

**THE RELATION BETWEEN EDUCATION, PERCEPTUAL VARIABLES AND THE CHOICE  
FOR ENTREPRENEURSHIP**

BACHELOR THESIS

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This thesis examines the relationship between education, perceptual variables and the choice for entrepreneurship. Previous studies have mainly focused on the connection between education and entrepreneurship, but little research has been undertaken on how perceptions influence the entrepreneurial dimension. In the hope of reducing this gap in the academic literature, the central goal of this thesis is to examine how perceptions mediate the relation between education and the choice to be self-employed. For this, cross-sectional data from the 2013 Global Entrepreneurship Monitor is used. The results show that the level of education and specific perceptual variables are significantly associated with the likelihood of becoming an entrepreneur. However, perceptual variables only partially mediate the relation between education and the choice to pursue the path of self-employment.

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## **1. INTRODUCTION**

Entrepreneurship plays a crucial role in economic progress, prompting the shift from a management economy towards an entrepreneurial economy. Understanding entrepreneurial involvement and what determines it is essential when one wants to obtain a complete portrait of a model entrepreneur and to design public policies that promote and support the creation of innovative and high-performing companies (Verheul et al., 2010). To create programs that positively affect the factors which trigger entrepreneurial impulses, contenders that have an impact on the formation process of entrepreneurs need to be researched (Global Entrepreneurship Monitor, 2013). This is possible by asking whether the method by which this happens has been perfectly understood and whether entrepreneurial involvement is still a mystery worth exploring further.

Among the usual suspects that have been proposed as determinants of entrepreneurial engagement is education, often seen as a proxy for human capital (Unger et al., 2011). The assumption that education can play a vital role in furthering and triggering the entrepreneurial orientations of individuals because it makes them more aware of particular skills, abilities and motivations that are highly-valued when entrepreneurs wish to enter the uncertain start-up market, underlies much of the research. Moreover, education is an important instrument for stimulating entrepreneurship: provides individuals with a sense of autonomy and self-confidence, expands people's horizons by making them more aware of business opportunities and encourages the appearance of celebrated business owners that develop innovative products, markets or production processes (Do Paço et al., 2015).

Despite this optimistic perspective, high levels of human capital in the form of education are not easy to acquire, since entrepreneurs need to invest considerable monetary and time resources to gain adequate theoretical and practical knowledge (Bates, 1990). In some business environments, entrepreneurs need only specific information to increase the chances of business survival. However, in other contexts, they might need diverse educational experiences to influence wealth creation (Dutta et al., 2011). Moreover, education can have a negative impact on the choice to pursue self-employment due to at least two possible explanations. For one, highly-educated individuals can be reluctant to switch to self-employment since they may get higher returns from their schooling in their capacity as wage workers (Li et al., 2016). In addition, they might discover during their learning process that they do not possess the necessary aptitudes (e.g. courage to face profound uncertainty) to be part of the entrepreneurial landscape (von Graevenitz et al., 2010).

Therefore, when comparing the perspectives and investigations of these opposing sides, researchers can infer that the recipe for designing efficient entrepreneurial education is still unclear, whether we

look at it from a general dimension like college or a specialised one such as training. Even though many researchers view education as an instrument that helps citizens enter and navigate the entrepreneurial market (Grilo & Thurik, 2008), there are still sceptics who argue that it is impossible to teach people how to become entrepreneurs and that the answer to this problem lies in understanding how genetic (Nicolaou et al., 2008), social (Baron & Markman, 2003; Santos Correia et al., 2013) or demographic (Fischer et al., 1993) factors affect the formation process.

Although there is an extensive body of research concerning the link between human capital and entrepreneurial involvement, few papers have incorporated perceptual variables in their economic models. Entrepreneurial engagement is a socially and culturally embedded phenomenon (Do Paço et al., 2015) that subjective and biased perceptions can influence (Arenius & Minniti, 2005), so further study into this topic is imperative. Thus, apart from exploring the role of demographic or social factors, researchers also need to understand how differences in perceptions can motivate a person's decision to open a business. Also, the impact of education on the choice to become an entrepreneur still represents a relevant research theme, since this factor can shape perceptions and change through public initiatives such as policy intervention or private ones involving self-development.

Due to the theoretical (for economics of entrepreneurship) and practical (for policy-making) importance of these research topics, this thesis shall look at how education and perceptual (e.g. fear of failure, knowing other entrepreneurs, confidence in one's skills and knowledge, alertness to opportunities) variables influence the potential to engage in entrepreneurship. The data used in this paper comes from the 2013 Global Entrepreneurship Monitor, the world's leading study and data collector in the field of entrepreneurship. Following the research of Arenius and Minniti (2005), I will employ binomial logistic regression models that incorporate both objective (e.g. gender) and subjective variables. However, I shall provide a new contribution by using the Sobel test to see how perceptions act as mediators. It can happen that even if individuals are highly educated or present other elements of the "entrepreneurial make-up" (Arenius & Minniti, 2005), they might still not pursue entrepreneurship as a career due to the influence of particular perceptions.

Accordingly, the research question of this thesis is: **How do perceptions mediate the link between education and the choice of an individual to become an entrepreneur?**

The structure of this bachelor thesis is the following: Section 2 outlines the main insights from previous academic literature; Section 3 explains the data and describes how it was collected; Section 4 details the statistical techniques used to test the hypotheses and gives the results of the regression models; Section 5 contains a discussion of the findings along with the limitations of this research.

## **2. LITERATURE REVIEW**

The impact of human capital, education as a proxy for human capital and perceptions on the choice of becoming an entrepreneur have been important topics of investigation for many researchers. In the following sections, the main conclusions and implications of this body of research will be outlined in order to develop hypotheses about their relationships.

### **2.1. Human Capital: Origins and Connections to Entrepreneurial Involvement**

This subsection will look at the beginnings of Human Capital Theory. There is an often-postulated assumption that human capital significantly influences (either positively or negatively) entrepreneurial intentions (Koellinger et al., 2007). By combining this notion with the entrepreneurial dimension, human capital becomes a factor that makes entrepreneurship a viable career option from both the selection and the success standpoints. For example, from the selection standpoint, some individuals choose self-employment because they can use their human capital in the form of knowledge, time, and talent more efficiently than they can as wage earners. From the success standpoint, some individuals prefer self-employment because they can get higher financial returns for their education.

Human capital, originally defined as the skills and knowledge that a person acquires through investment in schooling, on-the-job-training and other types of experiences, has been viewed as a factor that influenced the development of income differences between workers (Becker, 1964). By postulating that people who possess higher levels of education can enhance their wages, Becker advanced the notions that human skills can be created and that people desire to receive compensation for the effort they expend in accumulating human capital. Individuals are constantly involved in a process of weighting future gains (e.g. higher salaries) against present sacrifices (e.g. attending college or participating in a specialised traineeship) when they consider actions that could lead to increases in this type of capital (Becker, 1964). Thus, Becker argued that the opportunity cost of investing in human capital is highly relevant for analysing a wide range of economic phenomena.

*I would venture the judgment that human capital is going to be an important part of the thinking about development, income distribution, labour turnover, and many other problems for a long time to come.*

*(Gary Becker, 1964)*

In 1978, Robert Lucas's model inspected the link between human capital and entrepreneurial success. By assuming that people are rational economic agents and make decisions that provide them with the greatest benefits, Lucas introduced a framework where agents were heterogeneous with respect to their abilities. Specifically, he argued that entrepreneurs differ from and among themselves in terms of their innate "entrepreneurial ability" and more educated individuals have a

greater propensity to possess such talent. Furthermore, more talented individuals have a higher demand for labour and capital and can manage larger firms. Hence, they can reap greater returns from their investment in human capital since the larger scale of their enterprises enables them to produce more and gain generous profits. Even if Lucas's contributions to the economics of entrepreneurship cannot be denied, his model did receive criticism for neglecting the speed of technological change, taking entrepreneurial ability as fixed and exogenous even though entrepreneurs learn over time and failing to define entrepreneurial ability in a clear manner (Parker, 2009).

Despite Lucas' efforts in providing a coherent model, there were still concerns surrounding the connection between education and self-employment. To begin with, critics wondered whether the traditional theme of the greatly fortunate entrepreneur who did not finish his whole education but still managed to establish a large company through his hard work and cunningness implied that entrepreneurs were more educated than the general public. Secondly, related to the macroeconomic dimension, researchers wondered whether higher levels of human capital bring certain gains regarding job creation and business development. In other words, they asked if highly-educated individuals are more likely to establish and operate their own business than individuals with lower levels of educational attainment. Finally, researchers inquired whether higher levels of human capital help an entrepreneur to succeed in the market, i.e. at the microeconomic level. In 1994, the results showed that higher levels of education improved both the probability of pursuing self-employment and the success of individuals in the sector (measured by earnings). Business establishment was not just an option for those who could not find employment or attain more skills, but a desired career choice for the segment of the population that possessed higher levels of human capital. Thus, the implication was that individuals should carefully plan the specifics of their professional development and aim to gain experience and knowledge through more training and schooling (Robinson & Sexton, 1994). Moreover, business owners' level of human capital played an important role when looking at the amount of loans that commercial banks were willing to extend to small businesses. In general, highly educated individuals had better chances of attracting financial capital, which represents an entry barrier for venture creation. Thus, the probability of business discontinuance decreased sharply when owners had college education (Bates, 1990; Cooper et al., 1994).

On the other hand, even if attainment of more human capital can help in upgrading the economic performance of firms, highly-knowledgeable owners may choose to discontinue their operations. This can be explained by the idea that self-employed people may believe that they can receive substantial compensation for their investments in human capital by yielding to the ever-present temptation of more lucrative wage-working opportunities (Gimeno et al., 1997). Furthermore,

potential entrepreneurs face a hidden risk because they must capitalize on their human capital inputs (e.g. previous experience) quite early in life. Specifically, those who start their entrepreneurial profession at a younger age are capable of anticipating their future challenges and pursuits better than those who start later, resulting in them having longer and more successful careers (Ronstadt, 1986).

These days, the above findings still retain their truth, since researchers continue to view human capital as input that is not easily acquired, but is crucial for decreasing the difficulty of various obstacles that people encounter when deciding to pursue the path of self-employment. There are numerous advantages that the accumulation of human capital brings in the context of opening and managing a business and particular advancements have been made with regards to understanding them. In the following subsection, the (often) beneficial relationship between education (as a proxy for human capital) and entrepreneurial intentions shall be studied.

## **2.2. Education (as Proxy for Human Capital) and Entrepreneurial Involvement**

The determinants of entrepreneurial engagement are an important topic of research (Grilo & Thurik, 2008) because they promote the development of efficient policies for stimulating productive entrepreneurship. Among them, education is a particularly interesting one, since it can be constructed and encouraged by public and private institutions such as governments and corporations. Moreover, it does not depend too much on fixed factors, such as genetics or inherent personality traits.

Education is often used as a proxy for human capital (Koellinger et al., 2007) and I will do the same in this thesis. For these reasons, the following subsection presents important insights from relevant studies that have analysed the relationship between education and the creation of particular motivations (e.g. returns, performance, specialization) or knowledge (e.g. general or specific know-how) that lead to the fostering of entrepreneurial involvement.

### **2.2.1 Returns to Education: Entrepreneurs versus Wage-Workers**

To begin with, van Praag et al. (2013) found that the returns to higher education are greater for entrepreneurs than for wage-workers. They argue that this "entrepreneurship returns puzzle" may be solved when considering that self-employed people face fewer organizational constraints, which grants them more personal control over their use of human capital. Entrepreneurs have the luxury of deciding in which activities to participate for their human capital investments to yield the highest returns, while wage-workers are constrained in this issue by employment norms and by the institutions to which they have to report. Moreover, van der Sluis et al. (2008) discovered that the returns to schooling for entrepreneurship are higher in the USA than in Europe, while the returns to education for employees are higher in Europe when compared to the USA. Thus, the relation between



earnings and entry into entrepreneurship should be further investigated, since an individual would be more likely to consider self-employment if he or she believed that it could bring more freedom and also be profitable.

Lately, academic researchers have argued that the heterogeneity of citizens' educational background matters when it comes to having considerable returns to education. Teixeira et al. (2016) found out that the financial benefits acquired from formal education are larger for entrepreneurs than for employees. Nevertheless, they point out that different academic majors have diverse impacts on entrepreneurial intentions. Therefore, since fields of study are relevant predictors of entrepreneurial involvement, policy makers should take this variable into account and avoid assuming that entrepreneurs represent a homogenous group. Regarding this phenomenon, Li et al. (2016) also studied the effects of various fields of study such as Business/Economics, Natural Sciences and Technology/Engineering) on entrepreneurial earnings. They have shown that the returns to fields of study are not different between entrepreneurs and wage-workers. Nevertheless, two classical trends were verified. One trend indicated that graduates with a degree in Business/Economics or Technology/Engineering still earn more than those who completed different specializations, while the other trend found that entrepreneurs still earn less on average than their employed counterparts. In conclusion, even within a particular level of education such as university studies, there can be variation with respect to economic returns and entrepreneurial engagement levels.

### **2.2.2 General Education as a Source of Entrepreneurial Performance**

When looking at entrepreneurial performance, Parker and van Praag (2006) found that the performance of small business ventures was affected by the owner's education, which enhances entrepreneurial performance both directly (e.g. bigger rates of return) and indirectly (e.g. greater ease of acquiring capital). Limited financial capital is an important economic constraint for business owners, so organizations that possess more financial capital have a greater chance of survival in the entrepreneurial market. Hence, having more years of education decreases the risk of failing to attract funds to start a firm. Also, education improves the chances of having a mix of human and financial capital, which leads to sustainable growth in terms of long-term survival and profits for a venture.

In 2008, van der Sluis et al. reviewed the empirical studies that look at the impact of schooling on entrepreneurship selection and performance. They found out that the impact of education on selection into entrepreneurship is insignificant, but its impact on performance is positive and significant. On the other hand, Davidsson and Honig (2003) show that both tacit (work experience) and explicit (years of schooling) human capital increases the probability of individuals to enter into nascent entrepreneurship and to identify attractive business opportunities. Additionally, they argue

that particular types of human capital such as previous work experience and business trainings can make this process move forward, as indicated by how rapidly and systematically nascent entrepreneurial activities are completed. Unfortunately, the effect of human capital on successful venture creation was not statistically significant for this study.

Solomon et al. (2008) also looked at the link between education and entrepreneurial success. These authors found a positive relationship between the studied variables, since training gives students the skills and abilities to recognize venture opportunities and improve their self-efficacy. This positive outcome is also confirmed by Ucbasaran et al. (2008), who argue that self-employed people which report higher levels of human capital will identify and pursue more business opportunities, in a given time period. Still, the conclusions are diverse even on this point, since Asoni and Sanandaji (2016) recently found that college education benefits the self-employed less than the salaried, because it might generate skills that are more useful in standard jobs. Also, Unger et al. (2011) pointed out that the relation between human capital and entrepreneurial success is stronger and more positive for the outcomes of human capital investments (specific knowledge and skills) than for direct human capital investments (schooling and experience).

Interestingly, Baumol et al. (2009) wanted to investigate if the myth of the fortunate and inventive entrepreneur with minimal schooling is still valid. For this reason, they searched for the existence of an educational attainment gap between two types of entrepreneurs, namely the inventors or entrepreneurs engaged in enterprises offering new products, production processes and markets and the replicators or entrepreneurs whose enterprises show lower levels of innovations. These days, even if both categories are better educated thanks to pursuing and finishing graduate levels of education (masters, PhDs), the gap has widened over time: inventors are still better educated than entrepreneurs. Steadily, as technology has grown in complexity and has become more important in business contexts, owners require more extensive educational qualifications to be able to produce highly-sought merchandise and to keep up with the fast pace of the uncertain entrepreneurial market. Nevertheless, when one looks at the life stories of distinguished entrepreneurial figures, the most important factor for surviving in the start-up market is still the ability to quickly sense business opportunities. Consequently, possessing a wide range of abilities or being a "Jack-of-all-Trades" (Lazear, 2005) might be the key to achieving success in a business venture. Thus, it could be argued that providing different kinds of education in order to help individuals to develop in multiple intellectual directions is beneficial for creating successful entrepreneurs. Unfortunately, the findings of this paper result from case study analysis, so arguing that there is a causal link between education and prosperous entrepreneurial careers is not appropriate. Moreover, in the list of famous entrepreneurs and inventors given by Baumol et al. (2009) there are many replicative entrepreneurs

that majored in Engineering or Business/Economics, while the truly innovative ones are mostly specialised in Engineering. Accordingly, one can ask if policy-makers should not predominantly subsidize education into those two fields as opposed to assuring the survival of other university degrees.

Despite these mixed conclusions, highly-educated entrepreneurs may be better able to employ all the skills they acquired through their formal and professional education for the purpose of optimizing the performance of their firms. Their access to high-quality information, advice and strategies might help them to identify obstacles earlier in the start-up process and work consistently to reach their targets.

### **2.2.3 Entrepreneurial Education as a Facilitator of Entrepreneurial Intentions**

Apart from formal education, the impact of professional entrepreneurial education has been investigated as a result of the popular assumption that it is possible to teach people how to become entrepreneurs. Nevertheless, the results concerning this topic are mixed. There are some empirical studies that confirm entrepreneurial education programs have a positive impact on the perceived attractiveness and feasibility of initiating a new venture. Still, other studies say that entrepreneurial education is insignificant when it comes to promoting successful and innovative entrepreneurial intentions. For example, Peterman and Kennedy (2003) found empirical evidence that exposure to enterprise education has a significant positive impact on people's perceptions concerning the desirability and feasibility of establishing a start-up. In addition, providing access to this type of education helps aspiring women entrepreneurs to raise their levels of self-efficacy and develop stronger desires for creating new ventures (Wilson et al., 2007).

On the other hand, entrepreneurial training may not be the key to making more individuals engage in innovative and high-quality entrepreneurship. Oosterbeek et al. (2010) argue that the traditional hypothesis of education as a facilitator for encouraging individuals to become entrepreneurs can be false, since entrepreneurship programs might actually decrease the intention to become an entrepreneur. Moreover, the quality of their pedagogical content is relevant because it determines whether participants acquire necessary skills such as outlining a business plan or attitudes such as self-confidence in order to smoothly transition into the start-up market. Even if entrepreneurial education can teach people particular skills that could make them more successful when deciding to manage a start-up, its most important contribution might be that it allows individuals to better appraise whether they should pursue an entrepreneurial career. Since not all individuals are suited for self-employment, it is better for this segment of the population to avoid spending significant monetary and time reserves on opening a business when they can direct their energies towards more beneficial activities, like excelling in a corporate job. Hence, the value of entrepreneurial education

is to teach people whether entering self-employment is the right move for them and, in the process, help them decrease their waste of monetary and time resources (von Graevenitz et al., 2010).

However, the questions of whether traditional methods of educating people can be improved and whether it is possible to teach human beings to become entrepreneurs remain open. The contradiction in the results obtained from the papers that analyse entrepreneurial education occurs because there are methodological issues in that literature: the studies rarely employ pre-and-post-testing designs, survey participants self-select due to their predisposition towards targeted schooling, the samples are made out of rich individuals and the research is mostly conducted in Western countries. Moreover, the threat of endogeneity lurks in those studies and causal links are difficult to establish (Block et al., 2013). All of these problems can lead to biased results when it comes to estimating the link between education and entrepreneurial intentions. Thus, this factor shall not be included in my empirical models. Instead, it will be discussed in the limitations section.

After outlining the motivators that can lead to consistent entrepreneurial intentions, I believe that education significantly influences their development. Education encourages individuals to view self-employment as a viable career choice, facilitates the accumulation of knowledge and skills that help people to overcome specific entrepreneurial challenges and provides significant gains when one decides to open a business. Thus, the following hypothesis is advanced:

**H1: Higher levels of education (as a proxy for human capital) are positively associated with the likelihood of becoming an entrepreneur.**

### **2.3. The Role of Perceptions for Entrepreneurial Involvement**

The strong emphasis on objective determinants can lead to considerable gaps in the economics of entrepreneurship literature, especially when one wants to find causal links from economic models that aim to find the key to fostering lasting entrepreneurial engagement (Parker, 2005). Consequently, the entry into self-employment can also be researched from a subjective standpoint, since even entrepreneurs are subtly influenced by a number of perceptions. Moreover, by acknowledging that these factors have a significant impact on decision-making patterns (Tversky & Kahneman, 1985), policy-makers can design more efficient programmes for encouraging people to act on their desire to start and manage a business.

This subsection of the paper will first look at the origins of the link between education and perceptions. Afterwards, I will review previous academic research that incorporated the subjective perspective (i.e. perceptual variables) into entrepreneurship models. Lastly, a number of hypotheses will be derived from these valuable insights.

### **2.3.1 The Link between Education and Perceptions**

The theory of planned behaviour (TPB) was among the first to identify education, a proxy for human capital, as having the role of mediator for the development of entrepreneurial intentions. This theory argues that behavioural attitudes, subjective norms and perceived behavioural control determine the formation of strong intentions, which in turn leads to a higher likelihood of engaging in particular behaviours. In other words, when individuals see entrepreneurship as an enjoyable and benefit-bringing activity, have the support of community, friends or family and believe in the ability to control how the desired project shall evolve, they will develop stronger entrepreneurial intentions. This complex chain of events will lead the potential entrepreneur to engage in more productive behaviour, such as designing a coherent business plan, trying to attract angel investors, or taking the necessary steps to legally register the start-up. Moreover, more people would pursue the path of self-employment if they could see that this career path is both feasible for themselves (e.g. possibility to apply their business idea into the market, few entry barriers) and valued by society (e.g. social status, encouragement of entrepreneurial initiatives, support from social networks). Applied to the theme of education and entrepreneurial involvement, researchers argue that education is a crucial variable which can ensure that the above narrative transforms into reality. Thus, education can lead not only to the creation of positive perceptions of entrepreneurship, but also to the outlining of important roles that entrepreneurs have for economic growth. Furthermore, it can encourage individuals to act on their want to be self-employed and promote the accumulation of accurate and complete knowledge regarding the entrepreneurial environment (Liñán et al., 2011).

On the other hand, as previously mentioned, the assumption that education necessarily enhances entrepreneurial intentions is not always true, for they might decrease when a person has more education and training (Oosterbeek et al., 2010). Moreover, it has not been proven that education can counteract the cultural and social aspects associated with gender. Males, when compared to females, have a greater propensity for establishing businesses and view entrepreneurship as a more desirable career. This gender gap in self-employment represents a significant problem for policy makers, who argue that the influence of subjective factors such as males having more confidence overcomes the benefits of entrepreneurial education (Do Paço et al., 2015).

Due to these clashing perspectives, this thesis will investigate how perceptions mediate the influence that education has on one's choice to become an entrepreneur. Education has the potential to influence the perceptions about entrepreneurship by portraying entrepreneurial careers as flexible and lucrative and giving people relevant knowledge and skills. However, inherent subjective perceptions, i.e. as mediating factors, can also influence the way education impacts the formation of entrepreneurial intentions.

### **2.3.2 The Use of Perceptual Variables in Entrepreneurship Models**

Despite the growing interest in finding ways to improve the perceptions regarding entrepreneurship, subjective measures are not always incorporated into economic models. In 1997, Busenitz and Barney took into account the behavioural dimension by postulating that, in large organizations, entrepreneurs have their own set of biases and heuristics when compared to managers, for they exhibit greater overconfidence, i.e. overestimating the probability of being right, and representativeness, i.e. the tendency to overgeneralize from a few observations. The authors argued that these factors might explain why entrepreneurial individuals, when compared to their management-oriented colleagues, are more successful in taking advantage of windows of opportunity and overcoming multiple hurdles (e.g. persuading employees to be enthusiastic about an idea), but fail to exercise an appropriate level of caution in the long-run. Koellinger et al. (2007) argued that individuals evaluate their business prospects in a subjective manner by relying overwhelmingly on perceptions rather than objective facts, which leads them to overestimate their chances of success in the start-up market. This overconfidence leads many businesses to fail, which can explain why the survival rate in the start-up market is lower than in other economic environments. Recently, Crecente-Romero et al. (2016) have shown that perceptions about entrepreneurship differ across countries and are contingent on the cultural and economic scenario of a nation.

However, Arenius and Minniti (2005) attempted to overcome considerable gaps in the research on entrepreneurship by including four perceptual variables into their forecasts, all of which were found to be highly correlated with new venture creation across all countries in their sample. Moreover, education was found to have a positive and significant influence on the intention to start a firm. Apart from demo-economic factors (e.g. age, gender, education, work situation), variables like alertness to unexploited opportunities, confidence in one's skills and abilities, fear of failure and the presence of role models are all relevant for the probability of being a nascent entrepreneur.

Firstly, opportunity perception- a fundamental trait of entrepreneurial behaviour- is positively and significantly related to being a nascent entrepreneur. This result was also confirmed by previous researchers, who argued that the ability to identify opportunities represents a unique entrepreneurial behaviour that needs to be understood in order to grasp the complexities of how successful entrepreneurs are formed (Gaglio & Katz, 2001).

Secondly, confidence in one's skills and abilities also has a positive and significant effect on entrepreneurial choice, since the entrepreneur's belief that he or she has the necessary skills for managing a start-up is crucial for acting on entrepreneurial intentions. This result was also confirmed

later on by Koellinger et al. (2007), who argued that this variable increases an individual's propensity to engage in venture creation, even if not all businesses survive.

Thirdly, knowing other entrepreneurs improves the chances of becoming a nascent entrepreneur thanks to role models that can provide advice to the potential entrants and due to membership in entrepreneurial networks that may reduce the ambiguity of the whole process of venture creation. Greve and Salaff (2003) argued that networks make a difference when starting a firm and that entrepreneurs use their social relations intensively.

Finally, fear of failure has a negative and significant impact on becoming an entrepreneur, since it increases the perceived risk attached to starting a business. This confirms the view that individuals with lower risk aversion are more likely to become nascent entrepreneurs (Caliendo et al., 2009).

In the end, Arenius and Minniti (2005) concluded that the best economic models for studying the determinants of entrepreneurial involvement are the ones that include both objective variables such as age, gender, education, household income and work status and subjective variables such as the four perceptual variables described above. Nevertheless, these perceptual variables are likely to be biased (e.g. self-reports are faulty, measurement problems), so the causal link between them and entrepreneurial engagement is still difficult to pinpoint. Therefore, this bachelor thesis aims to uncover the mystery behind this phenomenon and to find out what role does education play into this network of highly related effects. Therefore, I aim to find evidence for the following hypotheses:

**H2a: Alertness to opportunities is positively associated with the likelihood of an individual to become an entrepreneur.**

**H2b: Having confidence in one's skills, knowledge and abilities needed for starting a business is positively associated with the likelihood of an individual to become an entrepreneur.**

**H2c: Knowing other entrepreneurs is positively associated with the likelihood of an individual to become an entrepreneur.**

**H2d: Fear of failure is negatively associated with the likelihood of an individual to become an entrepreneur.**

Finally, by using the reasoning of the theories mentioned in subsection 2.3.1, I aim to see if perceptions mediate the effect of education on the choice to become an entrepreneur. Subjective factors might strengthen or diminishing the role that education plays in creating entrepreneurial intentions since their influence can be powerful. For example, fear of failure might prompt people to avoid self-employment even if they are highly-educated. Therefore, I will analyse the following hypothesis:

**H3: The relationship between education and choosing to be self-employed is mediated by perceptual variables.**

### **3. DATA & METHODOLOGY**

In this section, the data collection shall be explained and the variables used in my regression models will be described. In addition, the binomial regression models and the use of the Sobel test shall be further explained.

#### **3.1. Data collection**

In this subsection, information about the Global Entrepreneurship Monitor and about the data collection will be given. The data for this study was obtained from the Global Entrepreneurship Monitor (GEM), one of the largest and most relevant surveys in the field of entrepreneurship (Global Entrepreneurship Monitor, 2013). The main object of this survey is to analyse the propensity of working individuals from different countries to participate in entrepreneurial actions and to explore the conditions that determine enhanced levels of entrepreneurial engagement. GEM provides measures about the attitudes, activities and characteristics of citizens who take part in diverse phases and projects related to the entrepreneurial domain. Each economy that participates in the GEM research initiative selects a random representative sample of at least 2,000 adults and administers a standardized questionnaire designed by the GEM consortium. In 2013, more than 197,000 individuals from across 70 economies were surveyed; this sample embodies 75% of the world's population (Global Entrepreneurship Monitor, 2013). GEM data can be trusted with respect to its reliability and validity since the organization employs a trustworthy method of data collection and interviews a large and diverse number of participants. Unfortunately, due to missing data at the individual-level and unusual values, only 102, 431 observations were included in my final sample.

#### **3.2. Variables Description**

In this subsection, descriptions of the demographic and perceptual variables that are incorporated into the binomial logistic models are given. In the regression analysis, the demographic factors (e.g. age) represent control variables. Moreover, some of the variables from the original dataset, such as Education, were transformed in order to fit the conditions required for the binomial logistic regression models and the Sobel tests.

#### **DEPENDENT VARIABLE**

**Occupational status (renamed Self-employment):** The dependent variable is a recoded version of GEMOCCU, a variable from the original dataset which indicated the employment status of participants. The response categories students, homemakers, disabled or retired persons and unemployed individuals were dropped for two reasons. First, removing these responses provided a better focus on the contrast between self-employed and wage-working individuals. Second, it facilitated the creation of the binary dependent variable required for the successful use of the logistic



regression model. Specifically, it is useful to look at the self-employed group, since self-employment is often used as a proxy for entrepreneurship in the field of economics of entrepreneurship (Parker, 2009). Individuals who work for salaries (either full time or part time) were coded as 0, while self-employed people were coded as 1.

## INDEPENDENT VARIABLES

### a) Demographic

**Age:** Participants were asked to provide their age. The analysis was restricted to individuals that were 18 to 65 years old since they are able to legally open their own business and to work full-time and/or part-time.

**Gender:** Respondents were asked to provide their gender by answering the question "What is your gender?" and the reference category was "Female".

**Household\_Income (h1, h2, h3):** Respondents were asked about their household income. The variable GEMHHINC indicates how GEM harmonized the responses into 3 groups, namely the lowest, the middle and the upper third of the income distribution in the country of provenience. To correctly apply the Sobel test and use binomial logistic regressions, dummy variables were created for the three categories: h1, h2 and h3. The lowest-income group, i.e. h1, was used as a reference category.

**Education:** The participants were asked to provide the highest level of education that they had attained. The responses were harmonized into a five-category variable, which is named GEMEDUC. The original categories were collapsed into two: Low education ("None", "Some secondary", "Secondary degree") and High education ("Post-secondary", "Graduate experience"). I used "Low education" as a reference category. This response category was selected because the models will test whether individuals with higher levels of schooling are more or less likely to be engaged in entrepreneurial activities when compared to individuals with minimal levels of schooling. This methodological choice was especially important for testing hypothesis H1.

### b) Perceptual variables

**Opportunity\_perception:** Participants had to indicate whether they perceive the business environment as not lacking in opportunities, i.e. "In the next six months, will there be good opportunities for starting a business?" (yes=1/no=0). The inclusion of this variable was vital for testing hypothesis H2a.

**Confidence\_own\_skills:** Participants' self-efficacy was measured using the question "Do you have the knowledge, skill and experience required to start a new business?" (yes=1/no=0). The inclusion of this variable was crucial for testing hypothesis H2b.

**Knowing\_other\_entrepreneurs:** Respondents were asked whether they personally knew other individuals who had recently (in the past 2 years) started a business (yes=1/no=0). The inclusion of this variable helped with the testing of hypothesis H2c.

**Fear\_failure:** Respondents were asked if their fear of failure would prevent them from starting a business (yes=1/no=0). The inclusion of this variable facilitated the testing of hypothesis H2d.

### **3.3. Regression Models Description**

The dependent variable used in the current study was a binary variable, prompting me to employ binomial logistic regression models in order to answer the hypotheses. This type of regression is used to predict the probability of an event happening; in this case, the event is whether an individual chooses to be self-employed, i.e. pursue the path of entrepreneurship. The goodness of fit (how well they fit the observations) of the models is assessed based on the interpretation of the pseudo  $R^2$ .

In Model 1, the demographic variables that were controlled for included Age, Gender, h2, h3 and Education. This model explored the connection between the traditional demographic characteristics and the likelihood of choosing to be an entrepreneur. In Model 2, the same demographic control variables were included and specific perceptual variables were also incorporated: Opportunity\_perception, Confidence\_own\_skills, Knowing\_other\_entrepreneurs and Fear\_failure. This model tested the connection between these types, i.e. demographic and perceptual, of variables and the likelihood of someone choosing to be an entrepreneur. The goodness of fit of Model 2 is expected to be higher than the one of Model 1. That is, the predictive power of Model 2, which incorporates all variables, might be superior when compared to Model 1, which accounts only for the traditional variables.

### **3.4. Sobel Test Description**

Hypothesis 3 focuses on the mediating role of perceptual variables in the relationship between education and the choice of being self-employed. Specifically, a variable assumes the role of mediator when it carries the influence of an independent variable (IV: Education) to a dependent variable (DV: Self-employment). In this analysis, the demographic control variables (CV: Age, Gender, h2, h3) were taken into account when performing the Sobel tests.

In general, a mediation occurs when the following conditions hold (Baron & Kenny, 1986): **(1)** the independent variable (IV: Education) is a significant predictor of the mediator (MV: perceptual variable); **(2)** the independent variable (IV: Education) significantly affects the dependent variable (DV: Self-employment) in the absence of the mediator (e.g. MV: perceptual variable) **(3)** the mediator (MV: perceptual variable) is a significant predictor of the dependent variable (DV: Self-employment); **(4)** the coefficient of the independent variable (IV: Education) is reduced after adding the mediator (e.g. MV:

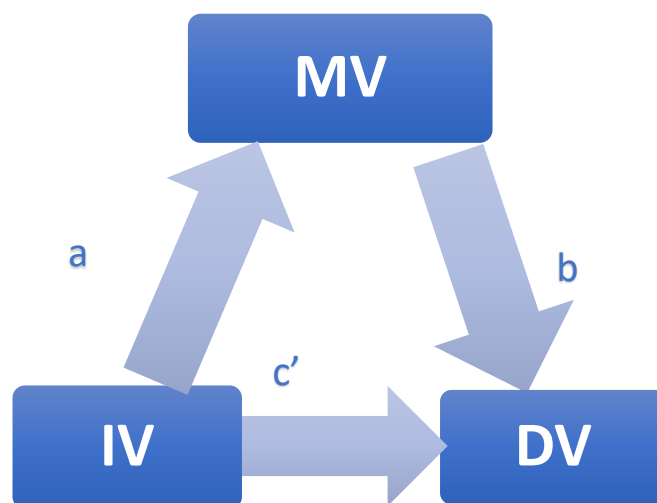
perceptual variable) to the model with "Self-employment" as the dependent variable (DV). In this description, any of the four perceptual variables mentioned in the variables description can be selected as mediator, but the Sobel test can compute only one mediation effect per testing. In the results section of this thesis, there are four Sobel tests and each one indicates the mediation effect of one perceptual variable. In conclusion, the Sobel test (Figure 1) is used to check whether the reduction of the IV's effect, when the MV is included, is observed and significant and whether the mediation effect can be declared statistically significant. This mediation effect, where the independent variable (IV) influences the dependent variable (DV) via the mediator (MV), is called the indirect effect. In other words, it represents the proportion of the total effect between the independent variable and the dependent variable that is mediated by the mediator. If the inclusion of a mediator makes the coefficient of the independent variable (IV: Education) insignificant, full mediation occurs. On the other hand, partial mediation occurs when the coefficient of the independent variable (IV: Education) is reduced but is still significantly different from zero.

**Where:**

a= regression coefficient for the association between IV and MV

b= regression coefficient for the association between MV and DV, where IV is also predictor of DV

c'= regression coefficient for the association between IV and DV



**FIGURE 1: Illustrating the Sobel Test**

In the next section, the participant profile of the current study is described and results of the binomial logistic regression models and of the Sobel tests will be discussed.

## 4. RESULTS

In this section, the results of the statistical analysis will be discussed. Following previous academic literature, expectations about the outcomes can be advanced, but it remains to be seen if this thesis' models yield similar insights. Firstly, a table with descriptive statistics will provide the portrait of the variables used in this thesis. Secondly, the regression results from the two binomial logistic models shall be analysed in order to test Hypothesis 1 and Hypotheses 2a, b, c, d and to maybe reaffirm the intuitions drawn from previous literature. Thirdly, the results of the Sobel test are shown in order to test Hypothesis 3 and to bring forth my contribution to the economics of entrepreneurship domain.

### 4.1. Descriptive Statistics

In this subsection, the descriptive statistics of the variables used in this research are provided.

**TABLE 1: Descriptive Statistics**

Variables	Wage-workers (70,234 observations)		Self-employed (32,197 observations)	
	Mean	S.D.	Mean	S.D.
<b>Demographic</b>				
Age (years)	38.85	11.51	39.94	11.81
Gender (Female=1; Male=0)	0.42	0.49	0.40	0.49
Household_Income:				
h1 (low-income category)	0.28	0.45	0.35	0.48
h2 (middle-income category)	0.35	0.48	0.29	0.45
h3 (upper-income category)	0.37	0.48	0.36	0.48
Education (High=1; Low=0)	0.57	0.50	0.71	0.45
<b>Perceptual</b>				
Opportunity_perception (Yes=1; No=1)	0.40	0.49	0.56	0.50
Confidence_own_skills (Yes=1; No=1)	0.50	0.50	0.79	0.41
Knowing_other_entrepreneurs (Yes=1; No=1)	0.38	0.48	0.57	0.50
Fear_failure (Yes=1; No=1)	0.43	0.50	0.31	0.46

**Note:** S.D. = standard deviation

As mentioned, the final sample of this study is composed of 102, 431 individuals, of which 70, 234 (68.6%) are working for a wage and 32,197 (31.4%) have declared that they are self-employed.

After performing a t-test to check the equality of means ( $p\text{-value} \leq 0.001$ ) and analysing the descriptive statistics, it is found that there was a significant difference in age between the wage-workers and the self-employed. Hence, the idea that "entrepreneurship is a young man's game" might not be applicable in the entrepreneurial environment of 2013.

The current study's sample is composed of 59, 704 males and 42, 727 females. There is not a big difference in means for the variable Gender and the chi-squared test ( $p\text{-value} = 0.069$ ) further confirms this finding. Although the gender breakdown is not large, one cannot infer that approximately equal proportions of females and males choose to be self-employed. This is because there may still be a gender gap in the entrepreneurial market.

Noteworthy, there was a greater number of individuals who reported having a low-level of income that chose to be self-employed. In the middle-income group, more individuals choose to work for a wage and therefore, this group had the lowest proportion of entrepreneurs compared to the other income categories. Furthermore, when participants have a high income and are not constrained by financial barriers, they have the liberty to choose between starting their own business or staying in their salaried position. After performing Chi-square tests, more proof is gathered for these findings since there are significant differences ( $p\text{-value} \leq 0.001$ ) in the means for the low- and middle-income categories, but not for the high-income category ( $p\text{-value}=0.350$ ).

The present study also found that entrepreneurs had higher levels of education compared to wage-workers. This finding is in line with some of the insights gathered in the literature review, but it does not immediately confirm Hypothesis 1. However, it does indicate that there is a higher proportion of more educated entrepreneurs in this sample. Furthermore, the Chi-square test indicated that there is a significant difference ( $p\text{-value} \leq 0.001$ ) in means between the education of self-employed individuals and the one of wage-workers.

Analysis of the perceptual variables suggested that entrepreneurs in the present study exhibited the following characteristics: greater propensity to perceive opportunities, more confidence in their own skills, more connections with other entrepreneurs and lower fear of failure. This is also confirmed by the Chi-square tests, which indicate that there is a significant difference ( $p\text{-value} \leq 0.001$ ) between means for all perceptual variables. All the means for the "optimistic" perceptual variables were higher for entrepreneurs than for wage-workers, while the mean for the "pessimistic" perceptual variable (i.e. Fear\_failure) was lower for the entrepreneurial individuals. This is in line with the findings from previous studies and indicates that those perceptual variables are important for when one chooses to become an entrepreneur. Therefore, even if there is no confirmation yet, these figures provide some support for Hypotheses 2a, b, c and d.

Finally, the correlations between variables (Table 4 in the Appendix) was tested with the Spearman rank correlation. This test was used because all variables are binary or ordinary (except age). Even if most correlations are significant, they are not particularly high. Hence, multicollinearity does not represent a threat for this analysis. However, there were some high correlations, namely those with coefficients above 0.1. For instance, work status was significantly and highly correlated with education and perceptual variables. There were also significant correlations between perceptual variables, indicating that perceptions might be interwoven (e.g. knowing other entrepreneurs can give an individual more confidence in his/her own skills). These results provide some support for the hypotheses of this bachelor thesis.

#### 4.2. Binomial Regressions

In this subsection, the binomial logistic regression models will be discussed.

**TABLE 2: Binomial Logistic regressions results with Self-employment as dependent variable**

	Model 1	Model 2
<b><i>Demographic variables</i></b>		
Age	0.008*** (0.001)	0.015*** (0.001)
Gender	-0.078*** (0.014)	0.070*** (0.015)
h2	-0.312*** (0.017)	-0.370*** (0.018)
h3	-0.021 (0.017)	-0.220*** (0.018)
Education	0.636*** (0.015)	0.672*** (0.016)
<b><i>Perceptual Variables</i></b>		
Opportunity_perception		0.358*** (0.015)
Confidence_own_skills		1.114*** (0.017)
Knowing_other_entrepreneurs		0.559*** (0.015)
Fear_failure		-0.311*** (0.015)
<b><i>Number of observations</i></b>	102,431	102,431
<b><i>R<sup>2</sup></i></b>	<b>0.021</b>	<b>0.107</b>

**Note:** \*\*\*p-value ≤ 0.001, \*\*p-value ≤ 0.01, \*p-value ≤ 0.05 (two-sided). Regression coefficients are displayed with standard errors between parentheses. Standard errors are clustered on an individual level. The pseudo R<sup>2</sup> and the number of observations are displayed per model.

In Model 1, only the objective variables were included since the goal was to see whether the demographic make-up of an individual is important for determining his/her likelihood of establishing a firm. As mentioned, the dependent variable is Self-employment. Almost all the coefficients, with the exception of the one belonging to h3 (p-value= 0.224), were significant.

First, the coefficient of age (i.e. Age) shows a positive relationship with the choice to be self-employed. Thus, older individuals are willing to pursue the path of self-employment.

Second, the coefficient of gender (i.e. Gender) is negative, meaning that females are less likely to choose the path of self-employment. This supports the expectation that males still tend to have a higher predilection for opening and managing their own business, despite the efforts that are made to overcome the gender gap in the entrepreneurial market (Do Paço et al., 2015). Furthermore, Arenius and Minniti (2005) reached the same conclusion with regards to this variable. Thus, gender (especially being female) significantly affects the choice of work status and represents an important demographic factor whose influence is not easy to overcome.

Thirdly, household income was negatively associated with the choice to become an entrepreneur. However, individuals that belonged to the middle-income category were unlikely to choose self-employment compared to the low-income group. This can mean that richer individuals may choose to avoid self-employment because they can receive more lucrative salary or promotion opportunities and higher labour security (Gimeno et al., 1997). Nevertheless, individuals that have accumulated the highest levels of income have more freedom to open their own business due to their lack of financial constraints (Cooper et al., 1994). Unfortunately, in this analysis, the coefficient of the higher-income group (h3) is not significant, which indicates that this statement cannot be proven yet.

Finally, the level of education is a positive and significant predictor of choosing to enter self-employment. It can be said that the entrepreneurs in this sample do have high levels of educational attainment. This finding is in line with Hypothesis 1.

Now, I will proceed with the analysis of the second binomial logistic regression model, which incorporates the perceptual variables. This model included both the objective (i.e. demographic) and subjective (i.e. perceptual) perspectives and was expected to have greater explanatory power than Model 1. Overall, the effects of age, gender, higher income and level of education are highly significant. As for the coefficient of the high-income category, it undoubtedly becomes significant compared to Model 1. The effects of the perceptual variables on the choice to be self-employed are also significant and positive, except when looking at fear of failure which has a negative impact. Moreover, the pseudo  $R^2$  of Model 2 is higher than the pseudo  $R^2$  of Model 1, meaning that it has better statistical fit.

Firstly, the idea that "entrepreneurship is a young man's game" is proven to be incorrect, since the coefficient of age (i.e. Age) had a significant and positive relationship (compared to Model 1) with the choice to be self-employed. Although Ronstadt (1986) suggested that potential entrepreneurs must capitalize on their human capital inputs earlier in their life, it can be argued that starting a business later in life is not a disadvantage in 2013. Hence, it can be argued that the more a person advances in age, he/she is more likely to consider entrepreneurship as a viable career option.

Secondly, the coefficient of gender was positive, which is surprising when one compares it to the coefficient from Model 1. It might be that the perceptual variables have a strong relationship with gender, namely that they have a role in overcoming or strengthening the influence of gender on the choice to pursue entrepreneurship. Despite this finding's striking nature, it can be explained by analysing the correlations between gender and perceptual variables, which are strong and significant (Table 4 in the Appendix). To put it more clearly, opportunity perception (correlation coefficient= -0.032), confidence in skills (correlation coefficient= -0.103) and knowing other entrepreneurs (correlation coefficient= -0.055) are negatively correlated with gender, i.e. being Female, while fear of failure is positively correlated (correlation coefficient=0.076) with gender, i.e. being Female. This may indicate that subjective variables reinforce the influence of gender, a fact that can lead to the widening of the gender gap in the entrepreneurial market. Many policy makers argue that the presence of "proven stereotypes" such as males having more confidence overcomes the benefits of entrepreneurial education, thus rendering irrelevant policies that subsidize initiatives which encourage people to pursue entrepreneurship as a career path (Do Paço et al., 2015).

Thirdly, household income was negatively associated with the choice to become an entrepreneur. The theoretical insights from previous literature that were discussed in Model 1 with regards to this variable can also be applied here. However, in Model 2, the coefficient of the higher-income group (h3) was significant. This signifies that individuals who have accumulated the highest levels of income and have more freedom to open their own business might be more likely to act on this desire (Cooper et al., 1994). However, the coefficient is still negative, which means that this theoretical rationale is not completely applicable to the entrepreneurial market of 2013 and that individuals with very high levels of income tend to avoid self-employment.

Fourthly, the level of education is a positive and significant predictor of choosing to enter self-employment. This finding corresponds to the conclusions of Robinson and Sexton (1994), who found that business establishment was not just an option for those who were in need of a job, but a desired career choice for the segment of the population that possessed higher levels of human capital. Moreover, Arenius and Minniti (2005) also found that education is positively related to the likelihood



of opening a firm, so the results of this analysis match with their conclusions. Hence, highly-educated individuals do not avoid self-employment and this is in line with Hypothesis 1.

Lastly, all perceptual variables were highly significant predictors of choosing to become an entrepreneur. As previously reported by Arenius and Minniti (2005), opportunity perception, confidence in one's skills and knowing other entrepreneurs are positively related to entrepreneurial choice. Opportunity identification is a necessary characteristic when one wants to act successfully on his/her entrepreneurial intentions (Gaglio & Katz, 2001), while knowing other entrepreneurs facilitates the creation of social and knowledge networks that help individuals overcome specific challenges (Greve & Salaff, 2003). Having confidence in personal skills is the factor that is especially associated with the dependent variable; this supports the belief that entrepreneurs possess higher levels of self-confidence, making them more likely to report that they have the necessary skills and knowledge to run a business successfully (Koellinger et al., 2007). However, fear of failure has a negative impact on the choice to become an entrepreneur. Most individuals are risk-averse and understand that starting a business involves a number of uncertainties, so an increased perception of the probability of failure reduces entrepreneurial involvement (Arenius & Minniti, 2005).

In summary, the following conclusions can be drawn. From the coefficients and significance levels of education (Education) that can be found in both binomial regression models, Hypothesis 1 is supported. Model 2 indicates that perceptions have a significant impact on the choice to become an entrepreneur and confirms the expected outcomes which were drawn from previous studies. Therefore, there is strong support for Hypothesis 1 and for Hypotheses 2a, b, c and d.

**H1: Higher levels of education (as a proxy for human capital) are positively associated with the chance of becoming an entrepreneur. Supported!**

**H2a: Alertness to opportunities is positively associated with the likelihood of an individual to become an entrepreneur. Supported!**

**H2b: Having confidence that in one's skills, knowledge and abilities needed for starting a business is positively associated with the likelihood of an individual to become an entrepreneur. Supported!**

**H2c: Knowing other entrepreneurs is positively associated with the likelihood of an individual to become an entrepreneur. Supported!**

**H2d: Fear of failure is negatively associated with likelihood of an individual to become an entrepreneur. Supported!**

### 4.3. Sobel Tests

In this subsection, the results of the Sobel tests will be discussed. The focus is on the effects, that is, how much the perceptual variable mediates the relationship between education (IV) and the choice to be self-employed (DV). In the tests, the demographic variables are included as control variables (CV) in order to account for their presence.

**TABLE 3: Sobel-Goodman Mediation Tests**

Mediations: MV	Sobel Statistic	IE	DE	Proportion of TE that is mediated
Via Opportunity_perception	0.003*** (0.000)	0.003 (0.000)	0.127 (0.003)	2.48%
Via Confidence_own_skills	0.004*** (0.001)	0.004 (0.001)	0.127 (0.003)	2.75%
Via Knowing_other_entrepreneurs	-0.000 (0.001)	-0.000 (0.001)	0.130 (0.003)	-0.6%
Via Fear_failure	0.003*** (0.000)	0.003 (0.000)	0.127 (0.003)	2.37%

Note: \*\*\* $p$ -value $\leq 0.001$ ; IE=Indirect Effect; DE=Direct Effect; TE=Total Effect= IE +DE= 0.130324 (the same value for each mediator). Coefficients are displayed with standard errors between parentheses.

To begin with, when looking at opportunity perception, it can be seen that the total effect – the link between education and the choice of work status (i.e. entrepreneurial choice) – is mediated by only 2.48%. The ratio of the indirect effect over the standard error –Sobel statistic– is 0.003 and statistically significant ( $p$ -value  $\leq 0.001$ ). Furthermore, the coefficient of the independent variable (IV: Education) is reduced but is still significant, so it can be argued that partial mediation occurs. Following these results, there is support for the findings of Gaglio and Katz (2001), who found that alertness to opportunities is a psycho-social trait of entrepreneurial people. Thus, even though the effect is in the anticipated direction and highly significant, opportunity perception plays only a small mediating role.

Secondly, confidence in one's skills seems to be the perceptual variable that is the most powerful mediator. The total effect- the relation between the level of education and the choice to be self-employed- is mediated by 2.75%. The Sobel coefficient reaches a peak at 0.004 and is statistically significant ( $p$ -value  $\leq 0.001$ ). Moreover, the coefficient of the independent variable (IV: Education) is reduced but remains significant so partial mediation occurs in this case. For this reason, it can be inferred that confidence in one's skills, knowledge and abilities still represents a unique character

trait for entrepreneurs (Koellinger et al., 2007). However, its mediating role for the relationship between education and self-employment is still quite small.

Thirdly, knowing other entrepreneurs is the weakest mediator: the proportion of the total effect that is mediated is very low (-0.6%) and the Sobel coefficient (-0.000) is not statistically significant (p-value=0.895). This means that there is no empirical evidence that knowing other entrepreneurs has a significant mediation effect on the relationship between education and the choice to be self-employed.

Finally, when analysing fear of failure, it is shown that the total effect- the relationship between education and the choice to be self-employed- is mediated by only 2.37%. The ratio of the indirect effect over the standard error, i.e. the Sobel statistic, is 0.003 and statistically significant (p-value  $\leq$  0.001). The coefficient of Education is reduced but is still significant, thus indicating that partial mediation does occur. Fear of failure usually makes individuals more aware of the risks associated with entering the entrepreneurial market, thus making them more risk-averse and decreasing their entrepreneurial intentions (Arenius & Minniti, 2005). Nevertheless, their mediating effect is small in this case.

In conclusion, there are significant mediation effects for two "optimistic" subjective variables, i.e. opportunity perception and confidence in own skills, and for the "negative" subjective variable, i.e. fear of failure. The results of the binomial logistic models show that perceptions have a statistically significant impact on the choice to become an entrepreneur. However, the Sobel mediation tests indicate that perceptual variables only partially mediate the relation between education and the choice to pursue the path of self-employment. It may be that perceptions are not the only key towards encouraging people to become entrepreneurs and that education is a powerful determinant by itself. Nevertheless, following the above statistical analysis, it can be concluded that there is partial support for Hypothesis 3.

**H3: The relationship between education and choosing to be self-employed is mediated by perceptual variables. Partially supported!**

## **5. DISCUSSION AND CONCLUSION**

In general, economists and policy-makers are constantly striving to discover the major determinants of enduring entrepreneurial engagement and to develop strategies that foster the development of successful entrepreneurs and innovative businesses (Verheul et al., 2010). Nonetheless, in order to achieve progress in this endeavour, researchers need to carefully analyse the interwoven effects of these determining factors, since each one of them has the potential to either strengthen or weaken the impact of each other. Until now, academic literature has primarily focused on the demographic

(Fischer et al., 1993), social (Baron & Markman, 2003) and genetic (Nicolaou et al., 2008) elements that play significant roles in the entrepreneurial environment. Although this approach contributed towards our understanding of entrepreneurs, another framework for exploring the complexities of entrepreneurial choice has been proposed. Specifically, incorporating perceptual variables into the analysis that investigates why individuals become entrepreneurs can certainly bring valuable insights into how this phenomenon might be shaped by subjective and often-biased perceptions (Arenius & Minniti, 2005).

This bachelor thesis explored the relationship between education, perceptual variables and the choice for entrepreneurship. Accordingly, the research question of this thesis was: **How do perceptions mediate the link between education and the choice of an individual to become an entrepreneur?** With this research objective guiding the investigation, the first step was to question whether higher levels of education, seen as a proxy for human capital, are positively associated with the probability of pursuing entrepreneurship as a career. Afterwards, the line of inquiry proceeded to examine whether particular perceptual variables, which were described in the paper of Arenius and Minniti (2005), were related to the fostering of entrepreneurial engagement. Opportunity perception, confidence in one's own skills and knowing other entrepreneurs were assumed to be positively associated with the chance of becoming an entrepreneur, while fear of failure was thought to be negatively associated with the choice for entrepreneurship. Ultimately, a new contribution to the current body of knowledge on the economics of entrepreneurship was provided; the focus shifted to the capacity of perceptions to mediate the relationship between education and the choice for self-employment. Subjective factors may have an unconscious but substantial indirect effect when education determines someone to act on the desire to become self-employed.

With the goal of testing this over-arching line of reasoning and the hypotheses associated with it, several statistical methods were employed using data from the 2013 Global Entrepreneurship Monitor. First, the variables were analysed using descriptive statistics, Chi-squared tests and a t-test (only for age). Second, binomial logistic models with "Self-employment" for dependent variable were used: the first model considered only the influence of standard demographic factors, while the second model incorporated the relevant perceptual variables and controlled for the presence of demographic variables. Next, Sobel mediation tests were performed in order to test the mediation effect of each perceptual variable on the relationship between education and entrepreneurial choice.

Regarding the main findings of this research, they confirmed that education and perceptual variables have a significant effect on the choice to be self-employed. Furthermore, they provided partial support for the supposition that perceptions have a mediation effect, albeit partial, on the relationship between education and the likelihood of becoming an entrepreneur.

First, education was found to be a positive and significant predictor of the choice to pursue entrepreneurship. This result suggests that education represents a valuable determinant of entrepreneurship; thus, policy-makers should include education in the initiatives that promote the development of an innovative entrepreneurial environment. Of course, highly-educated individuals can remain in a salaried position when they are interested in job security or promotions. Nevertheless, due to the knowledge and skills acquired throughout their educational trajectory, potential entrepreneurs face less difficulty when they decide to pursue the opportunity of opening and managing a business. This way, they might be able to apply their levels of human capital to selective projects, in a manner that not only brings them profits but also sincerely motivates them to work towards achieving their personal targets. Therefore, people with high levels of education perceive self-employment as a viable career choice.

Second, perceptual variables have a significant influence on the likelihood of becoming an entrepreneur. This outcome implies that subjective factors should be seen as relevant determinants for the development of entrepreneurial individuals, especially when policy-makers attempt to predict this phenomenon. Indeed, subjective perceptions can be more change-resistant and prone to biases. However, it is unwise to ignore their impact. As mentioned in earlier research and in the current study, "optimistic" subjective variables such as opportunity perception, confidence in one's own skills and knowing other entrepreneurs are characteristic of entrepreneurial people and positively influence the choice for self-employment. Meanwhile, "negative" subjective variables like the fear of failure still represent a threat to individuals' potential to act on their entrepreneurial intentions. Moreover, this study produced a surprising finding by showing that gender may be strongly correlated with perceptual variables; this result suggests that perceptual variables may have diverse and complex connections with other factors of interest. Therefore, studying the effects of perceptual variables is relevant for the economics of entrepreneurship and behavioural perspectives that provide valuable insights must be incorporated into academic research.

Third, perceptual variables slightly mediate the relation between education and the choice for self-employment. Opportunity perception, confidence in own skills and fear of failure have only moderate mediation potential, while knowing other entrepreneurs does not show any significant mediation effect. In this study, even though the subjective dimension may impact the way individuals choose to act on entrepreneurial intentions, it cannot be concluded that perceptions surely strengthen or weaken the advantages that education has in prompting people to pursue entrepreneurship as a career. Instead, policies that aim to stimulate entrepreneurship should promote educational attainment and regard perceptions as factors that have the power to unconsciously and strongly impact individuals' behaviour. This argument fits the behavioural perspectives advanced by

researchers such as Daniel Kahneman and Amos Tversky and supports the inclusion of these factors into the study of economic phenomena.

Nevertheless, this research had several limitations. Firstly, a limited number of demographic and perceptual variables were included in the analysis. While their study is important, it can be argued that other factors might have had an equal or even greater influence on the choice for entrepreneurship. While this thesis only examined the level of general education as proxy for human capital, other variables that measure the individual's accumulation of human capital (e.g. specific know-how, previous experience) might be more affected by perceptions or have an even more important influence for stimulating entrepreneurship. Secondly, entrepreneurial education was not considered in this research because the threats of endogeneity and biased results lurk when one decides to study entrepreneurial education. However, it has never been properly established whether the influence of this type of education on entrepreneurial choice is positive or negative. Moreover, the connections between entrepreneurial education and perceptual variables have never been studied in detail, so there is still potential for mapping this links more effectively. Thirdly, the inclusion of other subjective variables such as perceived financial support or perception of the existence of regulation should be incorporated into the models. There is a significant emphasis on the belief that perceptions are intrinsic and tied to the propensity of individuals to act irrationally, but an important point is often overlooked. Namely, on a macroeconomic scale, cultural (e.g. firm culture, business ethics) and economic (e.g. ease of a country to attract investments) perceptions might shape the formation of entrepreneurial individuals much more than psychological (e.g. confidence in own skills) perceptions. Therefore, the mediation effects of these perceptions for the relationship between education and the choice for self-employment may be stronger. Lastly, this research was conducted only for the 2013 GEM data, so more significant results might be obtained when replicating this thesis' methodology with data from recent years.

Despite the limitations, this thesis has shown that there is a relationship between education, perceptual variables and the choice for entrepreneurship. Also, slight mediation effects were found for three perceptual variables. Therefore, it represents a valuable contribution to the domain and literature of economics of entrepreneurship.

In conclusion, this study has the potential to aid in the design of future valuable research regarding the links between education, perceptions and the choice to pursue the path of self-employment.

## 6. APPENDIX

TABLE 4: SPEARMAN CORRELATION TABLE

	Self-employment: 1	Age : 2	Gender : 3	h1 : 4	h2: 5	h3: 6	Education: 7	Opportunity_ perception: 8	Confidence_own_ skills : 9	Knowing_other_ entrepreneurs: 10	Fear_failure: 11
1	1										
2	0.041***	1									
3	-0.023***	0.008*	1								
4	0.066***	-0.014***	0.043***	1							
5	-0.062***	-0.004	0.011***	-0.464***	1						
6	-0.003	0.017***	-0.052***	-0.501***	-0.535***	1					
7	0.138***	0.002***	-0.038***	0.241***	0.013***	-0.243***	1				
8	0.154***	-0.093***	-0.032***	-0.031***	-0.040***	0.069***	0.005	1			
9	0.271***	-0.020***	-0.103***	-0.042***	-0.041***	0.080***	-0.002	0.223***	1		
10	0.181***	-0.112***	-0.055***	-0.065***	-0.028***	0.089***	-0.023***	0.232***	0.248***	1	
11	-0.121***	0.029***	0.076***	0.015***	0.026***	-0.040***	-0.020***	-0.131***	-0.190***	-0.074***	1

Note: \*\*\* p-value  $\leq$  0.001; \*\* p-value  $\leq$  0.01; \* p-value  $\leq$  0.05. The significance levels are displayed below the correlation coefficients.

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