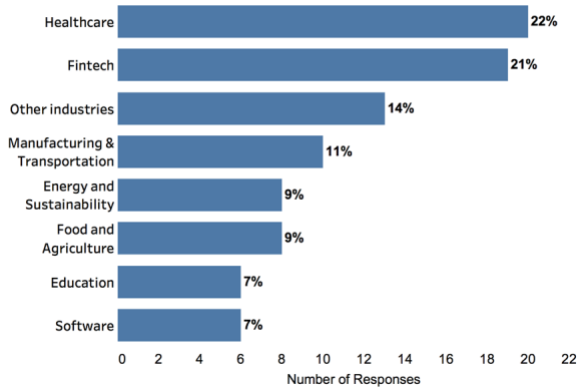


Figure 7: Survey participants by number of employees

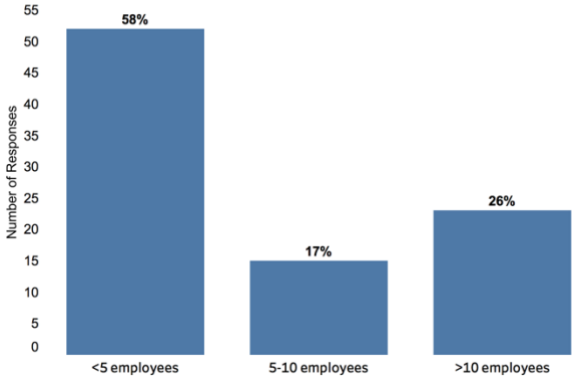


Figure 8: Survey participants by growth stage

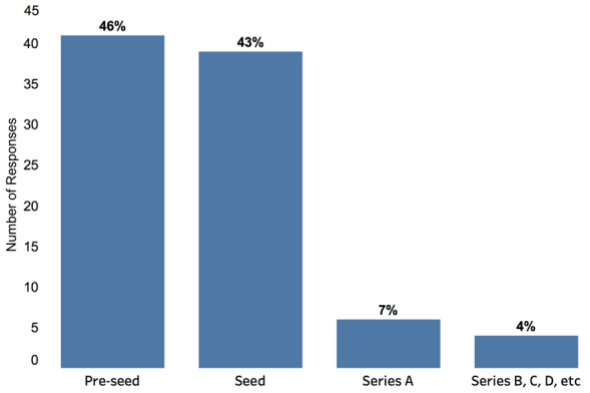


Figure 9: Average age of founders

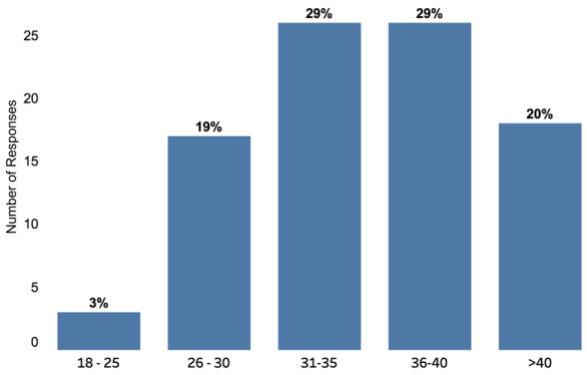


Figure 10: Highest education level of founders

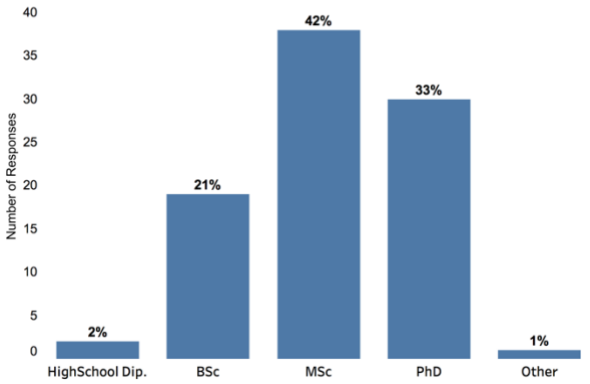
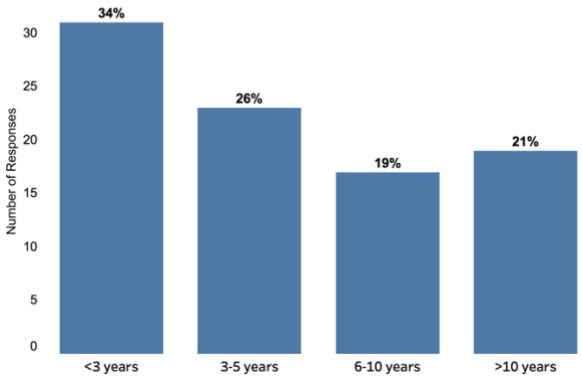


Figure 11: Average years of entrepreneurship experience of founders



Source: Own elaboration

Company demographics show that the majority of the startups that responded to the survey are located in Europe (64%), followed by North America (19%), Middle East and Asia (MEA) (10%), and South America (1%) (Figure 4). All the startups that participated in the survey were founded in the last 17 years, with 71% being founded between 2019 and 2022 (Figure 5). The sectors most represented in the sample are the healthcare industry (22%), followed by Fintech (21%). Regarding company size, 58% of survey participants have fewer than 5 employees, while 26% had more than 10 employees, and 17% had between 5 and 10 employees (Figure 7). Similarly, 46% of the participants are in the Pre-seed growth stage, followed by Seed (43%), and Series B, C, D (4%) (Figure 8).

Demographics about founders show that the majority of the founders have an average age of 31-40 (58%), followed by an average age above 40 (20%), 26-30 (19%), and 18-25 (3%) (Figure 9). The survey further shows that 42% of founders have a Masters degree, followed by PhD (33%), Bachelors (21%), High School diploma (2%), and other degrees (1%) (Figure 10). In terms of entrepreneurial experience, the category with the highest frequency is the group with less than 3 years (34%), followed by 3-5 years (26%), >10 years (21%), and 6-10 years (19%) (Figure 11). Please see Appendix 3 for additional demographic data.

3.2. Interview design and participant distribution

To complement the data obtained from the survey we conducted structured interviews with founders of startups that have participated in at least one acceleration program (Appendix 2). The interview questions were designed to capture additional information on the impact of startup acceleration programs on human capital, entrepreneurial motivation, and firm performance. The interview questions were divided into six sections. Section 1 focused on the demographics of interviewees (Appendix 2). The second section focused on the impact of SAPs on human capital. Section 3 focused on the impact of SAPs on entrepreneurial motivation, while section 4 focused on the impact of SAPs on firm performance. Section 5 focused on the comparison between educational programs and SAPs, while Section 6 focused on the future activities of the startup team. In total, 28 open ended questions were asked in the interviews (Appendix 2). All of the interviews were conducted virtually through virtual meeting software and lasted between 90 and 120 minutes.

To select startups that participated in the interview process we relied on purposive sampling, whereby we identified, via personal networks, startups that have participated in at least one acceleration program. In addition, the cases of study were selected in order to guarantee some diversity in terms of the defining characteristics of the ventures (e.g., founding year, country, industry, growth stage, revenue, capital raised, and participation in acceleration

programs). As a result, we conducted five in depth interviews. The details of the startups under analysis are presented in Table 3[1].

[1] Full transcript of the interviews are available upon request.

Table 3: Overview of participants in the structured interviews

Startup	Founded	Location	Industry	Company Size	Growth stage	Revenue ($)	Capital raised ($)	# of times in acceleration program	Program location
Founder 1 / Startup 1	2019 & 2020	Portugal	Big data Logistics	6-10	Seed	200K	Bootstrapped - 15K	2	Portugal
Founder 2 / Startup 2	2022	Estonia / Portugal	Human resource Tech (HR Tech)	10	Pre-seed	5K - 20K	20K	1	Portugal
Founder 3 / Startup 3	2018	Italy	Transport	10	Seed	150K	700K	Multiple (>3)	Multiple locations
Founder 4 / Startup 4	2021	Nigeria	Education Tech / Blockchain	11	Pre-seed	36K	Bootstrapped	Multiple (>3)	Multiple locations
Founder 5 / Startup 5	2022	USA / Nigeria	FinTech / Financial services	11	Pre-seed	<500	245K	Multiple (>3)	Multiple locations

4. RESULTS AND DISCUSSIONS

4.1. Startup Acceleration Programs and human capital

4.1.1. Impact of Startup Acceleration Programs on human capital

Following the survey, 94% of survey participants answered that startup acceleration programs provided them with entrepreneurial knowledge, skills, and abilities, while 6% responded that the program had no impact on their entrepreneurial knowledge, skills, and abilities (Figure 12). These results are in line with the findings of Hallen et al. (2016, 2020), which suggest that SAPs influence entrepreneurial learning by providing them with KSAs about "*what to do*".

Figure 12: Impact of SAPs on human capital

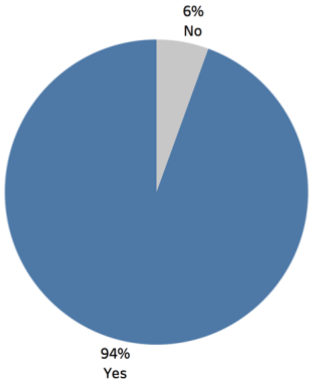
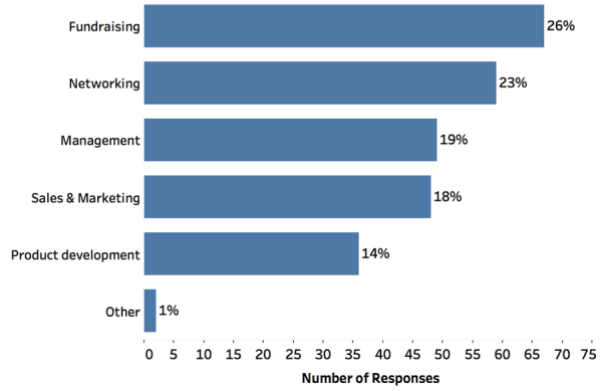


Figure 13: Type of KSAs acquired from SAPs



Our results indeed show that SAPs provide startup teams with knowledge on "*what to do*" regarding fundraising (26%), networking (23%), management (19%), sales and marketing (18%), product development (14%), and others (1%) (Figure 13). These results confirm that startup acceleration programs have a relevant impact on human capital.

In terms of area of expertise, fundraising (26%) stands out as the most important KSA that startup teams need to have (Figure 13). This choice is most likely explained by the challenges that these companies face in this domain. Startups find it difficult to receive funds through debt from traditional finance institutions, such as banks, because they are volatile and have a high level of risk, which, of course, has a consequence in terms of risk premium. Therefore, often they have to turn to venture capital for financing (Fischer & Rassenfosse, 2011; Kim & Wagman, 2016). While applying for a bank loan is often a straightforward process where loan decisions can be made in a few days, obtaining venture capital requires several steps that can take months before an investment decision is reached (Cremades, 2016; Yang & Berger, 2017; Onetti & Pisoni, 2021).

A typical fundraising process would require startup teams to develop specialized investment documents, such as a pitch deck or an investment memo, which are structured differently than the traditional business plan (Cremades, 2016; Yang & Berger, 2017; Onetti & Pisoni, 2021). In addition, startup teams need to do research on the type of venture capital investors they want to receive investment from. Furthermore, startup teams need to understand capitalization tables (also known as cap tables), which show the ownership structure of the company when an investment is received (Cremades, 2016; Yang & Berger, 2017; Onetti & Pisoni, 2021). The complexity of the fundraising process makes KSAs on fundraising critical to the entrepreneurial journey of startup teams. Founder 1 recognizes this challenge:

> *"I found that there were some gaps that I needed to address in terms of preparing documents for fundraising. All startups face one big question: what is the best time for fundraising? And that was one of the questions that I was trying to find the answers to during the acceleration programs".*

This evidence is aligned with Peneder (2008), which suggests that the funding gap is a major concern for small companies, hence the need for fundraising KSAs.

Networking (23%) is another important KSA in the entrepreneurial journey of startups (Figure 13). Many of the startup teams need the right network to receive the funding they need, get access to customers, and/or to hire the right talent (Cafferata et al., 2009; Abatecola et al., 2012). In many cases, the decision to join a SAP is driven by the need to acquire networking knowledge, skills, and abilities. According to founder 2, access to network knowledge was a determinant factor of the decision to enroll in a program:

> *"We actually discovered that we had many challenges related to being in a foreign country. […] We were quite limited in terms of resources we could have access to. We realized that we had a good idea, we could kick it off, but without help, it was going to be impossible. So we decided to join the accelerator mainly for that, to get involved in the ecosystem, to get network knowledge, more than raising the money"*.

Similarly, when asked about the decision to join a startup acceleration program (SAP), founder 4 says "*it dawned on us that we needed a vast network to scale up*". We thus observed that the challenges of achieving key milestones were addressed by acquiring the KSAs related to networking.

Other KSAs such as management (19%) and sales and marketing (18%) are also important to acquire in SAPs (Figure 13). To some extent this is an expected finding because

startup teams consist of individuals with strong science, technology, engineering, and mathematics (STEM) backgrounds but limited general business skills (Shepherd et al., 2000; Brush et al., 2001). For example, in the survey conducted in this study, when asked to rate the subject matter expertise of founders in their companies, we observed that 71% say that have high or very high expertise in STEM (40%), while 63% mentioned high or very high knowledge in business management (34%) (Appendix 3 – Figures A3.2 and A3.3). SAPs thus equip these entrepreneurs with this additional knowledge so that the startup teams can successfully manage their companies as well as steer their solutions to be commercially viable (Cohen, 2013b). Founder 1 explains:

> *"We had two objectives to join the acceleration program. The most important one was receiving some mentorship in terms of preparing the go-to-market documents and business modeling (which includes KSAs on sales, marketing, and management). The second objective was extending our network*".

Our evidence is in line with Hallen et al. (2016), who shows that accelerator participants reported they had learned how to refine and execute their business models (i.e., of which sales and marketing is a part) and strategy (i.e., of which management is a part).

Although important, KSAs related to product development (14%) appear to be the least acquired in SAPs (Figure 13). As previously mentioned, many of the startup teams that participate in SAPs have strong STEM backgrounds (Appendix 3 – Figure A3.2) and thus have technical knowledge about the way the product should be developed. Therefore, the need for additional KSA on the development of their product may not be a top priority when compared to other KSA gaps (Chan & Lau, 2005). These startup teams often leverage on SAPs to acquire KSA that is different from their traditional backgrounds. Using the words of founder 5:

> *"...because my co-founders are not startup persons [business-oriented people], I knew that I needed to get us into an accelerator program that could infuse the startup knowledge and startup understanding into them. These were programs that were startup rooted, that introduced my co-founders into what a startup is all about".*

Our evidence suggests that the challenge for many of these founding teams with technical and product knowledge is how to commercialize their product offerings, hence prioritizing the need for more "commercial oriented" KSAs (e.g., fundraising, management, sales and marketing, etc.). However, our data do not disprove the impact of SAPs on product development by providing startups teams with the relevant KSAs (Sadeghiani et al., 2022).

This KSA is particularly important for early stage startups, typically at the pre-seed growth stage (Sadeghiani et al., 2022).

4.1.2. Impact of Startup Acceleration Programs on human capital in different contexts

While the survey results show that SAPs provide different KSAs and that the demand from the startups reflects this heterogeneity (Figure 13), the analysis allows deeper insights about the impact of SAPs under different contexts (Figures 14 and 15).

Figure 14: Type of KSA by growth stage

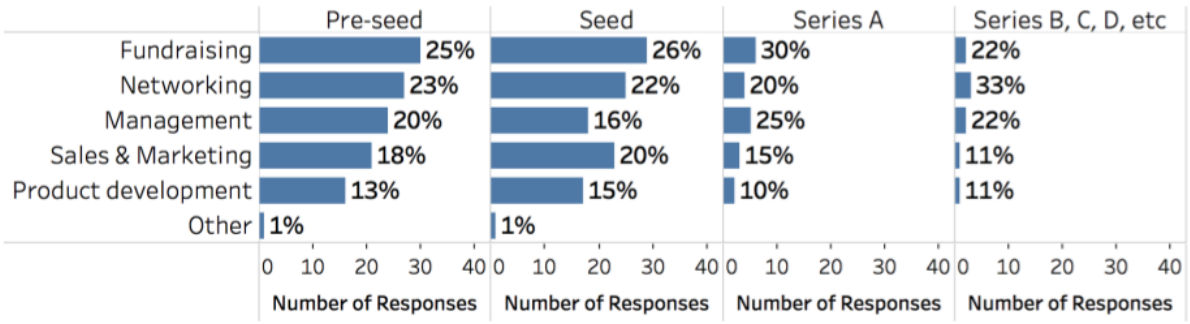
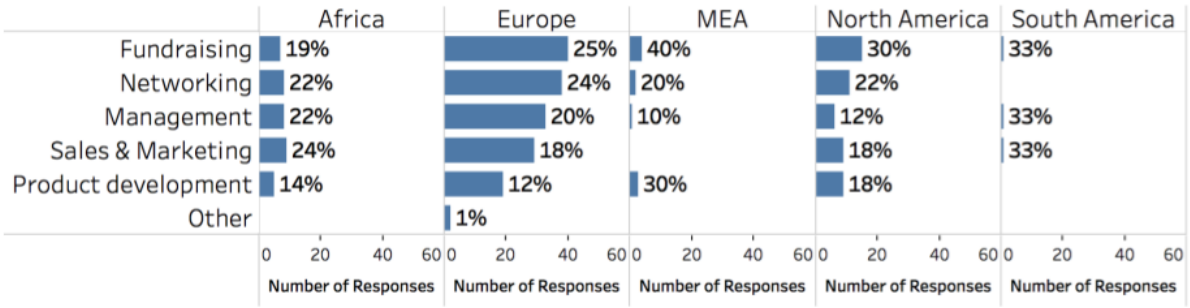


Figure 15: Type of KSA by region



These figures explore the impact of SAPs as a function of the growth stage and region, respectively. Fundraising appears to be the KSA most acquired through SAPs in all growth stages - Pre-seed (25%), Seed (26%), and Series A (30%) - with the exception of Series B, C, and D, where networking (33%) appears to be the most acquired KSA (Figure 14). In terms of growth stage, startups at the Pre-seed, Seed, and Series A growth stage are considered early-stage companies (Zinke et al., 2018; Naulin, 2021). At this stage, many companies are still figuring out product market-fit (Pre-seed), acquiring very first customers (Seed), or are just beginning to expand to new markets (Series A). As a result, they require a lot of funding to remain active (Yoon-Jun, 2010; Mueller et al., 2012; Bocken, 2015; Santisteban & Mauricio, 2017; Zinke et al., 2018; Molnár & Jáki, 2020; Naulin, 2021). Hence, prioritizing the need for fundraising knowledge, skills, and abilities (KSAs) is a natural behavior/finding. In the period

when startups are in growth stages above series A (i.e., Series B, C, D, etc.), their fundraising KSAs are well established because they have participated in several fundraising rounds. Startups at the Series B, C, and D growth stage would be generating significant revenues and would be more concerned with having a strong network to help them raise additional funds, sustain their growth, hire the right talent, and find additional customers (Yoon-Jun, 2010; Mueller et al., 2012; Bocken, 2015; Picken, 2017; Gastaud et al., 2019). These findings are in line with the conclusions of Gastaud et al. (2019), who suggest that network features have a higher likelihood of impacting key milestones (e.g., fundraising) at this growth stage. Moreover, Picken (2017) suggests that maintaining growth is a priority for startups at this growth stage and that network opportunities can be instrumental to achieve this goal (Cafferata et al., 2009; Abatecola et al., 2012).

Fundraising, followed by networking, appears to be the KSA most acquired through SAPs for startups in Europe (25% and 24%, respectively), North America (30% and 22%), and Middle East and Asia (40% and 20%) (Figure 15). Sales and marketing (24%) followed by management (22%), and networking (22%) appear to be the most acquired KSA for African startups (Figure 15). In general, regions such as Europe (>$58.6 Billion in 2022), North America (>$130 Billion dollars), and Middle East and Asia (>$21.7 Billion in 2022) have more venture capital than Africa ($3.5 Billion in 2022) (Dealroom, 2022; African Private Equity and Venture Capital Association, 2022; EY, 2022; KPMG, 2022). Hence, acquiring KSAs to obtain fundraising may be a priority for startups operating in regions where capital is more abundant. Furthermore, the markets of these regions are more developed than markets in Africa. Thus, there are more opportunities to expand using venture capital financing and networking (Yusubova & Clarysse, 2016; Prashantham & Yip, 2016; Mametse, 2019; Muathe & Otieno, 2022). As founder 3 (founder of a European startup) explains, "*the last thing that made us choose an accelerator is that there is usually money or grants involved*". On the other hand, African startups are operating in a more uncertain environment, which requires them to build more trust before financing can be deployed. One of the ways African startups can build trust is by showing they have traction through sales and building a team and business structures that are reliable (Yusubova & Clarysse, 2016; Prashantham & Yip, 2016; Mametse, 2019; Muathe & Otieno, 2022). Hence, it is a priority for African startups to acquire KSAs related to sales, marketing, and management, as these KSAs can contribute to traction. This argument is highlighted by founder 4 (founder of an African startup):

> "*We also needed to tidy out a few things. We had structural issues within the organization. It was clear that we needed to accelerate to give us that edge. We needed to fine tune our skills*".

Similarly, foreign investors prefer to invest in African startups when they can co-invest with a reliable local investor (Anyanwu, 2006; Osei-Kyei & Chan, 2017; Siwale, 2018; Lindsey et al., 2021; Ochinanwata et al., 2021). Having local co-investors minimizes the risks of investing in uncertain markets. This is why it is also a priority for African startups to seek networking opportunities locally, which can in turn help them to secure global partnerships (Chapman, 1988; Mustafa, 2015; Siwale, 2018).

4.1.3. How Startup Acceleration Programs impact human capital

Following our interviews, we observe that the acquisition of human capital through startup acceleration programs is a dynamic process (Figure 16). Human capital is acquired through startup acceleration programs in three phases: i) need assessment phase; ii) need fulfilment phase; and ii) fulfilment assessment phase (Table 4).

Table 4: Phases of acquiring human capital through startup acceleration programs

Phase	Mechanisms/Tools	Interview responses
Need assessment phase: This phase is the pre-acceleration program phase, and often occurs when startup teams are deciding if a SAP is the right learning mechanism for them. In this period, startup teams identify the specific challenges or gaps they hope to address by participating in a SAP.	There is no standardized process in this phase and startup teams often identify the challenges they have in their business and/or the milestones they want to achieve. Startup teams identify their needs / milestones through the influence of previous entrepreneurial knowledge, previous professional experiences, interactions with society, market, and environment (Robinson, 2006; Aldrich & Yang, 2014). This identification process involves critical self-reflection on previous experiences and milestones (Kassean et al., 2015; Fust et al., 2018). The identification of needs or milestones to achieve can motivate startup teams to pursue ways of acquiring the relevant human capital (Lasso et al., 2019).	Founder 1: "*I found that there were some gaps that I needed to address. […] And that was one of the questions that I was trying to find the answers to during the acceleration programs*". Founder 2: "*We actually discovered that we had many challenges related to being in a foreign country. […] We realized that we had a good idea, we could kick it off, but without help, it was going to be impossible*". Founder 4: "*As soon as I identified that we had gaps that needed to be filled, I pursued startup acceleration programs immediately*". Founder 4: "*The first thing would be to identify what you need to have. […] To identify the skills that you probably need to own and the skills that you need to fine tune*".

Table 4: Phases of acquiring human capital through startup acceleration programs (cont.)

Phase	Mechanisms/Tools	Interview responses
Need fulfilment phase: This phase occurs when the acceleration programs are running. This is the period when a variety of tools within the SAP delivers the KSAs that are relevant to addressing the challenges/milestones the startups have identified in the pre-acceleration phase. Some of the tools in this phase include workshops, one-to-one mentorships, learning from peers, learning by repetition, learning by doing, and funding.	**Workshops** - These are sessions where experts are invited to speak about a specific topic or theme (e.g., fundraising, sales and marketing, etc.). They are usually generalist in the sense that they target a broad audience of the SAP (Cohen, 2013a; Yin & Luo, 2018; Hallen et al., 2016, 2020). As a result of these workshops, startup teams can acquire KSA by imitating, copying, or adapting the examples of the experts that have been invited to speak at each session (Haunschild, 1993; Beckman & Haunschild, 2002). This is in line with studies that show that participating in lectures that are relevant to the startups' needs increases their knowledge base (Davidsson & Honig, 2003; Mansoori et al., 2019)	Founder 2: "*We also attended some really nice workshops, where we got insights from people specialized in sales, or people specialized on how to raise money or how to do the right pitch*". Founder 5: "*In our acceleration program, there were topics covered by people who had real expertise, people who gave lots of examples and helped our team in this topic. So, for example, valuation was not our strongest suit and we had experts helping us learning the valuation software and how to set it up independently".* Founder 5: *"We learnt about how to expand to other countries. […] We had an expert that talked about how his company was able to expand into Ghana, Kenya, and how they were able to set up and structure the company*".
	One-to-one Mentorships - These are one on one sessions with a mentor that has specialized knowledge. These sessions are more intimate and customized to the needs of the startup teams (Cohen, 2013a; Yin & Luo, 2018; Hallen et al., 2016, 2020). Several studies show that mentorship in SAPs have a positive impact on knowledge acquisition (Wise & Valliere, 2014; Gonzalez-Uribe & Leatherbee, 2016; Hallen et al., 2016; Battistella et al., 2017; Qian et al., 2018; Seet et al., 2018; Polo García-Ochoa, 2020). These studies are in line with our evidence that these sessions helped startup teams to acquire KSAs through feedback mechanisms, where mentors provided critical inputs on various aspects of the startup teams business (Mansoori et al., 2019). Rymer (2002) suggests that trust between startup teams and mentors enables the expertise of the mentors to be channeled to the startup team.	Founder 4: "*We were assigned to a mentor. Then the mentor goes through your pitch and gives feedback. The first meeting with my mentor was a brutally honest conversation. I slept on it because I had many corrections to do. I kept trying to understand how to apply these corrections in real life. As I thought about it, and I continue to expand my thoughts around it, the ideas [solutions] keep expanding and expanding*".

Table 4: Phases of acquiring human capital through startup acceleration programs (cont.)

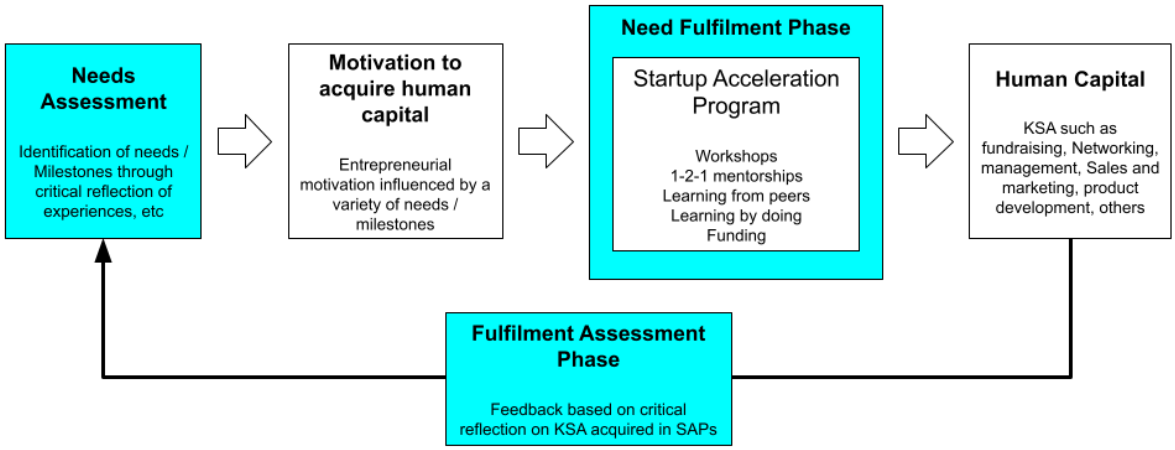
Phase	Mechanisms/Tools	Interview responses
Need fulfilment phase	**Learning from peers** - Many accelerators accept startup teams in cohorts and, as a result, the group includes teams with a variety of experiences and backgrounds. This often promotes the exchange of knowledge through shared experiences. By putting startup teams in groups or program batches, SAPs create the foundation for collective learning (Andreu & Sieber, 1999; Capello, 1999; Miller & Bound, 2011; Cohen, 2013a; Cohen et al., 2019).	Founder 2: "*You get knowledge from other entrepreneurs, which is really interesting. Sometimes you feel that you are the only one struggling with specific problems, like sales or even simple problems such as preparing for pitching your business. But when you see that other people are facing the same problems, then you get insights and knowledge from them and start to see your problem in a different way. So all the knowledge that they bring reshapes the ideas and thoughts that you had*".
	Learning by doing/repetition - Some SAPs create environments and scenarios where startup teams can put into practice the information they have received. The more they practice and repeat a particular action the more they form habits about that activity. Examples of opportunities where SAPs help startups to learn by doing are demo days (Arrow, 1962; Levinthal, 1996; Tasic et al., 2015; Ghorashi & Asghari, 2019; Yu, 2020).	Founder 1: *"It was very important for us to revise our 3 minute pitch. We generated more than 10 versions of the 3 minute pitch to find what was a good pitch. […] And that is critical to make a good first impression on potential investors"*.
	Funding - Some startup acceleration programs provide financing to startup teams that participate in their programs. The value of the funding varies with the type of acceleration program, the growth stage it supports, etc. (Miller & Bound, 2011; Fehder & Hochberg, 2014; Naulin, 2021). Our findings show that SAPs that have some funding available motivate startup teams to learn, especially through the execution of projects (which is also learning by doing).	Founder 1: "*The first motivating factor for acquiring human capital was the finance component. This is important for all startups that need money for starting the project, preparing the MVP [i.e., minimum viable product]*".
Fulfilment assessment phase: This phase is an iterative phase that can occur while the program is ongoing. It is the phase in which startup teams review the KSAs they are acquiring and if they align with the needs they have identified in the need assessment phase. This phase operates like the feedback mechanism for startup teams.	This is also not a structured phase and can occur either before or during the acceleration program. However, in this phase startup teams are filtering which information is most relevant for them, and discarding information that does not apply to them. They execute this selection by using the KSAs acquired in the SAP (Kassean et al., 2015; Fust et al., 2018). We observed that the participation rates in some programs were impacted when the startup teams realized that the information from the SAP was irrelevant.	Founder 4: "*After the first or second session, I know if what I am being taught is meaningful to me. For instance, you are telling me how to scale out into Latin America. That is not my business at all. It is not what I want to do so I lose interest. Startup acceleration programs have to be specific to the goals. If it does not make sense to what I'm building or to my current ideas, then I'm not going to continue participating".*

These results further show that SAPs indeed impact human capital. However for that impact to occur (i.e., for human capital to be acquired) it has to match the needs of the startup teams participating in the program. Our interviews also show that there are mixed views regarding the component of SAPs that influence human capital the most. Some founders perceive that the non-financial component (i.e., the workshops, one-to-one mentorships, learning from peers, and learning by doing/repetition) affects human capital the most. According to founder 4, *"the biggest takeaway for me was the sessions I had with my mentor, which was the biggest learning acquired during the program*". Similarly, founder 5 expressed that "*I think the expert training [and] mentoring part had more impact*." On the other hand, there are also founders who believe that the financial component had a greater impact on human capital. For example, founder 1 explains that:

> "*The first motivating factor for acquiring human capital was the finance component. This is important for all startups that need money for starting the project, preparing the MVP [i.e., minimum viable product]. On a secondary level, mentorships are also relevant. They are useful to improve the pitch or prepare the market strategy*".

Based on our observations on how SAPs affects human capital we illustrate, in Figure 16, how these phases interact with each other.

Figure 16: How SAPs impact Human capital



Source: Authors illustration

4.2. Startup Acceleration Programs and entrepreneurial motivation

4.2.1. Impact of Startup Acceleration on entrepreneurial motivation

Our survey shows the impact of SAPs on each dimension of entrepreneurial motivation (Figures 17-22).

Figure 17: Impact of SAPs on need for achievement and learning

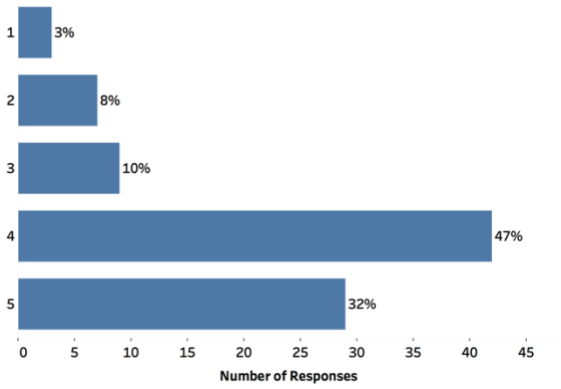


Figure 18: Impact of SAPs on need for independence and autonomy

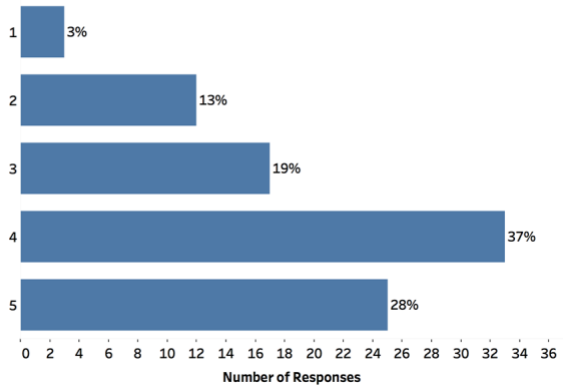


Figure 19: Impact of SAPs on need for company growth

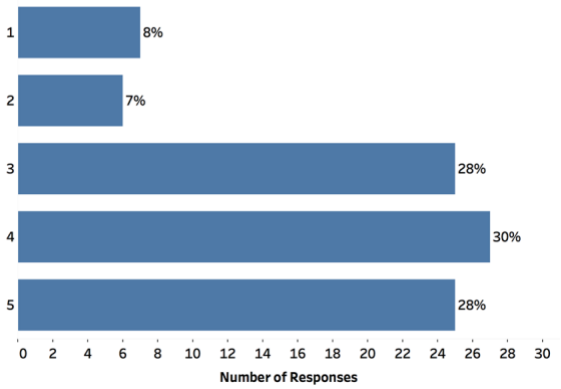


Figure 20: Impact of SAPs on need for recognition and status

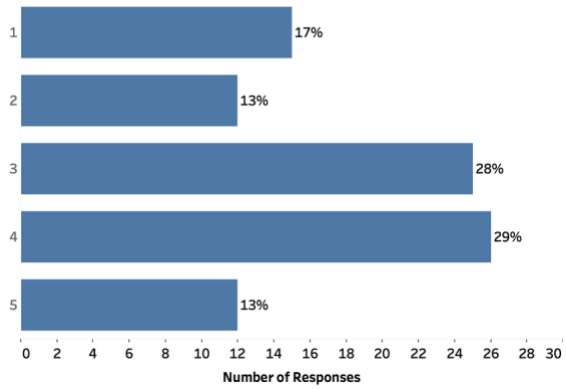


Figure 21: Impact of SAPs on need for social and community improvement

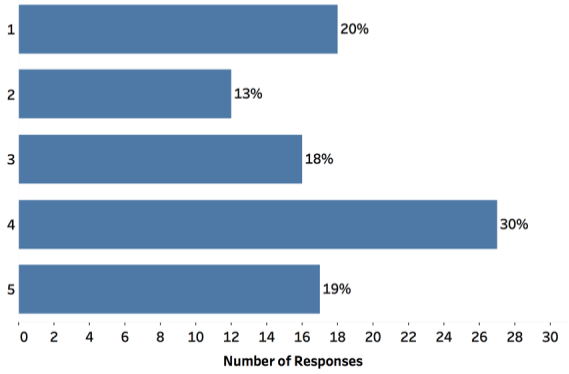
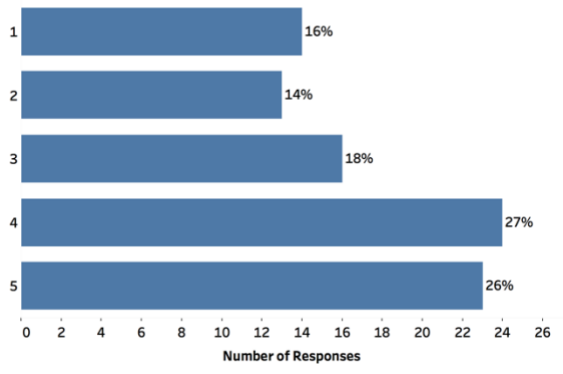


Figure 22: Impact of SAPs on need for income security and financial success



Note: The scale used in these figures is the following: 1 for very low, 2 for low, 3 for intermediate, 4 for high, and 5 for very high impact.

79% of respondents indicated that SAPs had a high or very high impact on their need for achievement and learning, while 11% indicated that SAPs had a low or very low influence (Figure 17). Participating in the SAP exposes some of the gaps that startup teams may have, which pushes them to want to learn and achieve more. Founder 5 explains that participating in the acceleration programs does indeed push startup teams to want to learn and achieve more by allowing them to see the "big picture":

> "*I have been to over 15 accelerators since 2015 and I have seen how that turned me from an ordinary graduate with no entrepreneurial background or startup background into what I am doing now [CEO of the startup]. I already knew that an accelerator program will help [team members] see the big picture of how a startup is different from a traditional business*".

Our evidence is in line with the results of Hallen et al. (2016), and our study suggests that participating in the SAPs elevated the aspiration levels of the startup teams on a weekly basis.

65% of respondents indicated that SAPs had a high or very high impact on their need for independence and autonomy, while 16% indicated that SAPs had a low or very low influence (Figure 18). SAPs often provide startup teams with knowledge related to managing capitalization tables and negotiating investment term sheets. Capitalization tables and term sheets are concepts that cover the ownership and control structure of the startup after receiving investment (Atherton, 2012; Cohen & Hochberg, 2014; Shijaku, 2016; Cwik et al., 2020). Hence, knowledge on these themes can empower startup teams to preserve their level of independence and autonomy when raising capital (Cohen & Hochberg, 2014). Some SAPs also provide startup teams with the opportunity to receive grant financing, which enables and motivates startup teams to maintain their independence and autonomy (Stagars, 2015; Woolley & MacGregor, 2022). Founder 3 explains that one of the reasons they chose to participate in accelerator programs is because they can have access to some grant opportunities. His words reflect the importance of this component: *"and of course, the last thing that made us choose an accelerator is that there are usually some grants involved"*. Many startup teams use this grant financing strategy (where they do not have to give up equity) to preserve their independence and autonomy for as long as possible (Atherton, 2012). Moreover, Hallen et al. (2016) suggest that SAPs motivate startup teams to pursue ventures on a full time basis, which may be an indication for the need for independence and autonomy. On the other hand, a possible explanation for SAPs having minimum impact on this motivation is that accelerators often facilitate startup teams to acquire venture capital, which requires them to give up part of the ownership of the company (Venâncio & Jorge, 2022).

58% of respondents indicated that SAPs had a high or very high impact on their need for company growth, while 28% indicated that SAP had an intermediate impact (Figure 19). SAPs also provide startup teams with knowledge on how to enter new markets, manage costs, or adapt their product and services in such a way that it leads to company growth (Regmi et al., 2015). Founder 5 explains that participating in the SAP motivated her startup team to adapt their products and improve team management, which may have implications on company growth. In the words of Founder 5:

> "*As an entrepreneur, you see yourself learn and grow, you see the growth in the way your team is structured and how you communicate the vision back to the team. That has been a very important outcome of these programs. I am able to go back to my team as a more knowledgeable founder and that helps with the structure of our products and services*".

However, many entrepreneurs come into SAPs already having the motivation for company growth, and thus experience an intermediate impact on their need for company growth. As Founder 4 explains, "*I always wanted to be an entrepreneur. But wanting to be a better entrepreneur was what inspired me to join*". Hence, for some startup teams the need for company growth is the motivation for joining SAPs and not the other way around.

42% of respondents indicated that SAPs had high or very high impact on their need for recognition and status, while 30% indicated that SAPs had a low or very low impact, and 28% indicated an intermediate impact (Figure 20). Some startup teams indeed leverage on the brand of the SAP, as this gives their teams "a stamp of approval" in the market they are operating in. In this case, startups that leverage on the SAP brand already have a motivation for the need for recognition and status. When asked about their choice of SAP, founder 3 explained that the brand was an important factor: "*....like the branding of the accelerator. So just by the fact that an accelerator has a reputation is one good point…*". This remark is in line with the findings by Hallen et al. (2016), who suggest that being accepted into a SAP helps legitimize the startup team's decision to start a company among family and friends. Some startup teams hope to get international recognition from participating in the SAP, and the opportunity to do so may add an extra level of motivation for startup teams (Bonk Sarmento et al., 2016). Founder 4 highlights this aspect:

> "*We do not look at our network here [in Nigeria]. But with accelerators I am able to network with people and close potential partnerships with customers outside of Nigeria, outside the borders of Africa. […] That is the power of an accelerator program. Through them I am able to speak with a potential partner in Morocco or in Indonesia*".

49% of respondents indicated that SAPs had a high or very high impact on their need for social and community improvement, while 33% indicated that SAPs had a low or very low impact (Figure 21). Among the six motivations under analysis, this was the one with the highest number of respondents indicating that SAPs had a very low impact. The study developed by Chandler et al. (2022) suggests that although SAPs provide the environment in which startup teams can pursue social motives, what really affects the fulfillment of the need for social and community improvement is the structure and background of the team. Chandler et al. (2022) suggest that startup teams that are young, educated, and with more females in the founding team are more likely to pursue social motives.

53% of respondents indicated that SAPs had a high or very high impact on the need for income security and financial success, while 30% mentioned that SAPs had a low or very low impact (Figure 22). SAPs provide the startup teams with knowledge, tools, and networks to raise capital or to generate revenues (Cohen, 2013a; Hallen et al., 2016). Therefore, exposing startup teams to these resources can affect their desire for income security and financial success. When startups raise capital through accelerators (and venture capital investors), it is expected that they should be able to grow to the point where the investors can recover the money they have invested (Zider, 1998; Cochrane, 2005). Similarly, startup teams strive to avoid failure, and one of the ways in which they can prevent failure is by being financially secure (Kalyanasundaram, 2018). Hence, this understanding may motivate startup teams to be financially successful. On the other hand, in the case of for-profit companies one of the goals of setting up a business is to make money (Chen & Elston, 2013; Lasso et al., 2019). Therefore, this motivation can exist prior to joining the SAP, and hence the contribution to this motivation post-program may only be marginal or even absent. This could explain why a significant number of respondents indicated that SAPs had almost no impact on their need for income security and financial success. While the need for income security and financial success is linked to the need for business survival (Dockel & Ligthelm, 2002), founder 2 explains that SAPs might have a greater impact on other motivations:

> "*I think it is not only about the survival [success of the business]. I think it is more like doing it [running the business] the right way, the best way you can. As I said, getting the motivation, being an entrepreneur, is really difficult. I think we always see the success star at the end, but all the processes are a bit painful. So you need to be really resilient along the process. You never know, when you are just going to be a bit tired and say, okay, maybe I just want to stop or give it a break. But actually, then you get motivated*".

Summarizing our main conclusions regarding the link between participation in SAPs and entrepreneurial motivation, we observe that the need for achievement and learning (79%) appears to be the EM to be impacted the most by SAP, followed by the need for independence and autonomy (65%), the need for company growth (58%), the need for income and financial success (53%), the need for social and community improvement (49%), and finally the need for recognition and status (42%).

Although our observations suggest that SAPs have an impact on entrepreneurial motivation generally, there appears to be a mixed view on the impact. This is also reflected throughout the interviews we conducted. On one hand, some founders expressed that there was indeed a positive impact on their motivation. Founder 2 expresses this:

> "*When you have people around you, I will not say with exactly the same goal, but with the same energy to make something like a dream come true, you get that motivation, because you realize that there are other people in the same situation, struggling but still fighting for the dream, and really trying to accomplish something they believed in. So that really motivates you"*.

Similarly, founder 3 explains that:

> "*It helps to become even more motivated because you meet other founders. When you share your doubts and feelings with others that is good. You feel less lonely. You feel that you are part of an ecosystem*".

On the other hand, there were founders expressing that SAPs had no impact on their motivation. Instead, it was the other way around, meaning that it was their initial entrepreneurial motivation that pushed them to participate in SAP (Lasso et al., 2019). The words of founder 4 illustrate these thoughts:

> "*Acceleration programs did not impact my motivation. I always wanted to be an entrepreneur. But wanting to be a better entrepreneur was what inspired me to join"*.

Similarly, founder 1 expressed that motivation already existed before joining the SAP and that participating only validated the motivation that already existed. According to founder 1:

> "*Getting back to five years ago, I already had a passion for being an entrepreneur. Participating in the SAP has helped by broadening the horizon of the entrepreneurship journey. Startup acceleration programs made me more confident about being on the*

right road [entrepreneurial journey]. This is a wise decision that I made. So knowing more and more about the different dimensions of the entrepreneurship ecosystem made me much more confident to continue my journey".

In conclusion, the evidence explored in this section suggests that the relationship between SAPs and entrepreneurial motivation is dynamic.

4.2.2. How Startup Acceleration Programs impact entrepreneurial motivation/channels

Based on our interviews, we observe that SAPs can impact the entrepreneurial motivation of startup teams through the following tools or mechanisms: i) Finance; ii) Peer interactions; iii) One-to-one mentorship; iv) Workshops; and v) Networking opportunities (Table 5).

Table 5: SAP tools that impact entrepreneurial motivation

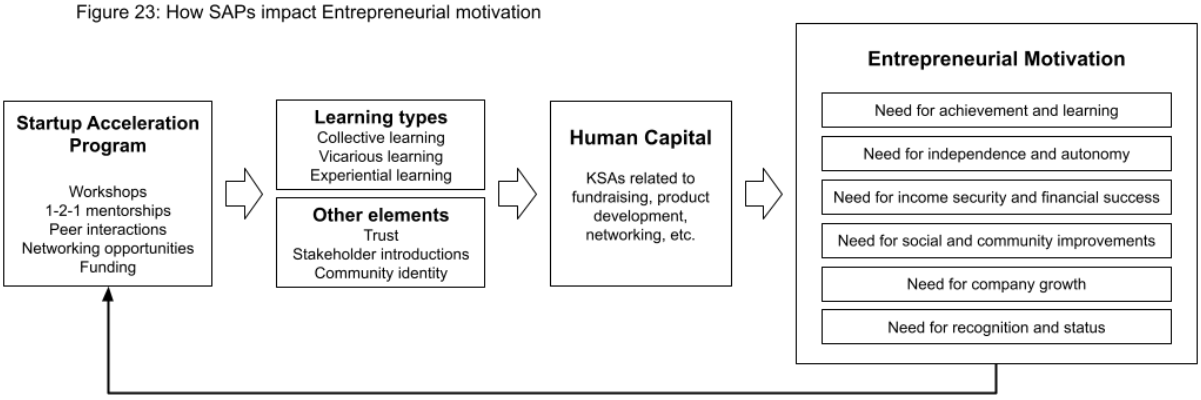
Mechanisms/tools	Interview responses
Peer interactions - Many accelerators accept startup teams in cohorts and, as a result, they have teams with a variety of experiences and backgrounds. This often results in the exchange of knowledge through shared experiences, which can motivate startup teams (Andreu & Sieber, 1999; Capello, 1999; Miller & Bound, 2011; Cohen, 2013a; Hallen et al., 2016; Cohen et al., 2019).	Founder 2: *"When you have people around you, I will not say with exactly the same goal, but with the same energy to make something like a dream come true, you get that motivation, because you realize that there are other people in the same situation, struggling but still fighting for the dream, and really trying to accomplish something they believed in. So that really motivates you".* Founder 3: *"It helps to become even more motivated because you meet other founders. When you share your doubts and feelings with others, that is good. You feel less lonely. You feel that you are part of an ecosystem".*
One-to-one mentorship - These are one on one sessions with a mentor that has specialized knowledge. These sessions are more intimate and customized to the needs of the startup teams (i.e., they are not generalist in nature) (Cohen, 2013a; Yin & Luo, 2018; Hallen et al., 2016, 2020). The one-to-one mentorship sessions can provide a setting where startup teams can be motivated on an individual basis (Mansoori et al., 2019). As suggested by Mansoori et al. (2019), one of the ways the one-to-one mentorship impacts startup teams motivation is through vicarious learning (where entrepreneurs learn from the experience of others, which in this case are the mentors) (Mansoori et al., 2019).	Founder 2: *"People who mentor or that are part of the ecosystem know how hard it is to go through all this process. So they bring the knowledge in a way that encourages you to keep trying and that is really motivating. That was something that I really did not expect to have out of that experience".* Founder 2: "*A few weeks ago I had a mentoring session. The mentor said something that really helped me switch the page and automatically changed 100% the way clients were looking at my company. So that kept me motivated to keep attending to the mentoring sessions, even when I had a tight schedule. […] So when you get a good result, automatically your motivation, goes up…"*,

Table 5: SAP tools that impact entrepreneurial motivation (cont.)

Mechanisms/tools	Interview responses
Workshops - These are sessions where experts are invited to speak about a certain topic or theme (e.g., fundraising, sales and marketing, etc.). They are usually generalist in the sense that they target a broad audience of the SAP (Cohen, 2013; Yin & Luo, 2018; Hallen et al., 2016, 2020). These workshops are not always technical discussions. In some cases, they intend to inspire and motivate the startup teams (Mansoori et al., 2019).	Founder 5: "*...the experts and the networking. So the experts are usually people that have gone through what we are starting to go through, they have made the mistakes, they have seen the opportunities, they have paved the way, and they are able to communicate that and help you out in most of these areas. As an entrepreneur, you see yourself learn and grow, you see the growth in the way your team is structured and how you communicate the vision back to the team. That has been a very important outcome of these programs. I am able to go back to my team as a more knowledgeable founder and that helps with the structure of our products and services".*
Networking opportunities - SAPs provide startup teams with opportunities to connect with stakeholders that can add value to participating startup teams (Tasic et al., 2015; Ghorashi & Asghari, 2019; Yu, 2020). Being connected or introduced to the right stakeholders (e.g., investors or customers) can boost the self-confidence and motivation of the startup teams (Passaro et al., 2020).	Founder 4: *"We do not look at our network here [in Nigeria]. But with accelerators I am able to network with people and close potential partnerships with customers outside of Nigeria, outside the borders of Africa. […] That is the power of an accelerator program. Through them I am able to speak with a potential partner in Morocco or in Indonesia".*
Finance - Our observation suggests that the financial component of SAPs drives motivation of startup teams. This is particularly true if fundraising is a goal. Achieving such goals increases the motivation of startup teams (Koo & Fishbach, 2014).	Founder 3: "*...The financial part because, like learning, some good idea also needs some fuel to be implemented. The money is that fuel".*

Our evidence suggests that both the financial and non-financial components of the SAPs impact the entrepreneurial motivation of startup teams. The views on the level of impact of the two components is mixed. In addition to SAPs affecting entrepreneurial motivation directly, they also affect it indirectly through different types of learning (e.g., collective learning and vicarious learning). Figure 23 illustrates how the different mechanisms and tools within SAPs interact with each other to impact entrepreneurial motivation.

Figure 23: How SAPs impact Entrepreneurial motivation



Source: Authors elaboration

4.3. Startup Acceleration Programs and firm performance

4.3.1. Dimensions of firm performance

Based on interview responses, we observe that firm performance can be divided into two broad categories; i) quantitative measures; and ii) qualitative measures. These broad categories can be further sub-categorized into three areas: i) financial measures; ii) milestones measures; and iii) impact (Table 6).

There are several benefits of using quantitative measures for firm performance because they allow us to monitor performance over time and in different contexts. However, quantitative measures, especially financial measures, are tailored for the case of matured companies. These firms are able to generate the data that is necessary to apply the most common measures of performance. However, it is challenging to measure firm performance using financial measures in the case of early stage startups (Rothaermel & Thursby, 2005). This occurs because early stage startups do not have some of the data that is necessary to obtain quantitative measures (Blank & Dorf, 2020; Naulin, 2021; Rovera, 2022). For instance, it will be difficult to use metrics that rely on profit or revenue information in the case of pre-seed startups because typically at this stage they do not have revenues (Blank & Dorf, 2020; Naulin, 2021; Rovera, 2022). Using milestones and qualitative measures opens the possibility to measure the performance of early stage companies. Qualitative measures can also be a benefit to late stage startups and can be used as a tool to complement the quantitative measures (Jarvis et al., 2000; Allio, 2006; Fabling et al., 2008; Herciu, 2017).

Table 6: Different dimensions of firm performance

Broad categories	Sub-categories	Interview responses
Quantitative measures - this refers to firm performance metrics that can be measured using numbers (Jarvis et al., 2000; Fabling et al., 2008; Herciu, 2017).	**Financial measures:** this involves using financial and accounting metrics to assess firm performance, such as revenue levels, profitability, return on investments, cash flows, etc. (Delmar, 1997, 2003; Shepherd & Wiklund, 2009; Thang et al., 2010; Crespo & Clark, 2012; Yazdanfar, 2013; Michelberger, 2016; Wijethilake & Ekanayake, 2019; Liu, 2019; Pham & Pham, 2020; Coletta & Arruda de Souza Lima, 2020).	Founder 1: "*There are several dimensions that we can consider to measure the performance of the firm. For sure, the first one will be the cash flow of the company…*" Founder 2: "*For me, company performance means reaching some specific KPIs*". Founder 4: "*For me performance is profit. The numbers have to add up. Sometimes you might not even have profit but you are getting to the point where you reach the breakeven [point]"*.
	Milestone measures: This refers to objective goals that have been set. Startup teams can set a timeline to achieve these goals. The goals should be quantifiable. The goals can be set for different areas of the business such as team goals, product development goals, and/or customer acquisition goals (Jarvis et al., 2000; Rothaermel & Thursby, 2005; Allio, 2006; Fabling et al., 2008; Herciu, 2017).	Founder 1:*"[....] the second one is the number of customers or clients. And the third one is the number of successful projects that a company can do in terms of the product or service…"* Founder 3: *"In my case, it is the milestones that you expect to hit. When you are a founder, you are always thinking about what is the next milestone. How can we get there? The performance is all about being able to track these milestones"*.
Qualitative measures: These are measures that cannot be quantified (Jarvis et al., 2000; Fabling et al., 2008; Herciu, 2017).	**Impact:** This refers to the level of influence one variable has on another. For example, impact could relate to people's happiness in the startup team or customer satisfaction with a service (Jarvis et al., 2000; Allio, 2006; Fabling et al., 2008; Herciu, 2017).	Founder 2: "*[…] it is about people's performance. I am always thinking about how can we as a company perform for the people that work for us, and that performance [e.g., level of satisfaction, happiness, etc.] impacts the performance of each individual in terms of the things they need to deliver. That is how I define the company's performance".*

4.3.2 Impact of Startup Acceleration Programs on firm performance

Results from our interviews indicate that there are mixed views on the impact of SAPs on firm performance (Chan & Lau, 2005; Cohen & Hochberg, 2014; Lukosiute et al., 2019; Polo García-Ochoa et al., 2020). On one hand, some founders suggested that SAPs had an impact on all identified categories of firm performance (i.e., financial measures, milestones, and impact measures). According to founder 2:

"Financially, I will say that the program opened some doors [i.e. through introductions] and made it easy to get the clients that end[ed] up becoming revenue for us. […] From the people's side, when we entered the program, I think it was a great motivation for all the team. That specific achievement [being accepted in the SAP] actually impacted their performance and they automatically started [to] perform better".

We further observe that the magnitude of the impact of SAPs, especially on qualitative measures of firm performance, is strongly dependent on the growth stage of the startup team. The words of founder 2 illustrate this idea:

"*In a startup that is in a really early stage, most of the people that work for you, it's not because they are earning the best salary in the world, or because you're providing the best job opportunity, most of the time it is because they believe in the people that are leading it. And they believe in the business you're [running]. So entering the acceleration program, [and] showing them that we were actually a company that can have some traction was really a motivation for them and at the same time that impacted on the performance they were having"*.

Other founders suggested that participation in SAPs influenced their firm performance regarding the achievement of specific milestones. As there is a tendency to stray away from key business milestones, founder 4 explained that the SAP helped her startup team get back on track. According to founder 4:

"*I will say that it helped us to correct our strategy, incorporating a better perspective, it helped us apply new learnings in the right way. So I can say that it impacted our startup [performance]* ".

This evidence is in line with the results of accelerator studies that have previously shown that SAPs have a positive impact on firm (quantitative and qualitative) performance (Gonzalez-Uribe & Leatherbee, 2018; Polo García-Ochoa et al., 2020; Nogueira, 2022).

On the other hand, some founders suggested that SAPs had no impact on their firm performance. However, this observation was not necessarily a result of the shortcomings of SAPs but a result of external factors, such as the environment or the economy. Founder 1 explains that SAPs did not influence firm performance because of the COVID-19 pandemic. According to founder 1:

"No [i.e., SAPs did not impact firm performance], because just after that acceleration program, we faced the pandemic. During the pandemic phase everything got frozen. We are still struggling to restart contract negotiations. COVID affected all the startups, including [ours]".

Furthermore, other founders suggested that there was no direct impact on the firm performance, but indicated that SAPs might have had an indirect impact. Founder 5 explains:

"Directly SAPs did not impact firm performance. But indirectly, the acceleration program impacted the minds and knowledge of the co-founders, which in the end enabled us to achieve better results".

Similarly, founder 3 shared the same sentiment:

"*Firm performance was indirectly impacted because maybe, when you are there, you learn something new and you exchange thoughts with peers, mentors, and managers of acceleration programs. So you learn something and based on what you learnt or listened you make wiser decisions".*

These arguments do not entirely dismiss the relevance of SAPs to firm performance but imply that their relationship is not as clear cut as assumed. Some studies (e.g., Chan & Lau, 2005; Gonzalez-Uribe & Leatherbee, 2018; Lukosiute et al., 2019) point to stronger evidence that SAPs can sometimes have no impact and in some cases have a negative impact on firm performance. For instance, Lukosiute et al. (2019) suggest that participating in SAPs can make startup teams unattractive for future rounds of investment as well as put their intellectual property (IP) at risk. This type of problem (e.g., IP risks) can have significant implications on the growth of the company. Also, Gonzalez-Uribe and Leatherbee (2018), show that if certain components (e.g., funding) of SAPs are implemented in isolation (as stand-alone offerings) there would be no impact on firm performance. Similarly, Chan and Lau, (2005) suggest that if SAPs are not tailored to the needs of startup teams there will be no impact on firm performance.

4.3.3. How Startup Acceleration Programs impact firm performance

Our analysis shows that SAPs impact firm performance in two broad ways: 1) direct impact; and 2) indirect impact. Table 7 provides an overview of this influence.

Table 7: SAP tools that impact firm performance

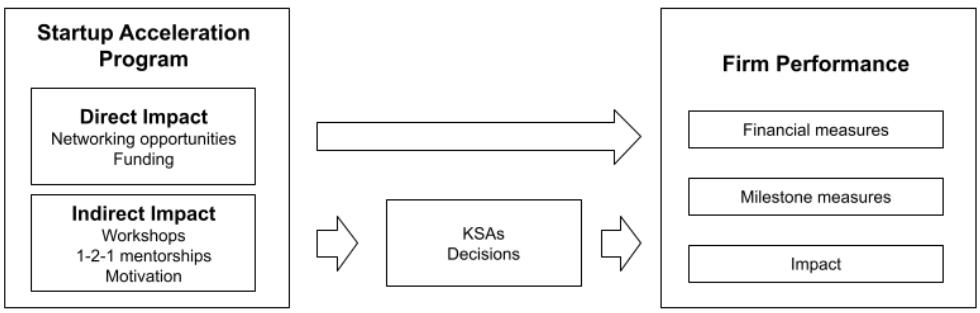
Type of impact	Mechanisms/Tools	Interview responses
Direct Impact	**Networking opportunities:** This involves actively connecting startup teams to relevant stakeholders. Networking has to be active in the sense that SAPs make specific introductions to relevant contacts for firm performance to be impacted (Hallen et al., 2016; Roberts et al., 2016; Polo García-Ochoa et al., 2020). Networking relationships can lead to direct impact such as closing a sales deal or raising capital. Networking can also facilitate the transfer of KSAs of relevant stakeholders to startup teams, which can then impact firm performance (Macpherson et al., 2004; Polo García-Ochoa et al., 2020). Studies such as Zahra and George (2002) and Polo García-Ochoa et al. (2020) argue that only consistent and intense interactions with relevant stakeholders can impact firm performance	Founder 2: *"I will say that, between financial and non-financial, non-financial is the impactful component. Among the non-financial elements, networking was really the one that changed the whole pitch."* Founder 2: *"The program opened some doors [i.e. through introductions] and made it easy to get the clients that end[ed] up becoming revenue for us."*
	Funding - Funding can have a direct impact on firm performance. This occurs because with the financing received startups can impact metrics such as team size, number of new products, increase customers, etc. (Gonzalez-Uribe & Leatherbee, 2018; Le Trinh, 2019).	Founder 3: *"Most of the time [it] is the financial component [that impacts firm performance]"*
Indirect Impact	**One-to-one mentorships -** Connecting relevant mentors to startup teams can facilitate the transfer of knowledge from mentors' domain expertise to the startup teams (Zahra & George, 2002; Qian et al., 2018; Cohen et al., 2019). This knowledge can then be used to impact the productivity of the firm. Polo García-Ochoa et al. (2020) argue that mentorship has to be intensive before it affects firm performance.	Founder 4: *"I think the mentorship was 100% for me. The mentor understands what I am doing. I can actually ask one question over and over again, without the fear of what [the mentor] might think".*

Table 7: SAP tools that impact firm performance (cont.)

Type of impact	Mechanisms/Tools	Interview responses
Indirect Impact	**Workshops** - The workshops provide the startup teams with knowledge and skills they can translate to improving firm performance. For example, workshops on sales and marketing could give startup teams strategies they can use to improve their revenues. Workshops where experts can give advice in a structured and practical way will have impact on firm performance (Gonzalez-Uribe & Leatherbee, 2018; Chatterji et al., 2019; Polo García-Ochoa et al., 2020).	Founder 1: *"When we are talking about [firm] performance, the non-financial components can be much more helpful, because they improve our entrepreneurship skills. Knowing how to reach the market, how to prepare a product for the market is very important for the performance of the company".*
	Motivation - Motivation drives individuals to take certain actions or change behaviors. SAPs can influence firm performance by motivating startup teams to take different actions. Motivation can occur as a result of the workshops, peer interactions, one-to-one mentorships, etc. (Hallen et al., 2016; Mansoori et al., 2019).	Founder 2: *"From the people's side, when we entered the program, I think it was a great motivation for all the team. That specific achievement [being accepted in the SAP] actually impacted their performance and they automatically started [to] perform better".*

Following our evidence, in Figure 24 we illustrate how the mechanisms and tools within SAPs impact firm performance.

Figure 24: How SAPs impact Firm performance



Source: Authors illustration

4.4. Startup Acceleration Programs versus other entrepreneurial learning experiences

4.4.1. Other entrepreneurial learning experiences

Prior to participating in startup acceleration programs, all interviewees have had previous entrepreneurial learning experiences, such as previous entrepreneurial experience, previous acceleration programs, and self-learning experiences.

Previous entrepreneurial experience: We observed that some founders had earlier been exposed to entrepreneurship through previous experiences either professionally (i.e., through a job) or by starting their own companies (formally or informally). Founder 2 explains that her previous learning came from working in the past with entrepreneurial teams:

> "*I was working with startups before I started working on my own startup. So I was always working with founding teams. And I helped them build the whole company from scratch, so I think that experience helped me a lot because I knew what was coming when I decided to start this journey*".

In addition, founder 3 explains that his entrepreneurship experience was not always formal but provided him with some of the knowledge, skills, and abilities that he uses in his current startup:

> *"It's not like [a] very classic entrepreneurial experience, but I have always been involved in doing things since when I was super young. So, when I was very, very young, I was trying to trade my comics and my toys for money or for other things, trying to bargain and extract some value out of [a] transaction. As I grew up, I was involved with entrepreneurship events and when I was a bit older, I started my first company".*

Some studies suggest that previous entrepreneurial experiences have an impact on human capital, entrepreneurial motivation, and firm performance (Stuart & Abetti, 1990; Harris et al., 2014; Burke et al., 2018). More precisely, these studies show that these experiences have a greater impact when they are similar to the current venture that startup teams are building (Gibbons & Waldman, 1999, 2004, 2006; Unger et al., 2011).

Previous acceleration programs: We also observed that some founders had acquired entrepreneurship knowledge, skills, and abilities from participating in previous acceleration programs even if they were not part of the founding team. Founder 4 explains that some of

her entrepreneurial learning experiences were obtained by being part of teams that participated in previous acceleration programs: "*I have been part of accelerator programs not as a founder, but as part of the team"*.

Similar to previous entrepreneurial experience, knowledge, skills and abilities obtained from previous acceleration programs can influence human capital, entrepreneurial motivation, and firm performance (Gibbons & Waldman, 1999, 2004, 2006; Unger et al., 2011).

Self-learning experiences: Another way founders obtained entrepreneurship KSAs was through self-learning activities. Many of the interviewed founders indicated that they searched for resources to equip them for the entrepreneurship journey. Some of these resources had some structure, such as online courses, while others were not so structured, such as watching movies. Founder 1 explains that self-learning through online courses helped him understand some entrepreneurship terminologies, which were helpful in his company:

> *"Through online courses, I learned some terms related to the entrepreneurship ecosystem. Each industry has its own language. It is very important that we can talk in that specific language. That created some basis for me. After that, attending the acceleration program was really a game changer"*.

Regarding informal self-learning, founder 3 elaborates: "*it is not just only that it was like matching it with learnings from the university, from reading books, watching movies, and YouTube"*. According to founder 1, specific human capital led to the acquisition of additional human capital, which in turn led to firm performance (Gibbons & Waldman, 1999, 2004, 2006; Unger et al., 2011).

4.4.2. Difference between Startup Acceleration Programs and other entrepreneurial learning experiences

We identified five key differences between SAPs and other entrepreneurial learning experiences. Below, we explore each of these aspects.

Structured format: Many of the interview participants agreed that a major difference between Startup Acceleration Programs and many of their previous entrepreneurial learning experiences was the structure. They suggested that startup acceleration programs were more structured and organized in delivering an outcome. Our evidence suggests that the structured learning component within SAPs is one key aspect in generating impacts in the acquisition of

human capital (Cohen et al., 2019; Polo García-Ochoa et al., 2020; Nogueira, 2022). According to founder 3:

> *“ SAPs give you a structure. Before, most of the things you do, you do naively. You feel that is the way to do it and you do it. After the program, you have tools that are very valuable. I started to understand the business model canvas, how to do financial planning, and how to deal with investors. These things are very, very important for an entrepreneur".*

This finding is similar to the conclusions drawn by other studies, such as Cohen et al. (2019), Polo García-Ochoa et al. (2020), and Nogueira (2022), which suggest that the design and structure of SAPs have a positive impact on human capital and firm performance.

Practice or learning by doing: A major difference with other entrepreneurial learning experiences is that in SAPs, startup teams get the opportunity to put into practice the knowledge they have received. Several studies suggest that the best way to learn about entrepreneurship is to practice it (Stuart & Abetti, 1990; Cope & Watts, 2000; Chang et al., 2014; Lafontaine & Shaw, 2016; Colombelli et al., 2022). Some other methods of learning (e.g., MBAs) can be too theoretical and therefore more difficult to translate into learned behavior or firm performance (Stuart & Abetti, 1990; Cope & Watts, 2000; Chang et al., 2014; Lafontaine & Shaw, 2016; Colombelli et al., 2022). In some cases, too much theoretical knowledge can even influence firm performance negatively (Stuart & Abetti, 1990). According to founder 1:

> *“The most important part of the acceleration program is the live activities and the hands-on activities. […] The online courses can give you some knowledge and help you to do some things [apply that knowledge] in terms of preparing your product or service for crushing the market".*

The knowledge received from accelerators or perhaps other sources appears to be reinforced or learned after multiple repetitions of practice when participating in accelerator programs.

Learning from peers: Another distinctive characteristic of SAPs is that they provide opportunities for startup teams to learn from each other. Peer learning can influence the entrepreneurial motivation and firm performance of startup teams (Andreu & Sieber, 1999; Capello, 1999; Cotic-Svetina et al., 2008; Miller & Bound, 2011; Wang & Wang, 2012; Cohen,

2013a; Hallen et al., 2016; Keeble, 2017; Cohen et al., 2019; Doğan & Doğan, 2020; van Dun and Wilderom, 2021). Many of the interviewees suggested that the entrepreneurial journey is sometimes very lonely. However, when startup teams decide to join SAPs, they can learn from the failures and successes of others and thus save time and costs. According to founder 2, the process of learning in SAPs can be considered as holding specific characteristics:

> *"I think SAPs are different because you don't learn from making mistakes. Basically, you learn from people that actually went through it and give you advice. In an accelerator, you're learning from experiences of the startup founders who are in the same accelerators, in the same program as you, and then you're learning from experts that have more years of experience than you*".

This difference also reduces the cost of experimentation, as opposed to when startup teams learn by themselves.

Broad and diverse content: We also observed that SAPs provide startup teams with a variety of learning opportunities in a single place. With self-learning, you can focus on a single topic for a long period. However, SAPs tend to broaden the horizon of startup teams by incorporating diverse knowledge, skills, and abilities. This is fully in line with the conclusions from different studies showing that the combination of different elements of SAPs affects firm performance (Gonzalez-Uribe & Leatherbee, 2018; Polo García-Ochoa et al., 2020; Nogueira, 2022). The words of founder 4 illustrate this aspect:

> *"For an accelerator, there are a lot of moving parts. You have the one-on-one mentor[ship], you have the community taking that program, and the networking. On the other hand, the self-learning experience is very focused"*.

Financial support: Finally, we observe that a major difference between SAPs and other entrepreneurial experiences is the financial support. SAPs often provide startup teams with financial support in cash or kind, which often goes a long way into helping the startups grow (Gonzalez-Uribe & Leatherbee, 2018; Nogueira, 2022).

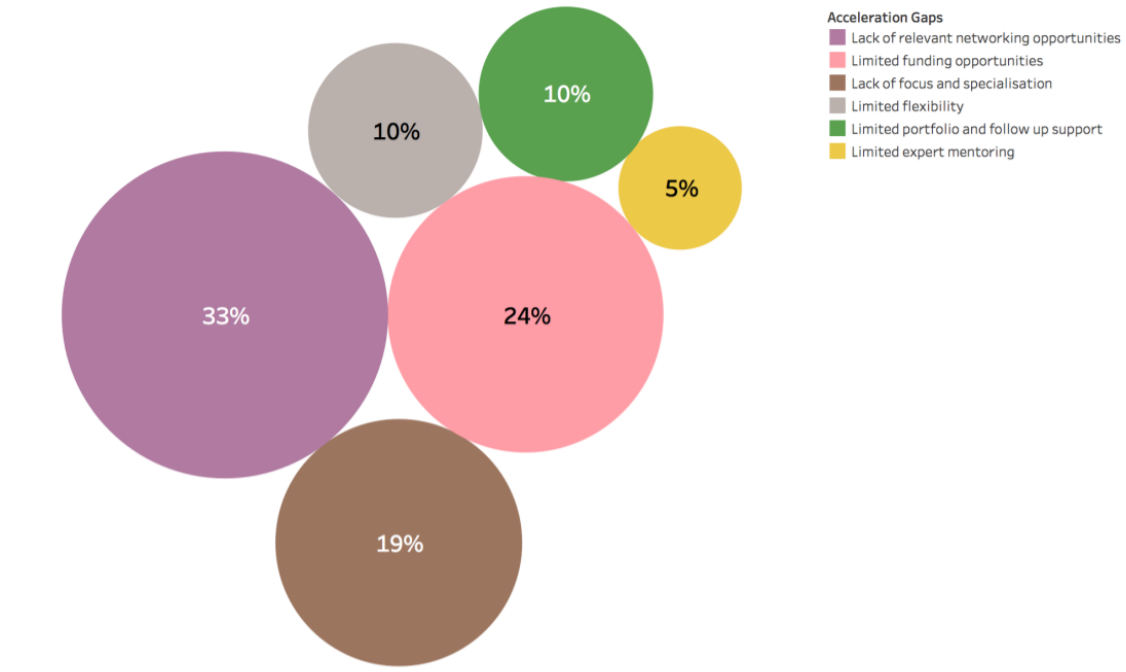
Although we identified key differences between SAPs and other entrepreneurial learning experiences, it appears that activities with different natures are more complementary than substitutes. As some of the interviewees suggested, their previous entrepreneurial learning experiences provided them a base for them to benefit from SAPs. Similarly, SAPs provide the

opportunity for them to put into practice information they might have received within and outside the SAPs.

4.5. Criticisms of Startup Acceleration Programs

Despite the many advantages of SAPs identified in our survey, interviews, and literature review, there are some areas in which SAPs sometimes need improvement. From our survey we identified six gaps (Figure 25). Lack of relevant networking opportunities (33%) appears to be the most important area, followed by limited funding opportunities (24%), lack of focus and specialization (19%), limited portfolio and follow up support (10%), limited flexibility (10%), and limited expert mentoring (5%).

Figure 25: Areas for improvement in SAPs



Our survey indicates that SAPs are not doing enough to connect startup teams to investors (investor introductions) and to other teams (e.g., alumni groups). In addition, it is perceived that many networking events are not very relevant to the needs of the startups. This observation is echoed in previous studies (e.g., Chan & Lau, 2005), who suggest that networking and clustering in acceleration and incubation contexts did not benefit young technology companies. Chan and Lau (2005) argue that one main reason for this relates to the fact that networking events are organized for marketing and political reasons, rather than having startups' needs in consideration. The importance of internal and external networking in

SAPs is a key dimension, being pointed out by many respondents of the survey as one of the main reasons for their decision to participate in SAPs.

Regarding funding opportunities, respondents indicate that SAPs have limited funding opportunities. Cohen and Hochberg (2014) and Gonzalez-Uribe and Leatherbee (2018) report that the average stipend provided by SAPs is $22,890. This average is low, especially for startups operating in the healthcare industry (highly represented in our survey sample) as they often require high capital (especially medical device startups). Gonzalez-Uribe and Leatherbee (2018) also suggest that inadequate funding can limit the impact that SAPs have on startups. It is important to note that funding opportunities do not always have to imply direct financing of startup teams but could imply connecting startup teams to sources (e.g., VC investors, business angels, etc.) where they can find additional resources (Dempwolf et al., 2014).

Similar to our observation of lack of networking opportunities explained in the previous paragraph, SAPs may not be connecting startup teams to new sources for funding. Having sufficient funding opportunities is very important because some startup teams value it more than expert training or mentoring. This is the case of startups in the growth stages of Series A and above (Figure 27). Another reason why having sufficient funding opportunities is critical concerns the fact that many early stage startups often have to give up other activities to participate in SAPs. Giving up other activities may come with a very high opportunity cost for startup teams. Hence, they need financial compensation for this cost. Founder 4 highlights that participating in SAPs demands an opportunity cost that sometimes might be too expensive for some startup teams to bear:

> "*There are some acceleration programs where founders are motivated because they are [financially] compensated. This is something important because it is a lot of time, [and] sometimes you need to leave everything including other opportunities of generating revenue just to focus on the program. So the financial compensation can be a motivation*".

Survey respondents indicate that SAPs need more focus and specialization (Figure 25). This implies that many SAPs take a generalist approach and do not have services that are tailored to the specific needs of participating startups. Although some of our survey and interview respondents are in favor of a more specialized approach, in the scholarly literature there are mixed views on the benefits of SAPs being generalists or specialists (Tang et al., 2021). While studies such as Haapasalo and Ekholm (2004) argue that specialization can lead to providing higher quality of services, others say that a generalist approach allows for diversity that can lead to providing more comprehensive learning (Vanderstraeten & Matthyssens,

2012). Schwartz and Hornych (2008) suggest that specializations might in fact have negative implications on startup teams (e.g., because of little cooperation due to too much competition). Perhaps it would be beneficial for SAPs to take a generalist approach in some circumstances, while being specialists in others. Founder 2 suggests that one area in which SAPs can take a specialized approach is concerning growth stage. According to founder 2:

> *"I feel that some of the programs are designed for a lot of startups, but not all startups are in the same stage [i.e., growth stage]. If there were ways to craft the programs for the [specific] needs then performance would be higher. A program will not fit all the startups that enter even if they have amazing ideas. We all have different needs*".

Another area where SAPs can take a specialized approach, according to founder 4, is gender-based programs:

> "*I do think that we need [more] niche. For example, we need accelerators that are tailored specifically to wome*n".

Moreover, according to founder 2, the desire for more specialization may also be an indication for SAPs to pay more attention to the needs of startups. As mentioned in previous sections, regarding the impact of SAPs on human capital (Table 4 and Figure 16), startups are always evaluating if the SAPs are meeting their learning needs. If SAPs are not meeting these needs, there is a high risk of dropping out.

Our evidence shows that SAPs also have limitations concerning portfolio and follow-on support. Not engaging in follow-ups (post-program) makes some startups feel isolated or abandoned after they have graduated. In the words of an anonymous survey participant "*[I] wish there would be more check-in points to see how everyone is doing and to reconnect*". Naulin (2021) suggests that accelerators have effects on startups beyond the acceleration phase. Indeed, follow on support is an important factor for several startups as they require continuing support until they get to a growth stage where they are “self-sustainable”. Some studies indicate that the continuous interaction of startup accelerators with their portfolio companies has a positive impact on their performance (Wise & Valliere, 2014; Naulin, 2021).

Moreover, survey respondents imply that SAPs are limited in terms of flexibility. This is not related to the format in which SAPs are delivered but to the duration of the workshops. For example, founder 3 says that the "long hour" training might be too much. Regarding the format flexibility, most respondents indicated that their SAPs were delivered online (40%) or through hybrid formats (37%) (Appendix 3 – Figure A3.8).

A final criticism emerging from the interviews is that accelerators are no longer unique in their offerings. This suggests that they are becoming repetitive, having reduced impact on startups after they participated in one program (Fredrick & Walberg, 1980; Castaño-Muñoz, 2013). This suggest that there might be an optimal number of times for the participation of startups in SAPs. Founder 3 suggests that technical learning via workshops might not be impactful after some time. However, vicarious learning might be a way in which SAPs can continue to be unique and impactful:

> *"Most of the acceleration programs are replicating the same thing. Moreover, sometimes the quality of the learning process is not that good. However, I find that when acceleration programs organize some fire chats with some entrepreneurs, successful entrepreneurs, very successful entrepreneurs that share their story, you can learn a lot".*

Although the above highlighted criticisms target specific SAPs, they may be indicative that the accelerator model has some problems in general. Some studies (e.g., Miller & Bound, 2011; Kim & Wagman, 2014) have highlighted the negative side of the SAP model. This includes aspects such as the exploitation of founders through exorbitant equity stakes, diversion of talent from high growth companies, among others. In addition, the accelerator market is also becoming saturated (Cohen & Hochberg, 2014; Hochberg, 2016).

These criticisms are thus setting the foundation for a new type of model called startup studios or venture builder model (Alhokail et al., 2019). Some prominent startup accelerators such as TechStars (number 2 globally) are already exploring the startup studio model parallel to their accelerator model (Haffen Lamm & Peters, 2019). Startup studios have some key similarities with SAPs, such as mentorship, training, and funding, but have key differences in terms of workflows and operations (Baumann et al., 2018; Haffen Lamm & Peters, 2019; de Alvarenga et al., 2019). One of the key differences is that startup studios do not accept startups with a pre-existing idea. Instead, they put individuals together to form teams that then collaborate with each other to generate new ideas and products to solve specific problems or exploit market opportunities (Baumann et al., 2018; Haffen Lamm & Peters, 2019; de Alvarenga et al., 2019). The startup studio model thus starts from the human capital, and from investing/developing that human capital generates a specific outcome. The startup studio in essence has a more hands-on approach throughout the entire lifecycle of the company (Haffen Lamm & Peters, 2019). As of 2022, there are over 700 startup studios that have been established and it is predicted that this model will expand rapidly (Alhokail et al., 2019). Moreover, this model appears to be an attractive alternative to the corporate accelerator model

for large corporates such as Boston Consulting Group, Ernst & Young, Deloitte, and even Procter & Gamble (Alhokail et al., 2019).

5. Conclusions and recommendations

5.1. Conclusions

Startup acceleration programs are a fast-growing phenomenon because they are an entrepreneurship intervention mechanism with specific and appealing characteristics for founding teams. Our study concludes that they influence various aspects that are important to the participating startups, including human capital, entrepreneurial motivation, and firm performance.

SAPs exploit a variety of mechanisms that lead to the acquisition of human capital. Our results show that this impact is more significant when they are able to match the needs of startup teams. Concerning motivation, SAPs influence every dimension of entrepreneurial motivation. Nevertheless, this impact varies in terms of magnitude. Finally, regarding firm performance, SAPs have direct and indirect impacts. We observe that the mechanisms/tools within the programs have a dynamic interaction with human capital, entrepreneurial motivation, and firm performance.

Our evidence shows that startup teams often have entrepreneurial learning experiences prior to joining the accelerator program, and we see that there are clear differences between other sources of learning and SAPs. Despite the differences between them, these experiences appear to be complementary to the impact that SAPs have on human capital, entrepreneurial motivation, and firm performance. Our study highlights the many advantages of SAPs, but also identifies some of the most important sources of criticisms.

5.2. Recommendations: Designing the "perfect startup acceleration program"

The findings of this study give us a set of elements that can be used to make recommendations about the “ideal” startup acceleration program for every growth stage (Figure 26). These recommendations are based on evidence that the design of SAPs has a significant impact on startup outcomes, such as entrepreneurial motivation, human capital, and firm performance (Cohen et al., 2019, Polo García-Ochoa et al., 2020; Nogueira, 2022).

We recommend that startup accelerators should begin by assessing their own priorities and goals. This is particularly important for corporate and government accelerators as they have certain strategic goals that they aim to achieve with the establishment of the SAP (Table 1). This should be followed by assessing the needs of the startup teams that have been

accepted into the program (assuming that the accelerator has conducted an efficient selection process that aligns with its goals). This assessment stage sets the foundation for the SAP and ensures that the startups would be getting exactly the support they need. Once this assessment of needs and goals has been performed, we recommend tailoring the SAPs components to the needs of the startups.

It is important to note that creating programs with specialized elements could imply higher cost for the startup accelerator. The incurred costs should be weighed against the return on investment on each participating startup. One of the strategies for reducing the potential costs of specialization is having a limit to the number of startups that are accepted into the SAP in the selection stage.

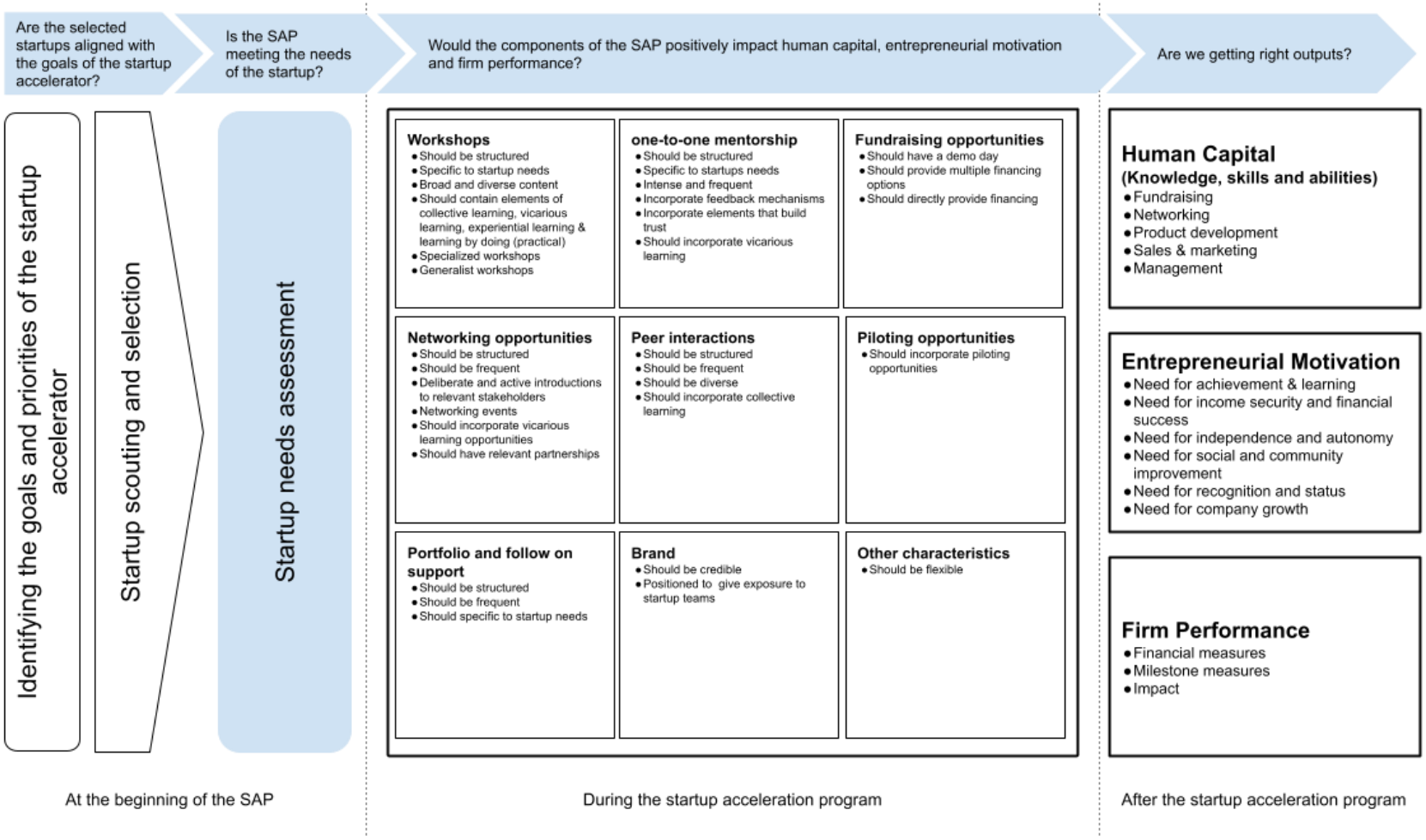
We recommend the inclusion of the following components in the startup acceleration program: workshops, one-to-one mentorship, fundraising opportunities, networking opportunities, peer interactions, piloting opportunities, portfolio and follow-on support, a strong brand, and other key characteristics (Figure 26).

The degree to which each component of SAP is incorporated should be dependent on the needs of the startup team. Finally, the SAP should take into consideration human capital, entrepreneurial motivation, and firm performance as preferred outputs and they should be assessed using the most adequate metrics.

While designing the SAP there are four broad questions that the program managers should provide an answer to: i) are the selected startups aligned with the goals of the startup accelerator?; ii) is the SAP meeting the needs of the startups? iii) will the components of the SAP positively affect the preferred outputs (i.e., human capital, entrepreneurial motivation, and firm performance)?; and iv) is our program generating the right output?

Considering that the design has to be adapted to the needs of startup teams, data from our survey allow us to provide a preliminary overview of the relative importance of the components that should be incorporated into the SAP based on the needs of startups in different growth stages (Figure 27). This illustration takes into consideration the responses from the survey participants about the reasons that led them to join a startup acceleration program. We thus assumed that their response reflects their needs. We ranked the components of the SAP from 1 to 7 based on the needs indicated by the startup recipients, with 1 representing the lowest rank (meaning the least needed) and 7 representing the highest rank (most needed).

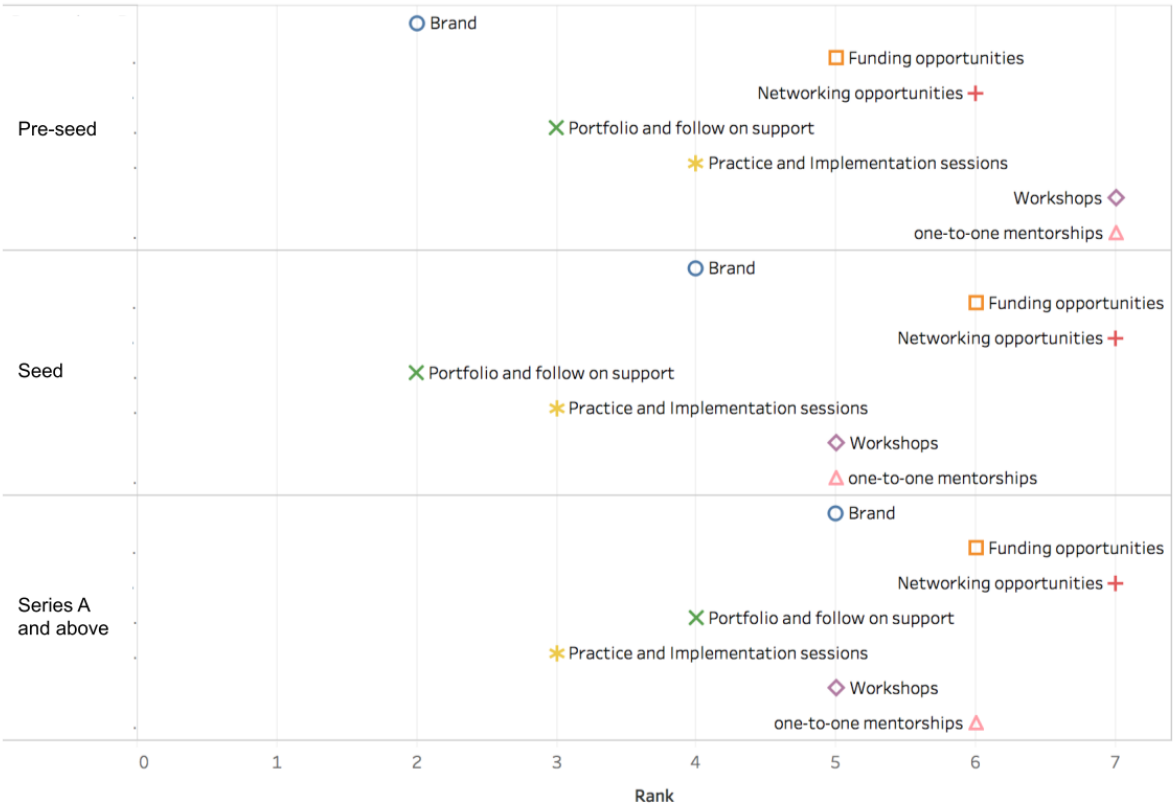
Figure 26: The "perfect" startup acceleration program



Source: Authors illustration

According to Figure 27, in the case of pre-seed startups we recommend that a significant portion of resources should be dedicated to workshops and one-to-one mentorships. Many of the startup teams at this stage answered that they need more knowledge, skills, and abilities to accomplish the entrepreneurial goals. Many of the startups at the pre-seed stage are still trying to determine if they have a product market fit and therefore need all the KSA available to help them accelerate the finalization of their minimum viable product (MVP).

Figure 27: Startup needs from SAPs by growth stage



Source: Authors Illustration

For seed startups we recommend that a significant portion of resources should be allocated to providing network and funding opportunities. This is justified by the fact that startups at this stage have determined whether or not they have a product market-fit and already have a minimum viable product. At this stage, it is a priority for them to find financing to ramp up product development and acquire customers.

Finally, for startups that are in the series A growth stage and above we also recommend allocating significant portions of resources to providing network opportunities, followed by funding opportunities. In this growth stage, startups attach a high priority to scale and to doing it quickly. As a result, they would need all the support and funding from relevant stakeholders.

It is important to note that as these startups progress to the following growth stage, their need for some specific components decreases. For example, the relevance of workshops is lower after the pre-seed stage. This SAP design recommendation serves as a framework for SAPs and can be tailored based on a variety of categories, such as industry, region, etc.

5.3. Limitations and directions for future research

One of the key limitations of the study is the low response rate of the target audience. Despite the tremendous effort made to distribute the survey, the response rate remained low. For future research, it may prove useful to incentivize target groups by offering a reward if they complete the survey. Concerning data collection, the interview participants were primarily early stage startups (i.e. pre-seed and seed), and this study therefore lacks additional perspective from startup teams in more mature growth stages (i.e. series A and above).

Our SAP framework is geared toward impacting startups. As a result, our framework does not emphasize the effect of SAPs on startup accelerators themselves or their contributions to the ecosystem. We assume that, by affecting startups, these benefits will be extended to the startup accelerators themselves and the ecosystem. It would be beneficial for future researchers to evaluate the effect of SAPs on the startup accelerators themselves and the wider ecosystem. In this way, we would obtain a full picture of the impact of SAPs at different levels. In addition, our framework was designed with the growth stages of startups in mind. As mentioned above, this framework will need to be adapted per industry, location, or other contexts. There is, therefore, an opportunity for future research to explore the differences in design frameworks in different contexts. Current literature on the limitations of the model is scarce and largely qualitative. It may prove insightful for future researchers to cover the shortcoming of the models empirically, as this can help relevant stakeholders to address the gaps in the model. Since new models are now emerging such as startup studios, there is an important and interesting opportunity for comparative studies between models.

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APPENDIX 1: Survey questions

A Survey on Human Capital Acquisition for Entrepreneurship and Entrepreneurial Motivation

Dear survey participant,

Responses from this survey would be used for the completion of my PhD Thesis in Economics at the University Institute of Lisbon (ISCTE-IUL). This survey is about the influence of startup acceleration programs on human capital and entrepreneurial motivation. This survey is anonymous and will take approximately 5 minutes to complete. I encourage you to fill the survey honestly. If you have questions about this survey, don't hesitate to reach out to me: otitooluwa_dosumu@iscte-iul.pt

Thank you

Company profile

1. Where is your company located/registered (Country)?
2. What year was your company founded?
3. In which industry is your startup active?
4. How many employees does your company have?
    a. <5 employees
    b. 6-10 employees
    c. >10 employees
5. What is the growth/investment stage of your company?
    a. Pre-seed
    b. Seed
    c. Series A
    d. Series B,C,D, etc

Founders profile

6. How many founders does your company have?
    e. 1
    f. 2
    g. 3
    h. >3
2. What is the average age of founders in your company?
    a. 18 - 25
    b. 26 - 30
    c. 31-35
    d. 36-40
    e. >40
3. What is the highest educational qualification of founders in your company?
    a. High School Diploma
    b. BSc
    c. MSc
    d. PhD
    e. Other

4. What is the subject matter expertise of founders in your company?
    a. STEM [Likert scale: 1 - 5]
    b. Business / Management [Likert scale: 1 - 5]
    c. Other [Likert scale: 1 - 5]
5. What is the gender ratio of founders in your company?
    a. Male [0 - >5]
    b. female [0 - >5]
    c. Non-binary [0 - >5]
    d. Others [0 - >5]
6. What is the average years of professional experience of founders in your company?
    a. <2 years
    b. 3-5 years
    c. 6-10 years
    d. >10 years
7. What is the average years of entrepreneurship experience of founders in your company?
    a. <2 years
    b. 3-5 years
    c. 6-10 years
    d. >10 years

Human capital acquisition for entrepreneurship

8. Where was your startup acceleration program located (Country)?
9. In what year did you or team members participate in your last startup acceleration program?
10. Did your startup acceleration program have a focus (i.e., Sector, Industry, impact focus, etc)? [yes / no]
11. If you answered 'yes' in the previous question, what type of focus did your last acceleration program have?
    a. Sector/industry focus
    b. Impact focus
    c. Technology focus
    d. Not applicable (Select if you answered no in previous questions)
    e. Other
12. Did your startup acceleration program provide you with any entrepreneurial knowledge, skills and abilities? [yes / no]
13. If you answered 'yes' to the previous question, what type of entrepreneurial knowledge, skills and abilities did you receive? (select as many options as apply to you)
    a. Management
    b. Fundraising
    c. Networking
    d. Sales & Marketing
    e. Product development
    f. Not Applicable (Select if you answered no in previous questions)
    g. Other
14. What kind of format did your acceleration program have?
    a. Informal
    b. formal,

c. Online
d. Physical,
e. Self-learning
f. Classroom
g. Hybrid (i.e. Combination of 1 or more formats)

15. Was your startup acceleration program specialised in supporting ventures at a certain stage (i.e. Pre-seed, seed, series A, etc)? [yes / no]
16. What was the duration of the startup acceleration program?
    a. <3 Months,
    b. 3-6 months
    c. 7-12 months,
    d. >12 year
17. Did your startup acceleration program have a demo day and/or other networking activities? [yes / no]

Entrepreneurial motivation [1 = Very low, 5 = Very high]

18. Did joining the startup acceleration program influence the team's desire to accomplish or learn more in their entrepreneurship journey? [Likert scale: 1 - 5]
19. Did joining the startup acceleration program influence the team's desire to be in control of their work, time, and decisions as entrepreneurs? [Likert scale: 1 - 5]
20. Did joining the startup acceleration program influence the team to have income security and financial success through entrepreneurship? [Likert scale: 1 - 5]
21. Did joining the startup acceleration program influence the team's desire to receive acknowledgement, respect, and/or validation from friends, family, and/or community? [Likert scale: 1 - 5]
22. Did joining the startup acceleration program influence the team's desire to solve socio-economic and environmental challenges in their community? [Likert scale: 1 - 5]
23. Did joining the startup acceleration program influence the team's desire to increase the size of the business in terms of number of employees, sales and/or investments? [Likert scale: 1 - 5]

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24. What part of the acceleration program influenced the team's entrepreneurial motivation most?
    a. Financial compensation
    b. Training /Masterclasses
    c. Mentorship component
    d. Networking opportunities
    e. Other
25. Why did you join a startup acceleration program?
26. How satisfied are you with your startup acceleration program? [Likert scale: 1 - 5]
27. What should be improved in your startup acceleration program?

APPENDIX 2: Interview questions

Interview on the impact of startup acceleration programs and human capital, entrepreneurial motivation and firm performance

Demographic Questions:

1. Where is your company located/registered (Country)?
2. What year was your company founded?
3. In which industry is your startup active?
4. How many employees does your company have?
5. What is your current growth stage?
6. Have you raised any capital so far?
7. Are you generating revenues?
8. Year of participation in an acceleration program?
9. Where was your acceleration program located?
10. How many programs have you participated in?

Acceleration programs and human capital

1. When did you and your team decide it was time to learn?
2. What was the timeframe between your intention to learn and actual learning?
3. Did you consider different options for learning? What options did you consider?
4. What factors influenced your choice to learn?
5. Did you receive any entrepreneurial KSAs?
6. How did acceleration programs influence your team's acquisition of Entrepreneurial Knowledge skills and abilities?
7. What parts of the acceleration program influenced your team's acquisition of entrepreneurial knowledge, skills and abilities (Finance components vs non-finance components) and Why?

Acceleration program and Entrepreneurial Motivation

1. How did acceleration programs influence your team's entrepreneurial motivation?
2. What parts of the acceleration program influenced your team's motivation the most and why (Finance components vs non-finance components)?

Acceleration program and firm performance

1. What does firm performance mean to you?
2. How do you measure your form performance?
3. Did joining the acceleration program influence your firm's performance? Can you explain?
4. What parts of the acceleration program influenced your firm's performance the most and why (Finance components vs non-finance components)?

Acceleration programs vs Educational programs

1. Did you or any other founder have an entrepreneurial learning experience? If yes: what was it?
2. If an educational program, can you compare?
    a. If other acceleration programs, how do they compare? Are there differences?
3. In your opinion, what are the key advantages of this type of learning experience in comparison to other options such as educational programs?
4. What are the plans for the future in terms of learning?

Other questions

1. What are the founders plans for the next year/3years?

APPENDIX 3: Other demographic data

Figure A3.1: Number of founders per startup

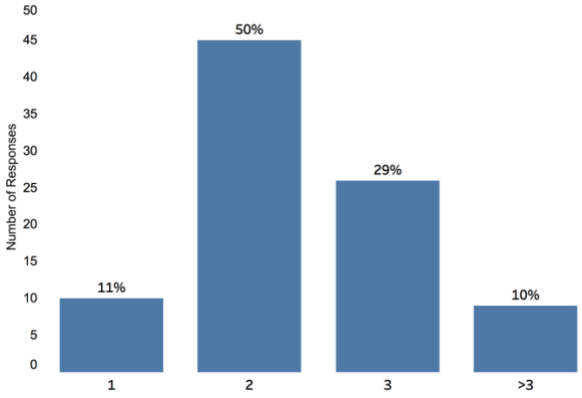


Figure A3.2: Number of team members wiht STEM backgrounds

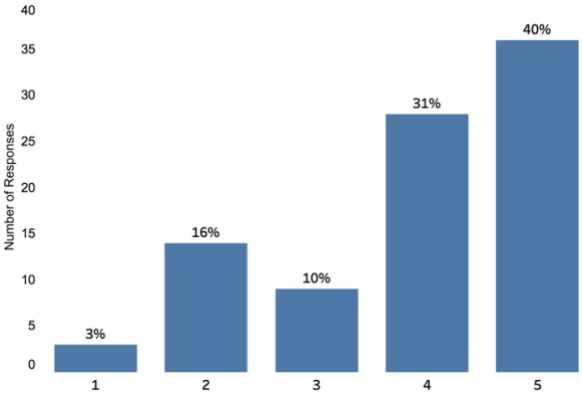


Figure A3.3: Number of team members wiht business/management backgrounds

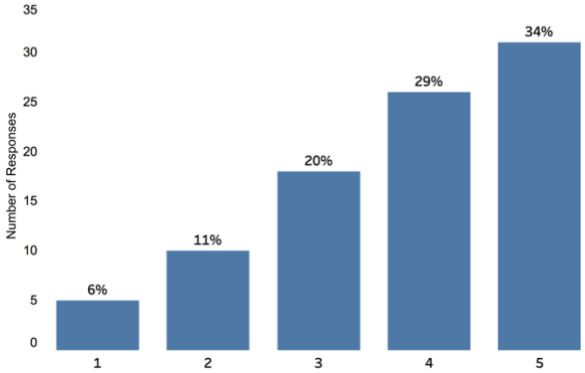


Figure A3.4: Proportion of male founders

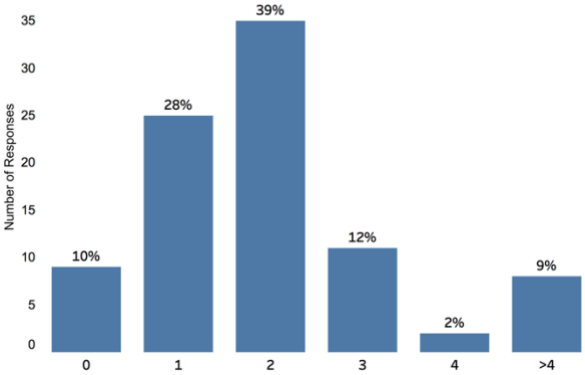


Figure A3.5: Proportion of female founders

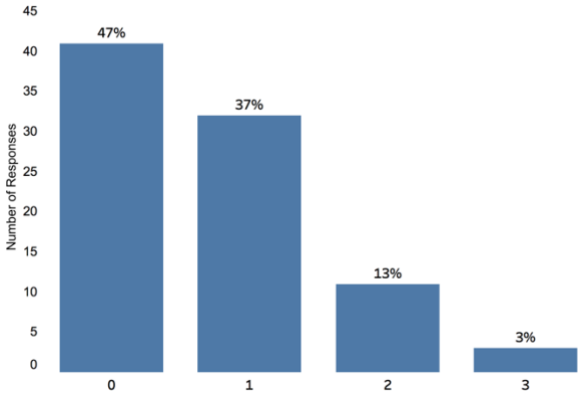


Figure A3.6: Avg. years of professional experience

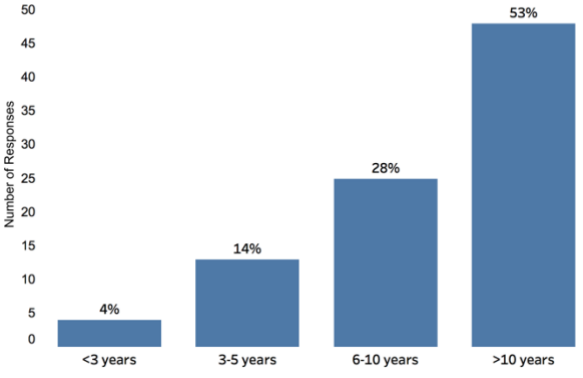


Figure A3.7: Program duration

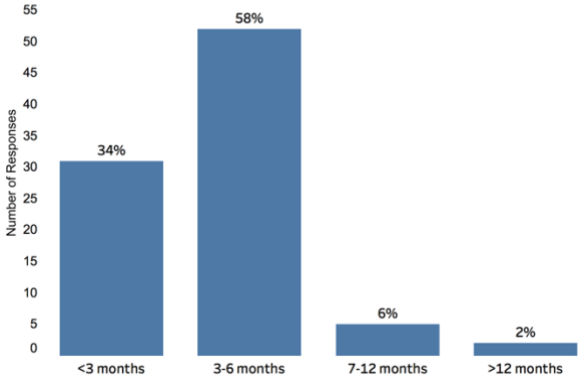
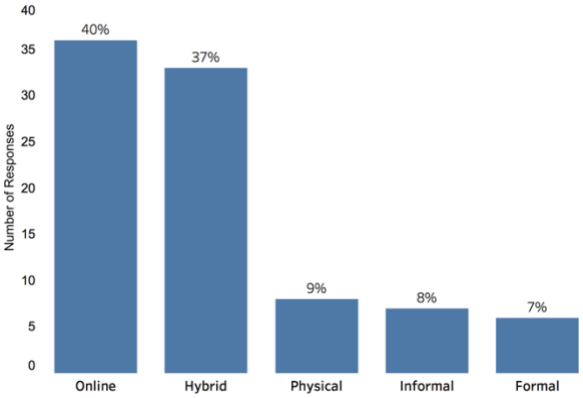


Figure A3.8: SAP format



Conclusions

1. Overall Conclusions

In the domain of entrepreneurship, all stakeholders aspire for firm growth. How to achieve that growth with limited resources has always been the key question, especially within Economics. Several studies have brought forth many interesting ideas by investigating the impact of different variables at the individual level (e.g., age, human capital, etc.), firm level (e.g., legal form, financial resources, etc.) and ecosystem level (e.g., political, economic, etc.) on firm growth. In spite of the significant amount of work that exists to enrich our understanding of the variables that influence firm growth, several shortcomings remain. The studies included in this thesis attempt to address these gaps. We take a unique approach to understanding variables that can influence firm growth by narrowing our focus on human capital for entrepreneurship (i.e., knowledge, skills, and abilities for entrepreneurship) and how it is acquired.

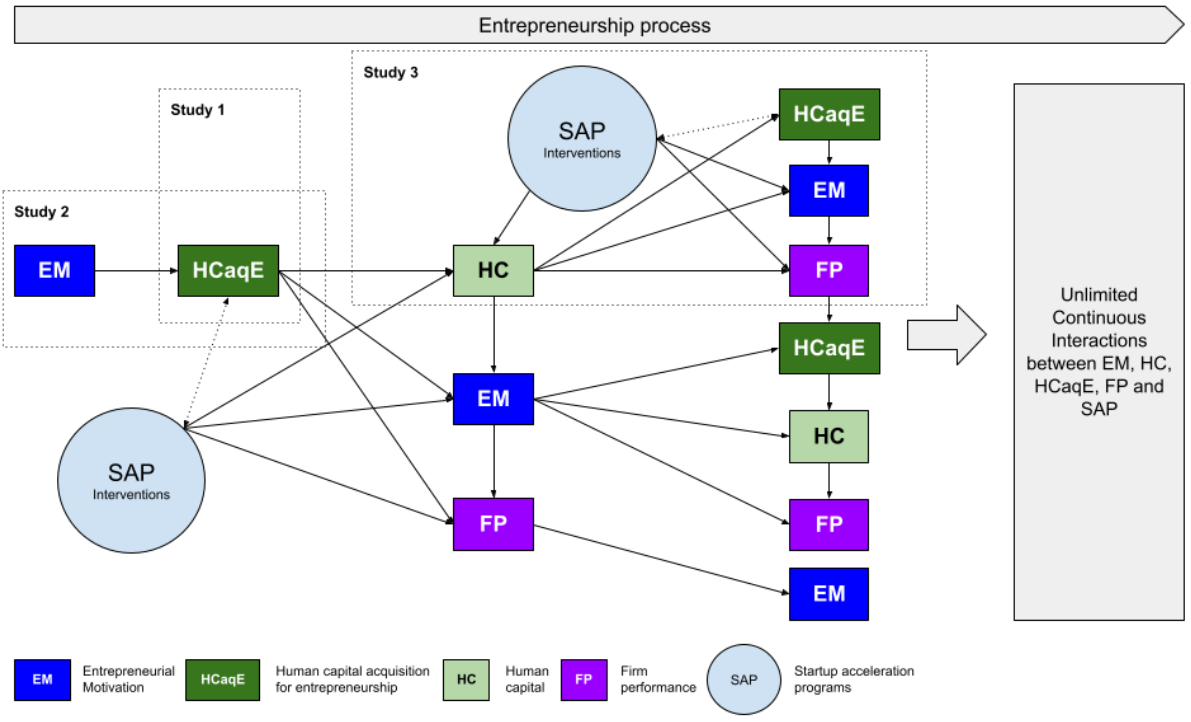
In the first study (Article 1), we realised that there were gaps in how human capital was conceptualised in the human capital entrepreneurship literature (HCEL). Through extensive literature review, we observed that current conceptualisations of human capital acquisition for entrepreneurship (HCaqE) might be limiting our understanding on how firm growth can be impacted. Our study thus set out to review and synthetize existing literature on the subject. We conclude that human capital acquisition consists of various components that have been studied in separate terms, which might have implications on firm growth. Our results show that the human capital acquisition for entrepreneurship should be viewed holistically. We develop a theoretical framework for HCaqE, which suggests that, when acquiring knowledge, skills, and abilities, entrepreneurs make decisions on: (i) what human capital they choose to acquire; (ii) where they want to acquire such human capital; (iii) how they want to acquire the human capital; and (iv) when they want to acquire human capital. Based on this theory, we develop a new definition of HCaqE: *"a set of choices and processes that entrepreneurs have to take and go through, at a certain period and circumstance, that lead to the assimilation of entrepreneurial knowledge, skills, and abilities relevant to that period or circumstance"* (Dosumu et al., 2022). In addition to re-conceptualising human capital acquisition for entrepreneurship, our first study goes on to theorise the relationship between entrepreneurial motivation (EM) and HCaqE. We identified that entrepreneurial motivation has not received adequate attention in the HCEL and aimed to emphasise its relevance in the entrepreneurship process. We propose the use of a multidimensional view of EM, as it provides more information on the drivers of human capital acquisition for entrepreneurship and firm growth. In conclusion,

our first study answered the broad question of “how is human capital for entrepreneurship acquired?” (Figure 1).

In the second study (Article 2), we build on the work done in the first study, and set out to answer the question: why do entrepreneurs acquire human capital for entrepreneurship? In this second study, we take an empirical approach to answer this question by relying on secondary data obtained from the Global Accelerator Learning Initiative (GALI). In order to add value to current literature, our analysis was also conducted at the firm level. This was a critical part of the study, as previous studies in the HCEL have been centred on the individual entrepreneurs. Our goal was to use empirical evidence to test the theory proposed in the first chapter. We therefore relied on the holistic multidimensional view of HCaqE and the multidimensional view of EM and examined their relationship. We also explored the impact of other variables on the HCaqE. Using logit and ordered logit models, we arrived at the conclusion that entrepreneurial motivation in general impacts HCaqE. Our results showed that different dimensions of entrepreneurial motivation impacted different components of HCaqE. The dimension of EM that had the most impact on HCaqE was the "the need for independence and autonomy". Our results also showed that internal firm factors, such as legal status, innovativeness, defensibility, firm size, age of founders, number of founders, educational background of founders, managerial background of founders, company age, and managerial experience of founders influenced the company's decision on human capital acquisition for entrepreneurship. Similarly, our results showed that external firm factors such as company sector and location also influenced the company's decision on HCaqE. Moreover, as a result of this study, we provide validation for the use of the multidimensional view of EM and the holistic multidimensional view of HCaqE in economic literature. We therefore validate their importance in the entrepreneurship process (Figure 1).

In our final study (Article 3), we investigate interventions that can influence entrepreneurial motivation, human capital, and firm performance at the firm level (Figure 1). We identify startup acceleration programs (SAPs) as an understudied phenomenon, and thus focus our efforts on assessing its impact on our variables of interest. We set out to answer the question: does startup acceleration really matter? Our variables of interests included human capital, entrepreneurial motivation, and firm performance. We also took an empirical approach in answering this question by relying on primary data obtained through a structured survey and detailed interviews. We were able to collect information from 90 startups through our survey, and 5 startups through our structured interviews. The study used descriptive analysis to explain the impact of SAPs on our variables of interests. Our results showed that SAPs had an impact on all dimensions of entrepreneurial motivation. Similarly, the evidence obtained also showed that SAPs had an impact on human capital and firm performance.

Figure 1: Dynamic interactions of different variables along the entrepreneurship process



Source: Authors elaboration

Based on our analysis, we are able to put forth recommendations on how to design the "perfect" startup acceleration program that can influence firms in different areas of the entrepreneurship process (i.e., human capital, entrepreneurial motivation, and firm performance). Our third paper also provides validation for the holistic multidimensional view of HCaqE, as we assume SAPs can simulate the components of the HCaqE.

From these three studies, we see that human capital acquisition for entrepreneurship, human capital, entrepreneurial motivation, and firm performance interact with each other dynamically and in a continuous way (Figure 1). This dynamism is so unique that it is challenging to assess the starting point of the interactions between these variables (Figure 1). Figure 1 illustrates that our studies are only a snapshot of the dynamic interactions that occur along the entrepreneurship process. Pragmatically, this web of interactions is even more complex.

2. Theoretical implications

The collection of studies in this body of work contribute to the existing human capital and entrepreneurship literature in the following ways. Study one increases the contribution of economic theory into the human capital entrepreneurship literature. This study focuses on the acquisition of human capital in the context of entrepreneurship. In doing so, we have created

a theoretical framework for human capital acquisition that can also be relevant in the broader economics domain. The holistic multidimensional view of human capital acquisition provides researchers with a more pragmatic view of how individuals and firms acquire human capital for a specific purpose. Moreover, our theoretical framework enables researchers to design interventions that can holistically affect decisions relating to the acquisition of human capital as it enables them to see the "big picture". The first study also emphasises the importance of acquisition of human capital in the entrepreneurship process. As a result, researchers can normalise (i.e., transform) our framework and include variables that explicitly capture "the choice and process of acquiring KSA" in their models. For example, researchers can develop a score on a scale that reflects all the components of human capital acquisition for entrepreneurship. This score can then be included as a variable in a model. This way they can evaluate its impact on variables of interest in relation to other known independent variables.

Our second study contributes to the literature by also emphasising the importance of entrepreneurial motivation in the entrepreneurship process. Our study expands the literature on the drivers of human capital acquisition for entrepreneurship within Economics by evaluating the impact of non-financial motivations on the acquisition of human capital. We thus provide evidence that entrepreneurs are not only motivated by economic terms but also by other factors, and that these should be considered in future research. In addition, our study provides empirical evidence to support the multidimensional view of entrepreneurial motivation. We show that entrepreneurial motivation, especially firm level motivation, can be measured objectively and captured using different elements within the firm. We have therefore set a precedent for how future researchers can capture firm level entrepreneurial motivation in practical ways. Seeing there was dearth in research of drivers of HCaqE at the firm level, this study also contributes to the literature by closing this gap. Future researchers can also transform the dimensions of EM into scores that can be used as variables in models to understand their impact on an outcome (e.g., firm growth) relative to other independent variables. In summary, studies 1 and 2 show that entrepreneurial motivation and human capital acquisition for entrepreneurship are critical variables in the entrepreneurship process and should therefore be used more frequently in HCEL.

Finally, study 3 shows that interventions, such as Startup Acceleration Programs, are effective in generating desired outcomes such as entrepreneurial motivation, firm performance, and human capital. We extend the SAP literature by evaluating its impact on entrepreneurial motivation. Consequently, we have gone beyond the primary focus of firm performance as a primary output for startup acceleration to other ways policy makers, accelerator managers, and startups can think about the impact of SAPs. Similarly, we elaborate on the definition of firm performance as it relates to younger startups, as traditional performance measures (e.g., financial measures) may not be relevant to them. For example, we emphasise the importance

of considering qualitative measures of firm performance, which may be useful for young startups. Finally, we create a framework wherein future researchers can design and evaluate the impact of interventions, such as startup acceleration programs, on a variety of outcomes. We have also set the foundation for future researchers to study our framework for SAPs in different contexts, such as location and industry. Results from future studies will show how relevant stakeholders can create interventions that are specific to their context.

3. Practical implications

There is a variety of practical implications from the collection of studies in this body of work. One of the areas in which our study has relevance is in the domain of venture capital finance. It is often a challenge to evaluate startups that are in their early stages (especially pre-seed and seed stage startups), because they do not have a lot of historical information for VC investors to evaluate. Therefore, VC investors often focus on the team and evaluate their human capital with the assumption that it will have an impact on firm performance. Even though many VCs have made right judgments based on the human capital, they have also gotten it very wrong because they are unable to judge the motivations of these entrepreneurs. In addition, VCs have always judged human capital based on the information they have about the current environment (e.g., economic and political climate), neglecting the potential impact of unforeseen changes. Hence, by elaborating on the importance of entrepreneurial motivation, and exploring the impact of the different dimensions of EM, we are providing VC investors with additional tools for evaluating the teams behind each startup. We are bringing objectivity to an area of investment decisions that has previously been evaluated through "gut" feeling. We believe that, by bringing objectivity to entrepreneurial motivation, investors can have more information about the team they want to invest in, and thus have more confidence in their investment. As the study of entrepreneurial motivation evolves such that motivation profiles can be created for teams in an industry or in a firm role, then VC investors can have benchmarks of profiles to which they can base part of their investment decisions. Similarly, by elaborating on a framework for acquisition of human capital, we are providing VCs with additional tools that go beyond the static view of human capital. If VC investors can focus on "how" teams can acquire knowledge, skills, and abilities rather than purely on the KSAs they currently possess (i.e., "what"), they will be able to identify teams that are able to adapt to new circumstances. Our study has expanded our general understanding of EM and HCaqE not only at the individual level but also at the firm level. Hence, VC investors can evaluate teams in different dimensions. In summary, our study shows that there is more to entrepreneurs than the traditional drivers for success, such as university degree, or previous professional experience. These new drivers of success should be seriously taken into consideration.

Furthermore, by emphasising the importance of EM and HCaqE, we are limiting the level of bias in workplace recruitment and also in venture capital investment. We are providing human resource professionals and investors tools to go beyond the traditional ways of assessing candidates (e.g., using number of years of experience or what university candidates went to). The current metrics allow for discrimination and biases regarding gender, ethnicity and economics. For example, some candidates may not have access to certain job opportunities because they didn't go to a particular type of university, which they couldn't afford because of their economic background. However, by taking into consideration other metrics, such as EM or HCaqE, recruiters or investors can make assessments on candidates that are less biased or prone to discrimination. Our results have shown that motivation can drive people to acquire the KSA they need to perform. We thus argue that, if candidates do not currently possess the KSA that recruiters are looking for, their level of motivation can drive them to acquire the necessary KSAs needed for them to perform. We also argue that the right motivation can increase the impact of the human capital already possessed by the individual. Therefore, recruiting and investing in the rightly motivated people may be as important as hiring or investing in people who already have the knowledge, skills and abilities in demand.

Finally, our study has also implications for accelerator managers or policy makers looking to develop interventions that can influence firm performance or growth. Due to the framework, we have developed, accelerator managers have a guide to set up acceleration programs that can "truly" impact their target group. By implementing programs that meet the needs of entrepreneurs, we envisage a more efficient process of generating impact. Furthermore, our framework does not only take into consideration impact on hard metrics such as firm performance but also provides guidance on how other variables such as entrepreneurial motivation and human capital can be influenced. Hence, accelerator managers and policymakers have a tool they can use to impact entrepreneurship holistically.