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"Microfoundations of Sustainability: A study on innovative ICT startups in Italy"

RELATORE:

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Firma dello studente

ELVIS SHAKYA

To my family and friends,

Thank you for all the care and support.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

There has been a growing concern for sustainable development, which is why more research is being done on the topic so that every task can be performed with a sustainability-oriented goal in mind. This research underlines the need of analyzing the microeconomic aspects that might increase organizational sustainable development tasks. We employ regression analysis to analyze the relationship between environmental sustainability, the skills and competencies that the founders possess, and the role of collaboration in 173 start-ups operating in the ICT sector in Italy. Our analysis consists of four regression models, which consist of environmental sustainability as the dependent variable, the skills and competencies that the founders possess, and the role of collaboration as the independent variables. With the use of regression analysis, in the given setting, we can conclude which variables affect environmental sustainability and which ones play a major role in contributing toward it.

INTRODUCTION

"If every human consumed natural resources at the same rate as the average American or German we would need at least another two earths." (WWF, 2000)

There has been a growing concern for the importance of sustainability and more emphasis is being given to the social and environmental goals of the organizations. The need to broaden the goals beyond financial well-being has become the primary focus of corporate managers (Busch, Delgado-Ceballos, & E. de Lange, 2012). Due to the growing concern for the topic, it is successful in grabbing remarkable academic considerations as well. Many studies have been carried out regarding sustainability and its micro-foundations at an organizational level.

Although, recent papers have already proved the relationship between founders' competencies, networks and sustainability at organizational level in firms based out of UK and New Zealand (Akhtar, Khan, Frynas, Tse, & Rao-Nicholson, 2018), further analysis of these components in this thesis, will help us better understand how the interaction between these components fosters sustainability in Italian start-ups focused in the ICT sector. Hence, this thesis is divided into four chapters: starting with the introduction of sustainability, sustainability and organizations, the introduction of micro-foundations and finishing off with research question proposed.

The first chapter starts with a brief history of sustainability, how the term was coined. This chapter also provides a proper definition of environmental sustainability which includes the three important aspects of environmental sustainability. The chapter also introduces business model with the challenges that the traditional business model faces in order to achieve environmental sustainability. It also suggests a three-layered business model which can help overcome the challenges and strive toward environmental sustainability. Finally, there are some remarks on the topics introduced in this chapter.

The second chapter depicts a picture of the trend of environmental sustainability in organizations. Then, the focus moves on to the trend being followed by start-ups all over the world. Eventually, this chapter also discusses the trend of start-ups in Italy and where it stands among the countries in Europe.

The third chapter introduces the concept of micro-foundations, and why it is being used to study the macro factors. In this chapter, we also propose two question to study the relationship between

environmental sustainability, and, skills and competencies of the founders and the role of collaborations in the start-ups.

Finally, the fourth chapter introduces the empirical analysis. Following an introduction of the Italian ICT industry's inventive and economic backdrop, the focus shifts to the presentation of data collection methodology and the sampling procedure, which allows for the creation of a sample of innovative ICT start-ups. The statistical analysis is then carried out using SPSS, a statistical program. In the analysis, we estimated four regression models to find an answer to the question proposed. The results provides an opportunity to focus on specific factors in order to strive toward environmental sustainability.

CHAPTER 1 – THE CONCEPT OF SUSTAINABILITY

1. Sustainability

About two centuries ago, researchers were starting to get concerned regarding the consequences of the development of our civilization could have on the environment and the natural resources of our planet. In 1798, Thomas Robert Malthus predicted, in his book "An Essay on the Principle of Population", the population would grow at such a pace that the world's population would starve to death as the rate at which foods are produced would not be able to match the population growth (Paul, 2008). Malthus also hypothesized that the human population would grow in a geometric progression, whereas the subsistence for the population would only grow in an arithmetic progression. Hence, the population growth would overtake the capacity of the natural resources to bear the needs of the increasing population.

In due course of time, since 1798, the world population has increased by seven folds – from one to seven billion (datacatalog.worldbank.org, 2019) – and with simultaneous development in technology, the population are more or less being fed and hence proving Malthus wrong (Paul, 2008).

With the exponential growth in population, similar growth in pollution and demand for food and non-renewable resources were to be seen. This provided the possibility of the hypothesis proposed by Malthus to be proven true, which was believed to be false earlier. With the technological advancement and development of our civilization, more people started focusing their attention on the supply of non-renewable resources in the environment. It was then being realized that no extra effort was being made to subside the pollution being created or even conserve the non-renewable resources.

The book by Malthus acted as an alarm bell, which provided a gentle reminder to society and the authorities that if we continue along with the same consumption of the resources found in the environment, we are bound to find ourselves in trouble. Consequently, more and more researchers were attracted towards the relationship between the developments of our civilization and the environment.

In 1968, Garret Hardin wrote a similar essay entitled "The Tragedy of the Commons" where he argues that if individuals acted independently, rationally, and focused on achieving their own personal interests, they'd end up going against the common interests of the communities and deplete the planet's natural resources (Hardin, 1968). Hardin also argues that the exponential population growth would ultimately result in the natural resources being eventually overexploited. He suggests to radically change the way of using natural resources to avoid a disaster in the future.

In 1972, to predict the consequences of what could happen on a planet with limited resources, Meadows ran a computer simulation using data on the growth of population, industrial production, and pollution. Meadows deduced that "since the world is physically finite, the exponential growth of these three key variables would eventually reach the limit" (Mensah, 2019).

Following the developments, the first international conference, The 1972 United Nations Conference on the Environment, which was exclusively devoted to environmental issues took place in Stockholm, Sweden. This conference was attended by delegations from 114 governments (Boudes, 2014). The conference developed a link between environment and economic development. It reflected a growing concern for environmental issues and laid down the foundation for global environmental governance. The Stockholm Conference also resulted in the creation of the United Nations Environment Programme (UNEP) in December 1972 which aims to co-ordinate global efforts to promote sustainability and safeguard the natural environment.

In the conference, participants elaborated a declaration, which contains a set of "common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment" (Sohn, 1973). The declaration included forward-looking principles, which proclaimed the necessity to integrate and coordinate the steps in planning the development to empower environmental protection.

Even though the conference played an important role to promote the adoption of international agreements, it also received some criticism. Even after the Stockholm Conference, UN records admitted that little had been done to integrate environmental concerns into growth strategies and plans. It was evident that a more holistic approach was required, one that included both economic development and environmental concerns (Paul, 2008).

In 1983, the World Commission on Environment and Development, subsequently known as the Brundtland Commission, was established by the United Nations General Assembly. Later in 1987,

the Commission published the Brundtland Report, entitled “Our Common Future”, which expanded on what had been accomplished in the Stockholm Conference. It coined sustainable development as: “the development that meets the needs of the present without compromising the ability of the future generations to meet their own needs” (Paul, 2008). This definition is the most significant of all the definition of sustainable development as it, firstly, covers the major concept of “needs”. It refers particularly to the essential needs of the poor, to which utmost priority should be given. Secondly, the belief that the environment's ability to meet existing and future needs is limited by the state of technology and social organization.

During this time, the concept of sustainable development gained political traction. However, even this report is not free from criticism. “The Brundtland Commission Report's discussion of sustainability is both optimistic and vague,” some critics claim. In spite of all the criticism that was received, the concept of sustainable development came into being (Paul, 2008).

Following the Brundtland Commission, the concept of sustainable development was taken further to the next level with the United Nations Conference on the Environment and Development (UNCED), also named as Earth Summit, which took place in the summer of 1992 in Rio de Janeiro, Brazil. The main aim of this conference was to reconcile global economic development with environmental protection. With 117 heads of state and delegates from 178 countries in attendance, the Earth Summit was the largest meeting of world leaders in 1992 (Britannica, 2021).

Most of the world's governments formally committed themselves to pursuing economic development in methods that respect the Earth's environment and nonrenewable resources through treaties and other protocols signed at the summit. Some of the treaties agreed upon are as follows (Britannica, 2021):

- The Convention on Biological Diversity
- The United Nations Framework Convention on Climate Change, or Global Warming Convention
- Kyoto Protocol (1997), superseded by the Paris Agreement on Climate Change (2015)
- The Declaration on Environment and Development, or Rio Declaration
- Agenda 21
- The Statement of Principles on Forest

In September 8, 2000, The Millennium Summit took place at the United Nations Headquarters in New York. 149 heads of state and government, as well as high-ranking officials from over 40 additional countries, had attended the Summit. The Millennium Declaration, containing a Statement of the International Agenda for the 21st century, was the main document that was unanimously agreed. It also lays down deadlines for many group actions. The summit also identifies specific objectives in broad headings that the participants believe will lead to desired results, referring to freedom, equal opportunities (for individuals and nations), solidarity, tolerance, respect for nature and shared responsibility as six fundamental principles in international relations for the 21st century. The world leaders, during the Summit, agreed upon the Millennium Development Goals with a specified deadline of 2015. They committed their nations to a new global partnership to reduce extreme poverty (Nations, 2000).

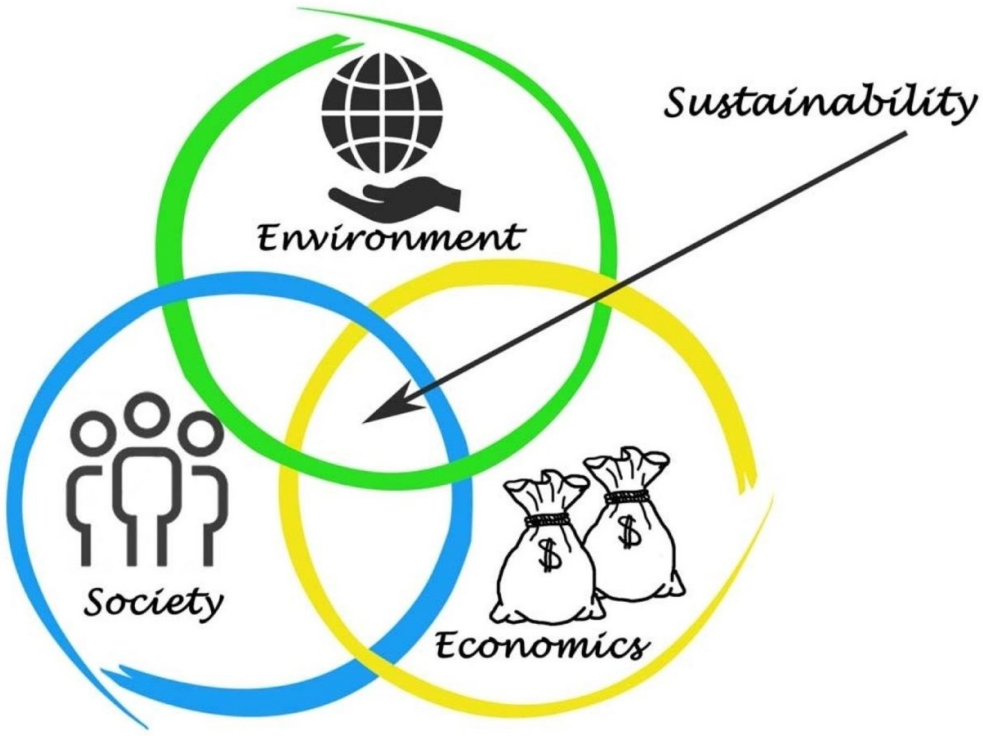
The Summit set out eight Millennium Development Goals (Nations, 2000):

- Eradicate extreme poverty and hunger
- Achieve universal primary education
- Promote gender equality and empower women
- Reduce child mortality
- Improve maternal health
- Combat HIV/AIDS, malaria and other diseases
- Ensure environmental sustainability
- Develop a global partnership for development

In August, 2002, The World Summit on Sustainable Development (WSSD) was held in Johannesburg, South Africa. Its key objective was to review progress since the 1992 United Nations Conference on Environment and Development (UNCED) in Rio and to recommend actions to enhance the implementation of Agenda 21 and other outcomes of the Rio Conference. The Johannesburg Summit reconfirmed and complemented the Millennium Goals with a number of additional objectives, for example halving the proportion of people without basic sanitation; minimizing the harmful effects caused by chemical products; and halting biodiversity loss. The Summit was a landmark in building UN, government, corporate and NGO partnerships to raise resources to address global environmental, sanitary and poverty challenges (Schirnding, 2005).

Sustainability can be defined as a way to conduct business that considers three important aspects: economic, environmental and social aspects, in such a way that benefits the current as well as the future generations of concerned stakeholders (Busch, Delgado-Ceballos, & E. de Lange, 2012). By paying attention to the three key aspects, organizations can achieve long-term sustainability such that their performance will not sacrifice the ability of future generations to meet their needs. In other words, sustainability is all about generating economic benefits with minimum adverse effects towards the environment and adding value to the community that they operate in (Del Giudice, et al., 2017).

Figure 1 The relationship between economic, social and environmental aspects



Source: https://scandasia.com/sustainability-solutions-5-steps-going-ahead-of-time/

The above figure shows three interconnected spheres or, in other words, the domains of sustainability that describe the relationship between environmental, economical, and social aspects of sustainable development. In the process of sustainable development, the best options are likely to continue to be those that suit societal needs while also being environmentally and economically

viable, economically and socially equitable, and socially and environmentally tolerable (Mensah, 2019).

Here, the social aspects include the quality of life, education, community development, equal opportunities, and many more. Similarly, the economic aspects may include growth, savings, cost of living, etc. Furthermore, the environmental aspects could include environmental protection, resource management, etc. The appropriate decision on sustainable resource management will result in long-term growth for a sustainable society and hence boost the economy of the society. The argument is that when the concepts contained in the three spheres of sustainability are well applied to real-world situations, everyone wins because natural resources are preserved, the environment is protected, the economy thrives and is resilient, and social life is good because peace and respect for human rights exist (Mensah, 2019).

"If a man in a given geographical area lacks a job (economic), he is likely to be poor and disenfranchised (social); if he is poor and disenfranchised, he has an incentive to engage in practices that harm ecology, for example, by cutting down trees for firewood to cook his meals and warm his environment (environmental). As his actions are aggregated with those of others in his region cutting down trees, deforestation will cause vital minerals to be lost from the soil (environmental). If vital minerals are lost from the soil, the inhabitants will be deprived of the dietary nutrients required to sustain the intellectual performance needed to learn new technologies, for example, how to operate a computer, and this will cause productivity to reduce or stagnate (economic). If productivity stagnates (economic), poor people will remain poor or poorer (social), and the cycle continues." (Mensah, 2019)

From the above statement, it is very clear there exists a crucial relationship among the three domains of sustainability and it clearly illustrates the need to integrate them for sustainable development. It explains how the economic, social, and environmental foundations of sustainability interact with one another and how they might promote sustainable development.

Thomas Robert Malthus prophesied in 1798 that the world's population would starve to death because food production could not keep up with population growth. With the exponential growth in population, there was a corresponding increase in pollution and demand for food and non-renewable resources. The book served as a subtle warning to society and the government that if we continue to consume the resources found in the environment at the same rate, we will inevitably find ourselves in difficulty. William Meadows anticipated what would happen if the world's

population, industrial production, and pollution outpaced the planet's limited resources in 1972. The exponential expansion of these three fundamental factors would eventually approach a limit since the world is physically finite.

With the prediction and anticipation of worldwide starvation and environmental pollution, as a result of the population growth, the concern towards sustainability was growing rapidly. The United Nations Conference on the Environment, held in 1972, was the first worldwide gathering solely dedicated to environmental issues. The United Nations Environment Programme (UNEP) was established as a result, with the goal of coordinating global efforts to promote sustainability and protect the natural environment. The Brundtland Commission defined sustainable development as "development that meets current demands without jeopardizing future generations' ability to meet their own needs". Following the Brundtland Commission, the United Nations Conference on Environment and Development took the notion of sustainable development to a new level. The conference's major goal was to find a way to balance global economic expansion with environmental protection. The Earth Summit, which drew 117 heads of state and representatives from 178 countries, was the largest gathering of world leaders in 1992.

Sustainability was coined as a company strategy that addresses three key factors: economic, environmental, and social. Organizations can achieve long-term sustainability by focusing on the three important factors, ensuring that their success does not jeopardize future generations' ability to meet their demands. Sustainability is defined as providing economic benefits while causing the least amount of harm to the environment and adding value to the communities in which they operate. The three areas of sustainability have a critical relationship that demonstrates the importance of integrating them for long-term development. It illustrates how the economic, social, and environmental aspects of sustainability interact and how they may help the world achieve sustainable development now.

The thesis, further, focuses on the situation of the start-ups in Italy. Late in 2012, Italy introduced legislation to encourage the establishment and spread of its startup ecosystem. The Decree-Law, often known as the "Italian Startup Act" (ISA), has piqued Italian entrepreneurs' attention. The ISA offers free and paperless incorporation for creative start-ups, as well as exclusions to normal company law, tailored labor standards, numerous tax benefits, and easier access to the SME Guarantee Fund. Incubators and accelerators also play a critical role in assisting businesses in Italy at various phases of their lifecycle. Young entrepreneurs make up 18 percent of all innovative start-

ups (2,067 in total), compared to 15.3 percent of non-innovative start-ups. In comparison to 32.8 percent of other enterprises, 41.4 percent of start-ups (4,758) are under the age of 35. In the Tech Scaleup Country Index, Italy is rated 10th, behind Ireland and Finland. In Europe, Germany, France, and the United Kingdom account for 53% of all scaleups. However, only 2.8 percent of the population in Italy was active with start-ups, according to the statistics gathered. According to estimates, talent leaving Italy costs the country around 14 billion euros per year, resulting in "brain drain" to the country.

2. Towards sustainable business models

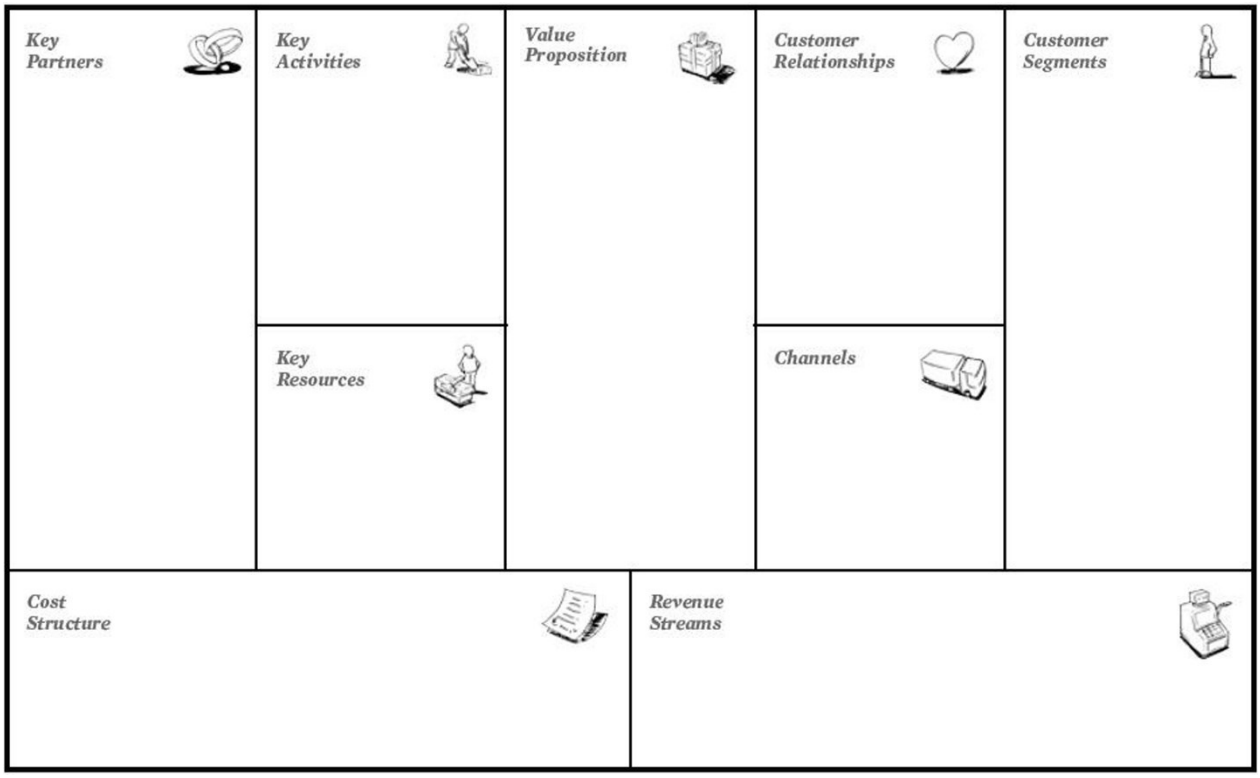
After a brief explanation of the concept of sustainability, it is important to discuss the concept of Business Model. As one talks to the clients, learns, and confirms or invalidates the assumptions, the Business Model is designed to be updated on a regular basis. It employs a process of testing assumptions through consumer interviews, followed by iteration which makes it a powerful tool that can ensure that OI practices are implemented in a way that is consistent with the company's strategy and goals.

"A business model describes the rationale of how an organization creates, delivers, and captures value." (Osterwalder & Pigneur, 2010) This definition may be simple, but it contains a number of features that are all part of the larger model's structure and function.

According to (Johnson, Christensen, & Kagermann, 2008), a business model consists of four interlocking elements that, taken together, create and deliver value. The most important to get right, by far, is the first one which is *Customer Value Proposition (CVP)*. A successful business is one that has figured out how to add value to customers by assisting them with a critical task. The second elements includes revenue model, cost structure, margin model, and resource velocity which are collectively termed as *Profit Formula*. The profit formula is a blueprint that outlines how a business generates value for itself while also offering value to customers. The third element represents the *Key Resources.* People, technology, products, buildings, equipment, channels, and brand are examples of the key resources required to deliver the value proposition to the intended client. Lastly, the final element is the *Key Processes.* Successful businesses have operational and management processes that enable them to create value in a repeatable and scalable manner.

Business Model is also defined as *"An architecture for the product, service and information flows, including a description of the various business actors and their roles; and a description of the potential benefits for the various business actors; and a description of the sources of revenues."* (Timmers, 1998) This is an expanded version that takes into account additional criteria not included in the prior definition. A few examples include a discussion of architectural validity, the value of each internal and external collaborator, and a mention of how the need for cash flows to support a firm is always justified by economic ramifications.

Figure 2 Business Model Canvas



Source: (Osterwalder & Pigneur, 2010)

The picture above depicts the nine building blocks of the Business Model Canvas (Osterwalder & Pigneur, 2010). The components of the canvas are:

i. Customer Segments: It is vital to know who the company's target market is. An enterprise's target market or customer base is defined by this component.
ii. Value Propositions: To satisfy a customer's requirement, the organization must supply a specific solution, which entails introducing the proper products or services. This component describes the product and service bundles that offer value for specific Customer Segments.
iii. Channels: It outlines how a firm connects with and reaches its Customer Segments in order to deliver a Value Proposition.
iv. Customer Relationships: Many different types of connections exist, depending on the sort of consumer and the firm's approach. Customer Relationships describes the types of relationships a firm has with specific Customer Segments.

v. Revenue Streams: When one successfully supplies Value Proposition to clients, it generates cash flows. In other words, this component represents how much money a company makes from each Customer Segment.

vi. Key Resources: For a business to be successful, it need certain resources to generate value propositions, deliver them, and make the BM work. This component represents those valuable resources.

vii. Key Activities: The business also need to carry out all the activities necessary to run the Business Model. This component defines all the necessary activities.

viii. Key Partnerships: It is only through a network of partners that the corporation is able to manage the Business Model. This component defines the network of relationships with the suppliers and the partners of the business.

ix. Cost Structure: The Business Model's operations entails some costs. This components describes all the costs incurred to operate a Business Model.

Businesses and academics have been paying more attention to business models over the last two decades. In competitive environments, a business model has been identified as a distinct source of competitive advantage. However, start-ups face different challenges in building a sustainable business model that strives towards the use of current environmental and social resources without sacrificing the ability of future generations to meet their needs. It is frequently argued that achieving economic, social, and environmental sustainability necessitates businesses departing from traditional operations by significantly improving their business practices. These adjustments would be impossible for a start-up since they are resource restricted by virtue of their small size and inexperience (Del Giudice, et al., 2017).

We can identify some major challenges in rethinking business models towards sustainability. Those are related mainly to the age and size of the company, but also the type of activities plays a relevant role.

There has been much discussion in recent years about the importance of a relatively limited number of high-tech startup companies in driving innovation and economic growth. But it's also well-known that, despite their importance, the high-risk/high return strategy used by these businesses results in high failure rates and a low success rate.

According to a study done on the relationship between, Information and Communication Technology (ICT), small and medium enterprises (SMEs) and poverty reduction, many SME's are struggling to survive and compete in an increasingly globalized market, especially in developing nations. They are one of the main drivers of globalization, and as such, ICTs can provide many opportunities for SMEs, such as increasing access to knowledge and information and improving communications within the business environment. They can also reduce costs and improve decision-making, responsiveness, and efficiency. However, due to the lack of financial resources, SMEs in underdeveloped nations haven't been able to reap some of the aforementioned benefits (Mbuyisa & Leonard, 2017).

According to a study done in New Zealand, firm structure and limited absorptive capacity of the SMEs could also be some of the barriers to implementing environmental initiatives. However, according to them, collaborative relationships may provide SMEs with the opportunity to overcome these barriers. (Lewis, Cassells, & Roxas, 2015)

Johnson and Schaltegger (2016) conducted a thorough systematic evaluation of the literature, led by the following study question: What instruments for sustainability management, such as those for corporate social responsibility and environmental management, have been created for and are suitable to SMEs? Lack of knowledge of sustainability concerns, a lack of human and financial resources, and the high complexity of sustainability management standards and tools are among the challenges they face (Johnson & Schaltegger, 2016).

The challenges that have been discussed till now, like lack of financial resources, firm structure, limited absorptive capacity, lack of human resources, lack of knowledge of sustainability concerns, and high complexity of the tools, are all internal to the business. Various external challenges are out of control to the company which acts as a barrier to the start-ups to strive towards sustainability.

Challenges like difficulties in acquiring financial capital, the high initial cost to implement the tools, lack of laws that regulate sustainability, non-transparency of the markets, and many more behave as the external challenges to the start-ups (Jaramilo, Sossa, & Mendoza, 2018).

These problems can only be addressed by a process known as Business Model Innovation, which can only be achieved through an open perspective of the business model and testing to determine which approach is most effective in overcoming the obstacles. Innovations in the traditional business model has also attracted attention resulting in the creation of additional value to the business. More than two-thirds of CEOs are changing their business models. Among those surveyed, more than 40% are transforming their business models to become more collaborative (IBM, 2008). It is important to note, however, that Business Model Innovation should be the last step of an innovative transformation that begins with rethinking the Business Model itself, taking into account the highly dynamic and unstable environment of the start-ups.

Furthermore, according to Chesbrough (2010), businesses use their business models to market innovative ideas and technology. A company's capacity to develop the business models via which these inputs will flow, may be limited, if not nonexistent, despite substantial investments and systems for exploring new ideas and when the same concept or technology is brought to market via two different business strategies, the economic consequences will be quite distinct. The capacity to reinvent company models therefore makes perfect financial sense for firms. "*A mediocre technology pursued within a great business model may be more valuable that a great technology exploited via a mediocre business model."* (Chesbrough, 2010)

2.1 Triple layer business model canvas

By now, it is obvious that it is getting harder and harder for firms to respond to concerns about sustainability. Financial crises, economic and social inequality, environmental disasters, material resource shortages, energy needs, and technological progress are all likely to be addressed more aggressively by organizations. However, on the one hand, it's possible to perceive these problems as an increase in danger. Another way to look at it is that businesses may use these same difficulties as an opportunity to participate in sustainability-focused innovation. The only way for companies to flourish in the face of such difficulties is by incorporating eco-efficient and eco-effective technologies into their core business, hence the introduction of the Triple Layer Business Model Canvas (TLBMC).

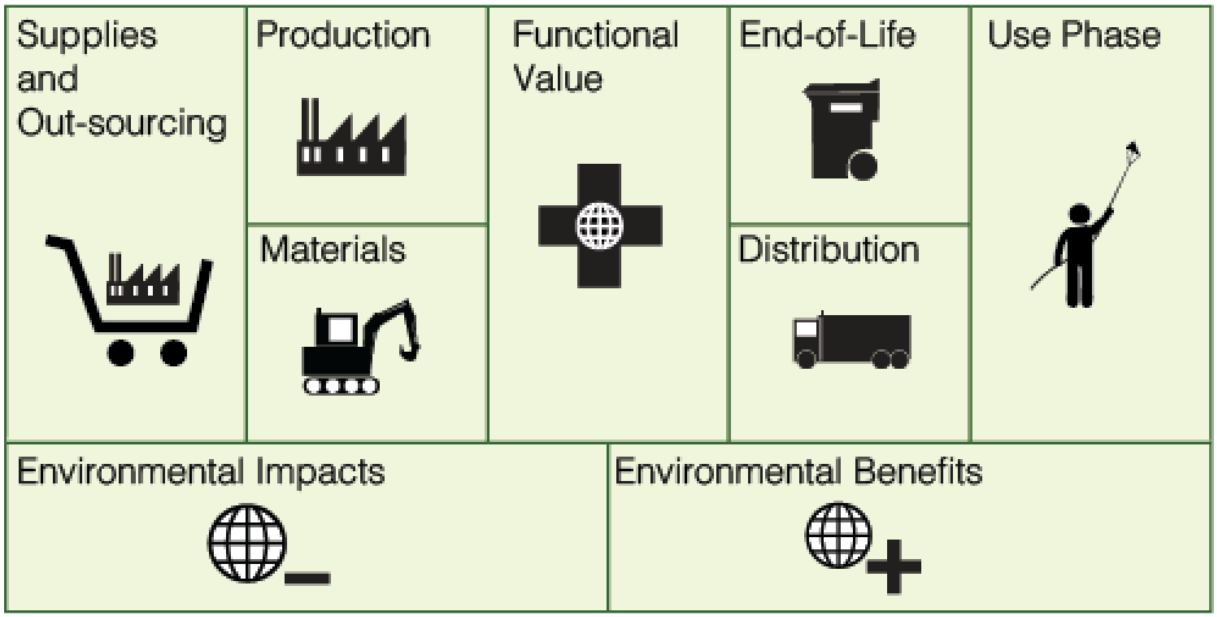
An organization's business model may be seen holistically using the Triple Layer Business Model Canvas (TLBMC) (Joyce & Paquin, 2016). By explicitly integrating environmental and social impacts through additional business model layers that align directly with the original economic-oriented canvas, the TLBMC builds on Osterwalder and Pigneur's (2010) original business model canvas - a popular and widely adopted tool for supporting business model innovation. An organization's business model must clearly address and integrate economic, environmental and social value creation in order to be sustainable under the TLBMC's triple-bottom-line approach. To conceive and link different forms of value creation within a business model viewpoint, it uses life-cycle analysis and stakeholder management views inside newly developed environmental and social canvases. A horizontal as well as vertical coherence or more holistic perspective on value creation is achieved by developing environmental and social business model layers as direct extensions of Osterwalder and Pigneur's (2010) original economic-oriented business model canvas. Consequently, the TLBMC may allow users to gain larger views and insights on their businesses' actions through their own creative thinking and innovation.

2.1.1 Foundation of the environmental layer

In the environmental layer of the TLBMC, environmental impact is assessed from a life-cycle viewpoint. According to research and practice, Life Cycle Assessments (LCA) are formal methods

for assessing the environmental effect of a product or service over the whole product's life cycle. A formal LCA evaluates environmental consequences across several types of indicators (e.g., CO2e, eco-systems quality, human health, resource depletion, water usage) across a product's or service's whole life cycle (e.g., raw material extraction, manufacturing, distribution, use and end of life.). Combining LCA and business innovation can help to support competitive product, service, and business model innovations with improved environmental characteristics over traditional business innovations, as well as ongoing impact measurement and improvement of sustainability-oriented innovations over time.

Figure 3 Environmental Layer of TLBMC



Source: https://luedekefreund.com/2016/03/20/business-model-workshop-may-2015/

The components of the environmental layer of the TLBMC could be explained as (García-Muiña, Medina-Salgado, Ferrari, & Cucchi, 2020):

i. Functional Value: It defines the product of the industrial process that's being studied. In the company's LCA study, this value relates to the functional unit that was utilized to calculate the LCA.
ii. Materials: As a result of incorporating environmental concerns into the initial business model canvas, the materials component was created. Materials are the bio-physical supplies that are utilized to create the functional value of a product.

iii. Production: It integrates typical economic operations and focuses on the transformation of raw materials into a final product.

iv. Supplies and outsourcing: Everything that is required for production but isn't considered fundamental to the organization.

v. Distribution: As in the traditional canvas concept, refers to the final product's transportation. This section in the environmental layer focuses on the company's primary forms of transportation. The mix of transportation options, distances traveled, and weights of what is delivered must be considered.

vi. Use Phase: Client participation in the organization's main service and/or product is examined in the usage phase. The client's material resource and energy needs should also be considered.

vii. End-of-Life: End-of-life is when a client decides to stop using a product's functional value. Environmentally, this component encourages the company to look for methods to reduce its effect by going beyond the value of its products.

viii. Environmental Impacts: The environmental costs of the organization's actions are addressed in the environmental effects component. While a typical business model frequently presents organizational impacts solely in terms of financial costs, the environmental impacts components expand that to include the organization's ecological costs.

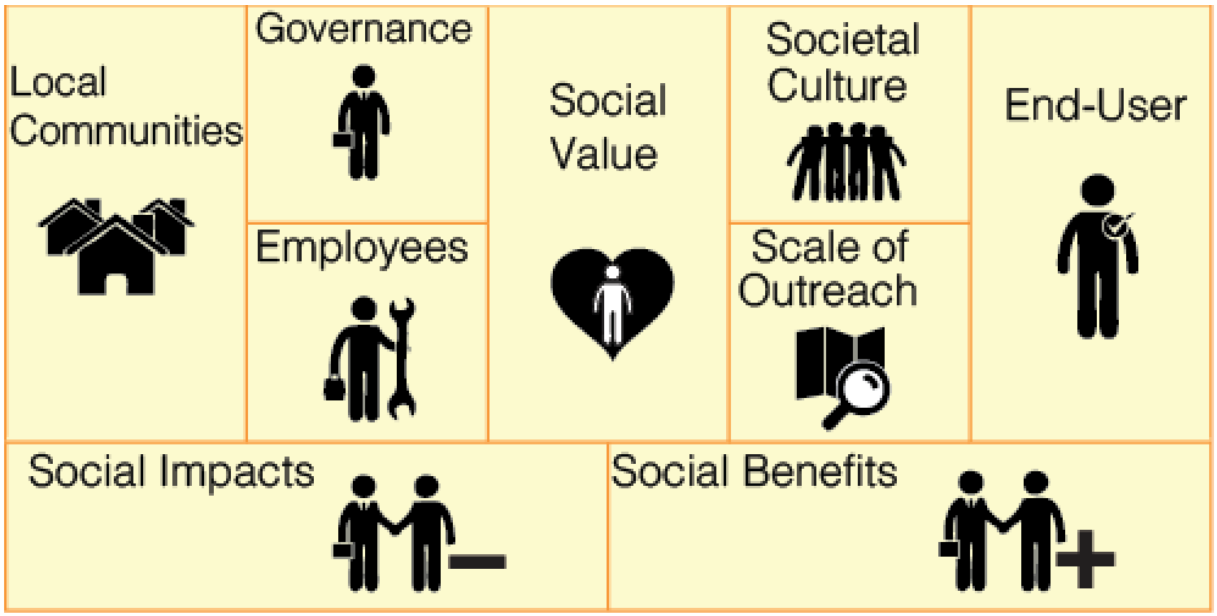
ix. Environmental Benefits: In addition to financial value, environmental advantages broaden the idea of value creation. Environmental impact reduction and even regeneration positive ecological value are included in this concept.

2.1.2 Foundation of the social layer

The TLBMC's social layer is based on a stakeholder management method to investigating an organization's social effect. Instead of focusing just on the organization's own interests, a stakeholder management strategy attempts to balance the interests of the organization's stakeholders. Groups of persons or organizations that can affect or are influenced by an organization's actions are referred to as stakeholders. Customers, suppliers, government agencies and interest groups are examples of stakeholders. Social canvas layer, like environmental canvas

layer, expands the initial business model canvas by filtering the business model and impacts of a company from a stakeholder's point-of-view.

Figure 4 Social Layer of TLBMC



Source: https://luedekefreund.com/2016/03/20/business-model-workshop-may-2015/

The components of the social layer of the TLBMC could be explained as (García-Muiña, Medina-Salgado, Ferrari, & Cucchi, 2020):

i. Social Value: It defines how to produce value for stakeholders and society, as part of a company's mission statement. In any business, even those that appear to be purely profit-driven, there is always a social benefit to be derived.
ii. Local Community: In order to properly evaluate "local community," one must first examine the company's relationships with its local stakeholders, particularly its suppliers.
iii. Employees: This component gives an opportunity to reflect on the importance of workers in the company. Included here are the number of workers and categories of employees, in addition to important demographics such as salary differences, gender, ethnicity and education (to mention a few).
iv. Governance: It explains about the company's structure. A variety of structural frameworks, such as functional specialization vs. unit-specification, privately-owned vs. publicly traded, can be compared and contrasted, for example.

v. Societal Culture: As part of the societal culture component, an organization's potential influence on society as a whole is considered. Reiterating the notion that business cannot flourish if society fails, this component uses a concept called sustainable value to recognize an organization's potential effect on society and how it may positively affect society via its activities.

vi. Scale of Outreach: It offers information on the breadth and depth of the company's interaction with its stakeholders. Relationships can be founded on the interests of both parties in the short term or on the long term. Consideration should also be given to the geographic reach of the campaign. The company's concentration might be on the local market, or it could take a worldwide approach.

vii. End-users: The value proposition is consumed by the end-user. This domain is concerned with how the value proposition satisfies the end-needs, user's therefore improving his or her quality of life.

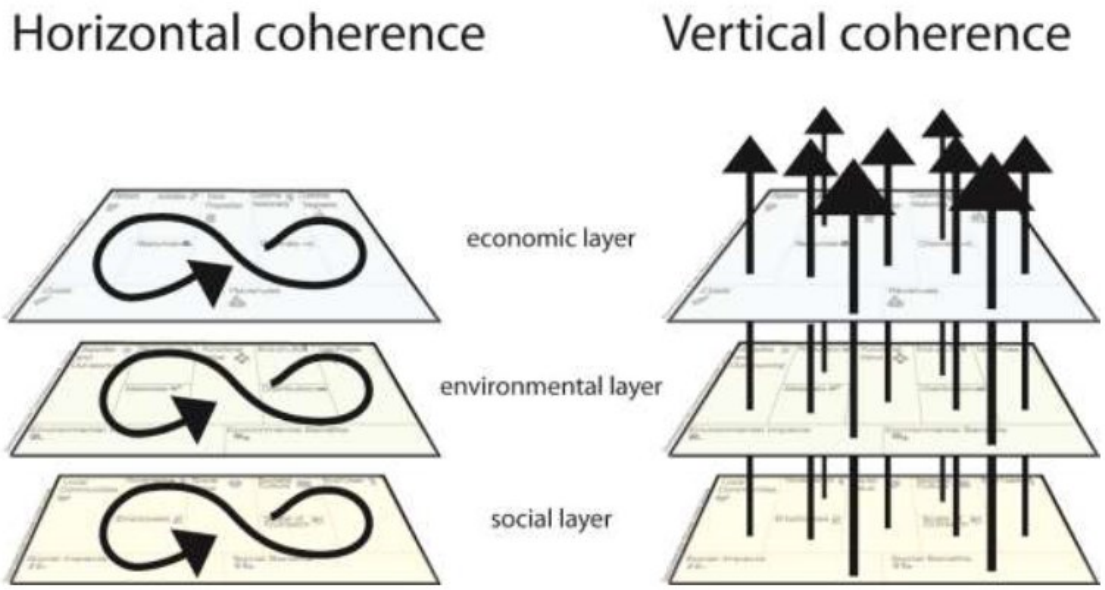
viii. Social Impacts: The organization's social expenses are addressed in the social effects component. Economic and environmental costs are complemented and extended by it, both in terms of financial costs and biophysical consequences.

ix. Social Benefits: The positive social value producing components of the organization's activities are referred to as social benefits. For this component, an organization's actions are clearly evaluated in terms of the social benefits they provide to society. Social benefits may be assessed using a wide number of indicators, including the following.

2.1.3 Horizontal and Vertical Coherence of each layer

To understand existing business models and creatively explore future sustainability-oriented business model innovations, the Triple Layer Business Model Canvas (TLBMC) provides an integrative approach. Vertical and horizontal coherence are supported in particular by the TLBMC layers For example, each layer promotes horizontal coherence by emphasizing important activities and interactions within the nine components of each layer. Furthermore, vertical coherence is achieved by linking the components of each layer to their analogs in the other layers, therefore clarifying essential actions and relationships and their repercussions across the three layers (Joyce & Paquin, 2016).

Figure 5 Horizontal and Vertical Coherence from the Triple Layer Business Model Canvas



Source: (Joyce & Paquin, 2016)

Each layer permits different forms of value generation to be made apparent to a greater degree, which may assist a more holistic perspective of the business model. As a result of the horizontal coherence, the nine layers are able to link with each other consistently and seamlessly. Each layer can be analyzed for horizontal coherence to identify social, economic, or environmental problems. Layer components are aligned across canvas layers to provide a vertical coherence throughout the canvas' layers. Exploration of action alignment and linkages across multiple forms of value is facilitated by this. How your business's (social, environmental, and economic) value creation logics work together is shown by the study of vertical coherence.

CHAPTER 2 – SUSTAINABILITY IN PRACTICE

1. Sustainability in organizations

A recent McKinsey study found that many companies are actively integrating sustainability into their businesses with goals that go far beyond previous concerns about reputation management, such as saving energy, developing, retaining, and motivating green products. Employees who help businesses generate profits through growth and return on capital. Development, emerging as a sustainable political idea on the international agenda, has reached the business sector in the last decade. Many businesses are being called upon to actively contribute to the long-term development of the society in which they operate. In this framework, the main task is to integrate and harmonize economic, environmental, and social concerns and challenges (Hahn & Scheermesser, 2006).

Global business leaders, especially in developed countries, are promoting sustainability initiatives and practices in their companies, understanding the importance of platforms for the survival of the company in fierce global competition. This approach might be interpreted as a sign that corporate executives have added social and environmental bottom lines to their typical financial focus. The ongoing push for firms to be socially and ecologically responsible stems from constant pressure from a variety of stakeholders, including consumers, communities, workers, governments, and shareholders (Eweje, 2011). This is based on a broad recognition that business can play an important role in lowering deteriorating environmental quality, poverty, and social inequality, as well as progressing society toward sustainable development. In general, much emphasis has been placed on the concept of corporate sustainability, which is typically characterized as the integrating of social, environmental, economic, and cultural considerations into company strategy.

It is clear that nowadays the concept of sustainable development is increasingly focused on the business world. It is common today that without the support of enterprises, society will never achieve sustainable development, as businesses represent the productive resources of the economy. The sustainability goals assume that private sector companies should not only create economic value and provide goods and services that improve living standards, but must also actively participate in the mitigation of environmental problems. Meanwhile, many researchers have grasped this question and provided empirical evidence as well as theoretical developments in the field of corporate sustainability. This empirical study focuses heavily on the relationship between

corporate environmental and social performance on the one hand and financial or economic performance on the other (Hahn & Scheermesser, 2006).

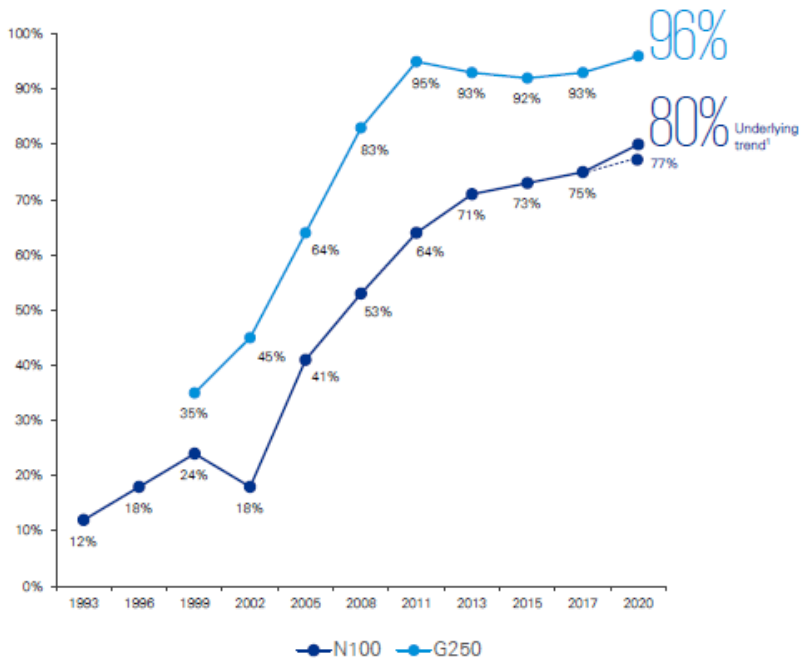
An online survey conducted on the state of corporate sustainability focused on the meaning and relevance of sustainability to German companies, the motivations that led them to commit to sustainability, and the ways they implement sustainability in their business practices (Hahn & Scheermesser, 2006). The study found that most companies in the survey said sustainability was important, but there were differences in how the companies achieved corporate sustainability. The study found that there are significant differences among the sample companies in the sustainability commitment. There are significant differences in the ways different German companies are approaching sustainable development. The study found that there are significant differences among the sample companies in the sustainability commitment. There are significant differences in the ways different German companies are approaching sustainable development. The sustainability leaders are the smallest group of people who have accepted the challenge of integrating sustainability into their management. Standards such as EMAS or ISO 14 000 are mainly used by large enterprises that can be characterized as environmentally conscious. Despite their concern for social issues, these companies mostly focus on the bottom line. There exists a group of traditionalists who see sustainable development as hardly having any value in and of itself. This paper attempts to use empirical evidence to show that managers' perceptions of sustainability issues, the motivation behind corporate commitments to sustainability, and the tools used to implement sustainability in corporate practice are related.

Another paper reports on a study of 15 large companies in New Zealand, carried out in 2009, in which the companies were asked about their sustainability strategy and practice (Eweje, 2011). In this paper, interviews with company managers have shown that corporations are keen to express their sustainability initiatives and practices. They also believe that sound and robust sustainability initiatives can be profitable and doing the ‘right thing’ is good for their survival and competition in the long term. As sustainability issues have become more and more important, corporations have taken on a greater and greater responsibility and have developed a focus on improving their company's various initiatives to mitigate, or at least minimize, their negative environmental and social impact.

Organizations now are increasingly interested in applying sustainable development to their daily activities and disseminating their actions to their stakeholders through sustainable development

reports. Both for market needs and for specific regulations, sustainability reports have become an important tool to communicate the sustainable activities implemented by organizations (Batista & Fracisco, 2018). In recent years, companies have increased their participation in publishing their reports by following the guidelines of the Global Reporting Initiative (GRI), which encompasses the three triple bottom line variables and is one of the most widely used and recognized in the world.

Figure 6 Growth in global sustainability reporting rates since 1993



Source: (KPMG, 2020)

In the figure above, the N100 refers to a global sample of 5,200 companies. It includes the top 100 companies by revenue in each of the 52 countries and jurisdictions researched in this study. The G250 refers to the 250 largest companies in the world in terms of revenue, as defined in the 2019 Fortune 500 ranking. Large global companies are generally leaders in sustainability reporting, and their business of reporting. It often predicts trends which are then adopted more widely. The results of the survey reveal that 80 percent of N100 companies around the world are now referring to sustainability. This underlying Global Sustainability Report rate (N100) has increased by 5 percentage points since the last KPMG survey in 2017, from 75 percent to 80 percent proving that the N100 companies continue to reach the G250. The N100 reporting rate is also expected to continue to grow steadily over the next few years (KPMG, 2020).

According to the same report, the N100 sustainability reporting rate in the Americas, which includes North America and Latin America, has increased by 7 percentage points since 2017 to reach 90 percent of reporting companies. This means that the Americas have maintained their regional leadership in the number of companies reporting sustainability since 2017. Asia-Pacific sustainability reporting increased by 6 percentage points from 2017 to 84 percent, while the sustainability reporting rate in Europe is at the same level in 2020 as in 2017 (77 percent). About a quarter (14) of the 52 countries and jurisdictions covered by KPMG's 2020 survey have a sustainability reporting rate above 90%. This high performing group includes countries and jurisdictions from all regions: North America, Latin America, Europe, Africa and Asia-Pacific. As such, the 2020 survey demonstrates that high sustainability reporting rates can now be found worldwide and are no longer limited to particular regions.

Therefore, from the studies and the reports, it is very much clear that the concept of sustainable development has been widely accepted and implemented by companies from all over the world. The organizations are increasingly interested in incorporating sustainable development into their everyday operations and communicating their progress to stakeholders through sustainable development reports.

2. Sustainability in startups

A startup is a business that is in its early stages of development and is frequently financed by its entrepreneurial founders during this time. It is a small business started by one or more entrepreneurs with the goal of creating a unique product or service and bringing it to market. As they use developing technologies to invent products and innovate business structures, today's start-ups are a major source of innovation. The startup lifecycle is divided into three stages: bootstrapping, seed, and creation. The entrepreneur uses his own resources to develop his idea and turn it into a firm during the bootstrapping stage. Entrepreneurs seek help from the entrepreneurial ecosystem in the seed stage, and the startup is transformed into a firm in the creation stage (Raju, Kumar, & Nikkat, 2020).

Major players in various sectors have already set their sustainability goal and implemented it. It's time for startups to take ownership of corporate sustainability and get a head start on their

competition. Startups need to integrate sustainability into their business strategies, as it is not just about a competitive advantage or an extension of CSR activities. The Sustainable Development Goals (SDGs) are important for businesses in general and for startups in particular, as businesses will not be able to create long-term value if natural, social, financial and manufacturing resources continue to shrink. The United Nations set out 17 SDGs that constitute a natural development, but also an improvement of the Millennium Goals, a set of similar objectives that was signed in 2000. The 17 SDGs include (D'Addario, n.d.):

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reducing Inequality
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace, Justice and Strong Institutions
17. Partnership for the Goals

Sustainability refers to methods of utilizing present natural and social resources without jeopardizing future generations' ability to meet their requirements. Businesses are increasingly emphasizing the need of implementing policies and practices that improve the social, economic, and environmental aspects of the communities in which they operate (Del Giudice, et al., 2017). Companies should be able to attain long-term sustainability if they combine these three factors.

However, start-ups are customarily resource constrained as they would be in a primary phase of business operation. Hence, it would be very difficult for them to follow the traditional operation

path and focus on sustainability simultaneously. In this context, it depends solely on the founder of the company to make timely and independent decisions aimed at the achievement of sustainability.

Due to the scarce resources in the start-ups, it depends more on the network of relationships of the firm, or otherwise the founder, in order to obtain skills and knowledge required to refine their sustainability practices. From the reliant and trustworthy network of relations with the firm's stakeholder, that the founder is able to maintain, the firm can not only learn about efficient sustainability practices but also achieve sustainability-oriented goals in collaboration with them. Hence, the founder plays an important role to cultivate a network of relations with customers, suppliers, employees, or even start-ups or well-established companies of the same as well as different sectors, in such a way that they collaboratively align their objectives towards the achievement of sustainability-oriented goals.

In the context of the start-ups, it is clear that the founders play an important role in identifying, attracting, and maintaining the key relations in order to achieve sustainability-oriented goals. Thus, the skill and the competencies that the founder possesses whether it be ICT skills, managerial skills, marketing skills, technical or relational skills. These skills can contribute to effective business operations that reduce negative environmental impacts (Akhtar, Khan, Frynas, Tse, & Rao-Nicholson, 2018).

Hence, the main purpose of this thesis is to study the relationship between the skills and competencies that the founder possesses, the network of relations and level of collaboration with the stakeholders of the firm, and the commitment towards society and environment, collectively as the micro-foundations of sustainability.

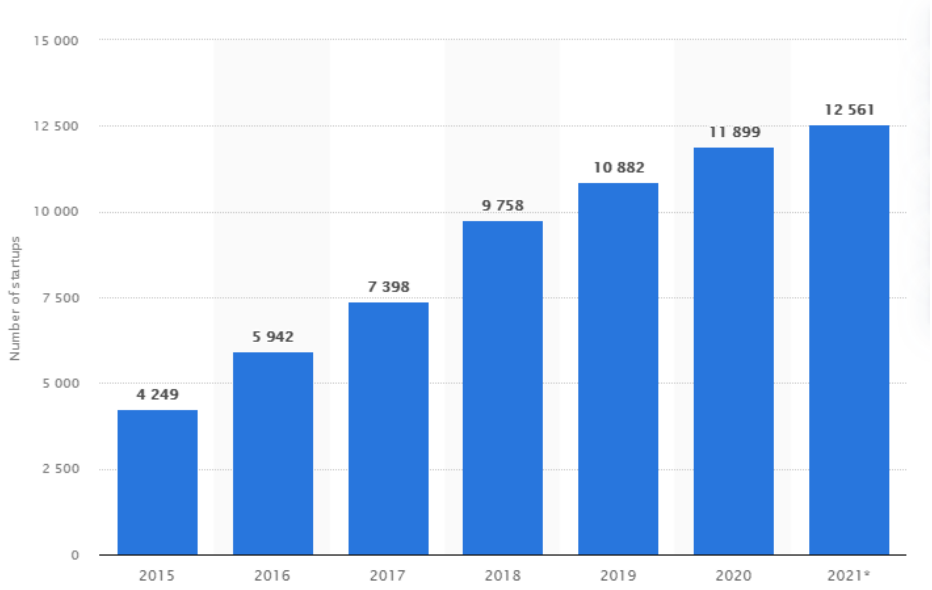
2.1 Start-ups in Italy

Italy passed a thorough legislative framework in late 2012 (Decree-Law no. 179 of October 18, 2012) targeted at promoting the formation and expansion of its startup ecosystem. Many of the policy proposals proposed in "Restart, Italia!" – a report compiled by a task force of 12 experts appointed by the Minister of Economic Development in April 2012 – as well as crowd-sourced policy suggestions arose during a large consultation with the main players in the Italian innovation

ecosystem – are gathered in Decree-Law 179/2012. Article 25 of the Decree-Law 179/2012 creates a completely new legal definition of an innovative startup. A comprehensive package of incentives (articles 26-31) was put in place to help this sort of company at every point of its life cycle, from formation to expansion and maturity (Development, 2019).

The Decree-Law also called as the "Italian Startup Act" (ISA), has sparked broad interest among Italian entrepreneurs more than six years after it went into effect. The ISA is targeted at innovative start-ups, which are freshly formed businesses with a strong link to technical innovation. There are no additional restrictions: inventive start-ups can work in any industry, including agriculture, energy, and manufacturing. The ISA also lays out certain requirements to be qualified as an innovative startup which is regulated by Circular 3677/C issued by the Italian Ministry of Economic Development on 20 January, 2015 (Trade, 2020). The ISA also provides various support measures such as free and digital incorporation for the innovative startup, exceptions to general company law, tailor-made labor regulations, various tax incentives, and simplified access to SME Guarantee Fund.

Figure 7 Start-ups in Italy



Source: https://www.statista.com/statistics/888478/number-of-innovative-startups-in-italy/

The number of innovative start-ups registered in the special section of the Business Register has been increasing at a gradual rate. The total share capital subscribed by the start-ups also has

increased and stands at 656.3 million euros[1] with the average capital of 57,090 euros per company. In terms of business sectors, 73.3 percent of innovative start-ups supply business services, with software development and IT consulting (35.6 percent) and R&D activities being the most common (13.8 percent). Almost 18 percent of start-ups work in manufacturing (3.2 percent in machinery, 2.8 percent in computers, and electronic and optical products), while 3.3 percent work in commerce (Trade, 2020).

When it comes to gender, women-led innovative start-ups — those in which women hold the majority of the shares and administrative functions – accounted for 13.2 percent of the total (1,522), a far smaller percentage than the 21.7 percent seen when looking at new "traditional" businesses. The number of innovative start-ups with at least one female employee is 4,902, accounting for 42.6 percent of the total, a smaller ratio than other new businesses (46.6 percent).

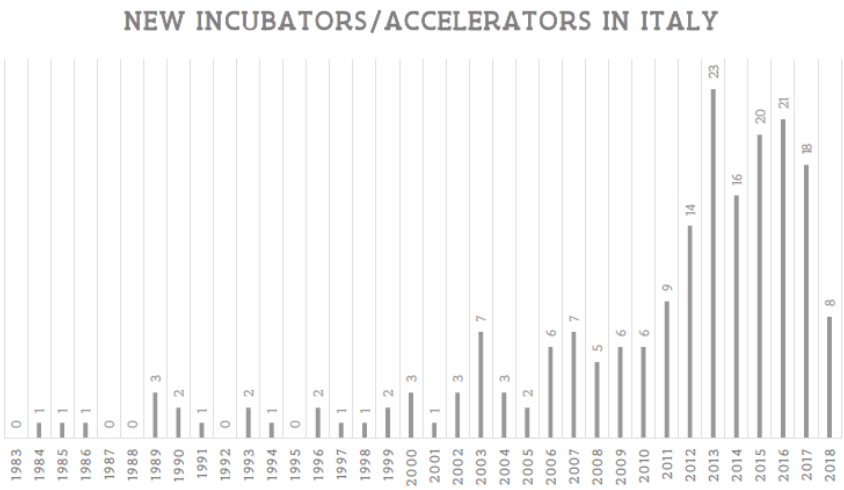
Young persons (under 35) account for 18% of all innovative start-ups (2,067 in total), compared to 15.3 percent of new non-innovative businesses. The disparity is even more pronounced among enterprises with at least one young employee: 41.4 percent of start-ups (4,758) against 32.8 percent of other businesses (Trade, 2020).

In Italy, incubators and accelerators play a crucial role in helping start-ups at different stages of its lifecycle. Both accelerators and incubators provide early-stage possibilities for entrepreneurs. Founders receive assistance in rapidly growing their business, which increases their prospects of later recruiting a top venture capital (VC) firm to participate in their company. Nonetheless, the programs provide distinct foundations for achieving entrepreneurial success. There are 197 active incubators and accelerators in Italy, according to the latest reports. Northern Italy is home to about 60% of these incubators and accelerators. With 26.4 percent of the total, Lombardy is the region with the most incubators, followed by Emilia Romagna with 2.7 percent and Lazio with 8.63 percent (Trade, 2020).

The Italian Startup Act of 2012 ushered in a new age for Italian businesses and incubators, and the plethora of new platforms that have sprung up since then are a direct result of that legislation. More than half of all incubators (54.1 percent) were built in 2013 or later.

[1] As of 30 June, 2020.

Figure 8 Growth of Incubators and Accelerators in Italy

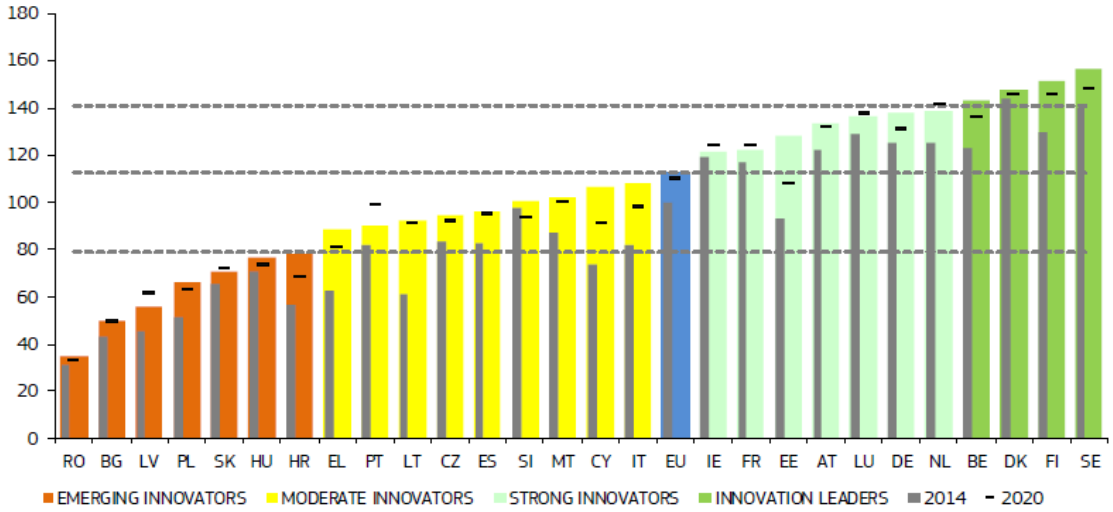


Source: (Trade, 2020)

Incubators and accelerators often provide a variety of services to assist entrepreneurs in navigating the national and international markets on their own terms. These services include managerial guidance (e.g.: drafting of business plans, business setup, business model development, mentoring, marketing and sales support, internationalization), real estate properties (including shared services), entrepreneurial and managerial training, fundraising assistance (including guidance on meeting potential investors), administrative and legal services, intellectual property management support, networking support (e.g. with research centers, universities, government agencies, companies and other incubated enterprises) and many more.

Hollanders and Es-Sadki (2021) have developed the "European Innovation Scoreboard," a metric that measures four key innovative dimensions: framework conditions (such as human resources) and investments (such as company investments or access to funding), as well as innovation activities (such as intellectual property) and impacts (employment or revenues). There are four major innovator categories based on score: "innovation leaders" (with a score over 125 percent), "strong innovators" (with a score between 100 percent and 125 percent), "moderate innovators" (with a score between 70 percent and 100 percent), and "modest innovators" (with a score under 70 percent).

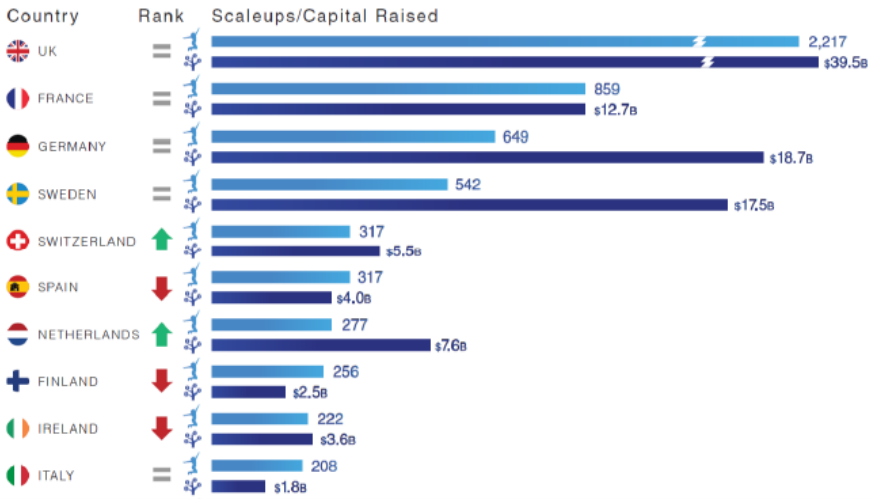
Figure 9 Performance of EU Member States' innovation systems



Source: (Hollanders & Es-Sadki, 2021)

Italy (IT) falls into the category of "moderate innovators", and as it can be clearly seen from the figure above that Italy has improved its performance from 2014 (80 percent) to achieve a value equal to around 100 percent in 2020 and around 110 percent in 2021. Small and medium-sized enterprises (SMEs) have fostered this trend by introducing new goods or processes while also resolving its shortcomings, such as financial assistance or human resources management (Hollanders & Es-Sadki, 2021).

Figure 10 Tech Scaleup Europe Country Index 2019

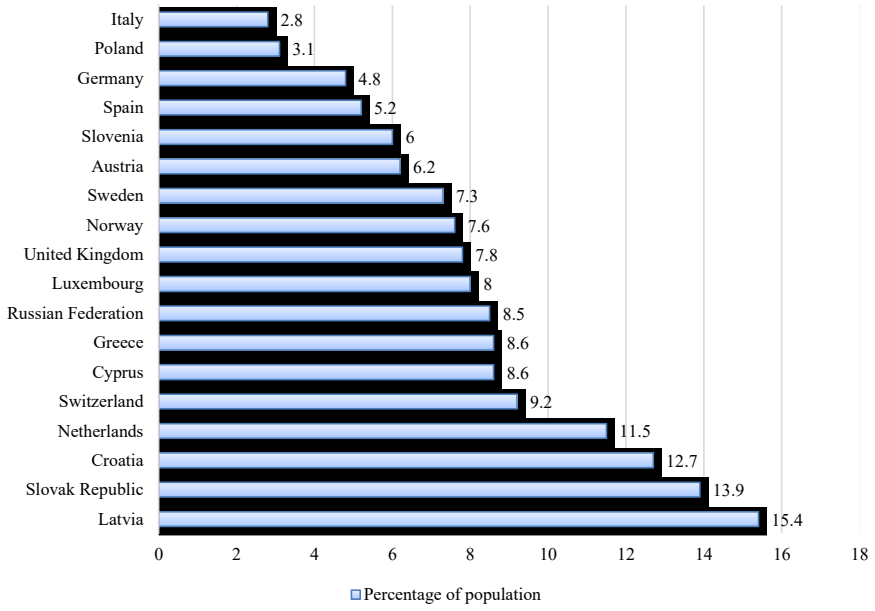


Source: (Trade, 2020)

If we look at how many active scaleups there are in Italy and how much capital they have raised, Italy only ranks 10th in the Tech Scaleup Country Index. This puts it behind nations like Ireland and Finland, both of which are far from economic powerhouses. There are 53 percent of scaleups in Europe living in Germany, France, and the United Kingdom. The top three nations account for 56 percent of the overall funding.

The probable reason behind Italy's ranking among the European countries could also be the population involved in the start-ups. According to the data collected, only 2.8 percent of the population in Italy were involved in the business start-ups. Furthermore, Italian youths seek employment abroad after their graduation. Italian graduates who work abroad earn on average greater salaries, have better odds of getting permanent employment and are more likely than their Italian counterparts to use their formal education as a tool to enhance their careers (Carella, 2021).

Figure 11 Percentage of population involved in business start-ups in Europe in 2020



Source: https://www.statista.com/statistics/315502/percentage-of-population-involved-in-business-start-ups-in-europe/

The phenomenon "brain drain" could also be one of the reasons why a low percentage of population are involved in start-ups. When a nation's human capital — its people, its talents – leave their own country in search of greater possibilities elsewhere, it's known as "brain drain." Around 14 billion euros a year are lost due to talent leaving Italy, according to estimates (the number of Italians leaving the country is roughly 80,000 every year) (Carella, 2021).

CHAPTER 3 – MICROFOUNDATION OF SUSTAINABILITY: LITERATURE REVIEW AND RESEARCH QUESTIONS

1. The theory of microfoundation

The theory of micro-foundations can be seen as an instance of “Reductionism” (Foss, 2010). According to Nicolai J. Foss, the concept of reduction refers to the process of explaining a particular topic in terms of more fundamental phenomenon, by disintegrating the topic into further fundamental levels. The disintegration into further level aids us in understanding the aggregate phenomena much clearly as we are able to understand to its origins, its behaviors and its relations with various other variables. By reductionism, in turn, means the best way to comprehend a complicated phenomenon is to "look at its structure, behavior, and rules as well as their interrelationships." (Foss, 2011) As a result of reductionism, science is viewed as a quest for "deep structure" under aggregate phenomena.

Foss (2011) also questions, to understand the extent to which the aggregate phenomena is to be reduced as there may exist multiple levels. The macro variables can be reduced to the organizational level as well as the individual level in the firm. The deeper the reduction, the higher the time consumption – or otherwise resource-consuming. There also exists some misconceptions regarding micro-foundations that they are all about individuals and are simply equivalent to disciplines such as psychology, human resources, or micro-organizational behavior. Furthermore, when we talk about the reduction of the macro variables, this could lead to an infinite regress (Barney & Fellin, 2013).

Therefore, the micro-foundations approach offers an explanation of the collective phenomena, such as sustainability of a firm through the commitment of firm towards the environment as well as the community, requires the consideration of lower level entities, such as the skills and the competencies that the founders possess and the level of collaboration with the stakeholders of the firm (Felin, Foss, Heimeriks, & Madsen, 2012).

There are many reason why micro-foundations approach is required to explain the collective phenomenon. According to Foss (Foss, 2010), the approach provides (i) alternative explanations, (ii) managerial intervention and (iii) fundamental causes and predictability.

As already discussed, there are many micro-foundations that drive sustainability and explain its relationship. Such as the HR practices, manager's influence on company's strategic decisions, its relationship with its stakeholders, commitment towards the society and the environment and many more. Hence, for the collective phenomenon of sustainability alone, we are able to provide explanations from different perspectives.

Managers, in any business, must be equipped to make judgments and take actions that enable them to obtain and maintain competitive advantage. Management involvement is necessary to achieve this, which must occur at the micro-level (Molina-Azorín, 2014). As per the journal (Del Giudice, et al., 2017), managers of the UK based SMEs engage in sustainability related activities only when those activities result directly in improving their financial well-being. On the contrary, managers of the Italian companies considered sustainability as an activity independent of the company's operations. Therefore, managers can intervene while understanding their influence on strategic decisions and lead the organization towards sustainable activities.

As in the journal (Felin, Foss, Heimeriks, & Madsen, 2012), the micro-foundation for routines in any organization are the individuals, processes and the structure of the organization. Without understanding these fundamental phenomena, it is inconceivable to explain the aggregate phenomena of routines.

To the extent that people are important, micro-foundations are necessary in order to explain collective strategic occurrences. In order to completely grasp any strategic subject at the organizational level (capabilities, knowledge, learning, identity), the company must start with and understand the core players, i.e. the individuals who make up the total.

There are a number of reasons in support of the micro-foundations project that have surfaced in contemporary management research. Creating micro-foundations, on the other hand, is far more difficult than just advocating for them. This is due to a number of factors.

Firstly, because the aggregate constructions have so many distinct dimensions and features, building micro-foundations for them is difficult. Let us use routines as an example. When it comes to routines, there are many distinct phenomena that share the commonality of referring to a group of individuals performing consecutive acts in the same way over and over again (there does not seem to be any definitional requirement that these must be employees). Aside from that, routines can differ in a variety of ways. They can be codified or implicit. They can be classified as either

performative or ostensive, depending on how they are presented. Either they're flexible or they're quite rigid and so forth. It's possible that regular micro-foundations differ based on these dimensions.

Second, the construction of multi-level theory is more difficult than mono-level theory. There are many and complex connections between layers. Aggregating people into groups inside networks is complicated since it must take into account how people are organized based on density and centrality, for example. In any case, multi-level theories with unambiguous micro-foundations do exist.

Thirdly, there are no clear, unambiguous behavioral models that command universal acceptance since management research borrows from so many sources and covers so many diverse challenges. When it comes to behavioral (micro-) foundations, there are a lot of options.

2. Environmental sustainability and its microfoundations

Businesses are increasingly being urged to embrace policies and practices that would improve the social, economic, and environmental circumstances of the communities in which they operate, according to a growing body of research (Porter & Kramer, 2011). Companies should be able to attain long-term sustainability by combining these three factors. Although they consume resources economically and effectively with no or minimal pollution to the environment and bring value to the community in which they operate, they are making consistent profits (Dyllick & Hockerts, 2002).

Many studies have already been carried out to identify different factors that drives a business to commit towards environmental sustainability. According to a research carried out that compares the cultural and creative SMEs in UK and Italy, the micro-foundations that drive sustainability are manager's influence on the company's strategic decisions, their HR practices, relationship with stakeholders, and their interaction with society as well as towards the environment (Del Giudice, et al., 2017). A study carried out focusing on MNEs in Brazil, Russia, India and China, identifies a set of routines to manage three institutional forces (regulative, normative and cultural-cognitive) and support micro-foundations at individual, interactive and structural levels in achieving environmentally sustainable positions (Elg, Ghauri, Child, & Collinson, 2017). An empirical study carried out in 71 countries from multiple industries, shows the increase in level of sustainability activities in the organization with increase in involvement of number of women on the board of directors (Shoham, Almor, Lee, & Ahammad, 2017). Also, a theoretical and empirical study suggests that by building upon the ethics of care (EoC) among the organization's employees, it can drive employee involvement in sustainability related behaviors (Carmeli, Brammer, Gomes, & Tarba, 2017). A study examined the link between top management tangible competencies (TMTCs), relationship-based business networks (RBNs) and environmental sustainability, based on the unique data collected from 175 top management representatives working in food imports and export firms headquartered in the UK and New Zealand (Akhtar, Khan, Frynas, Tse, & Rao-Nicholson, 2018).

The application of micro-foundations has emerged as an important theme in management research. The use of the theory of micro-foundations helps us in clarifying the micro-economic variables pertinent towards specific macro-economic variables. It further helps in understanding the

interactions between the underlying micro-economic variables and hence the presence of heterogeneity in these variables resulting in heterogeneity among firms. Furthermore, in simple words, the theory of micro-foundations helps us to clearly articulate concepts at higher level of analysis from lower level entities and their interaction (Foss, 2010).

Resource-Based View (RBV) research also shows that resources and capabilities are key to understanding why certain businesses outperform others in a particular industry (Barney, 1991). Investments in employee training or employee engagement systems, for example, can provide significant returns if they are targeted at resources that are precious, uncommon, unique, and non-replaceable (VRIN), according to Barney. Because they allow us to comprehend how different sorts of resources or competences may contribute towards sustainability, both the RBV and more current debates on micro-foundations are crucial to understanding sustainability practices and processes of organizations.

However, to attain economic, social, and environmental sustainability, it is frequently stated that firms must deviate from their conventional operations by significantly changing their business practices in order to reach this goal. As a result of their modest size and inexperience, small firms are unable to make such adjustments. This means that there are no managers in charge of learning about and implementing sustainable practices or activities. Consequently, understanding the adoption of sustainable practices by small businesses through the direct application of RBV and micro-level activities would be an essential theoretical lens through which to comprehend SME sustainability processes and mechanisms.

Much RBV-related research has mostly focused on how company-specific resources and capabilities promote corporate sustainability goals. But despite all of these ideas, very little attention has been devoted to how the resources and abilities of leaders–owners and micro-level interactions between individuals may enhance the environmental sustainability practices of SMEs. Hence the primary concern of this thesis is to study the relationship between the commitments of founders of ICT start-ups towards environmental sustainability, the skills and competencies that the founders possess, and their collaboration with its stakeholders such that they can further strive towards environmental sustainability.

In the context of a small firm, the founder, as an idiosyncratic individual, is responsible for everything from operating the company to managing its human resources and making timely and autonomous choices targeted at attaining any sustainability goals. The study of micro-foundations

provides us with a theoretical framework that allows us to examine how founders' activities might help SMEs to attain sustainability. Few studies have looked at how the resources and abilities of the founders, as well as the micro-level interactions of individuals, may help SMEs become more environmentally sustainable (Akhtar, Khan, Frynas, Tse, & Rao-Nicholson, 2018). As a result, the major goal of this thesis is to investigate the link between the commitments of Italian ICT start-up founders to environmental sustainability, their skills and competencies, and their engagement with stakeholders.

2.1 Founders' competencies and environmental sustainability

Many academics believe that organizational resources and skills possessed by the founders may play a significant influence in enhancing the environmental performance of businesses for a long time. The use of RBV may aid us to study how micro-foundations such as competences of the founders are connected to environmental sustainability since business scholarship has evolved in recent years towards examining micro-foundations of the RBV (Abell, Felin, & Foss, 2008). Affirming that firm-specific resources and competencies can provide a competitive advantage, this scholarship has long explored how specialized resources and competencies can improve organizational environmental practices, while paying less attention to how resources and competencies of leaders can improve environmental sustainability (Akhtar, Khan, Frynas, Tse, & Rao-Nicholson, 2018).

The micro-level studies has improved our understanding by positing that knowledge and skills are not directly held by firms, but rather by individuals working in organizations, whose unique motivations, demands, and preferences drive organizational sustainability practices (Del Giudice, et al., 2017). Some scholars have suggested that top-level managers' idiosyncrasies and those of small-business owners are essential when engaging in cooperative sustainability efforts with other heterogeneously driven stakeholders.

The RBV micro-fundamentals research has lately shifted its attention to the role individuals play in generating, using, and maintaining these micro-fundamentals from its former emphasis on developing resources and competencies at the organizational level (Barton & Court, 2012). Firms, according to contemporary RBV literature, do not possess relevant in-depth knowledge and demonstrable capabilities, but rather by the individuals inside the firm. As Coff and Kryscynski (2011) noted, *"valuable capabilities rely on individuals with idiosyncratic goals, desires, and preferences who can choose whether to join, stay, or exert effort"*.

Various studies have been made that identifies the competencies of the start-up founders which acts as the key criteria to drive the growth of the start-up and its commitments towards environment and society. According to a study performed by Hudáková, Urbancová and Vnoučková (2019), it aims to research and discover essential and efficient abilities of start-up founders and new company leaders, coupled with the identification of crucial support given by accelerator programs. According to them, innovativeness, industry 4.0, and technology-driven business models

necessitate these skills. To take a firm to the next level, there is need a unique mix of skills from entrepreneurs who can think beyond the box. A study done by Lee and Ha (2015), through a data collected from a survey with 320 entrepreneurs, these experts stressed the significance of entrepreneurship and entrepreneurial skills, such as market orientation, marketing skills, and networking skills. Also, according to Kim, Kim and Jeon (2018), entrepreneurial circumstances like goal-orientation and the competency of the founders are crucial success factors for new businesses as they surveyed a total of 24 experts, 12 from design-based small venture startups and 12 from technology-based small and medium startups.

Therefore, we propose to study the relationship between skills and competencies of the founders and environmental sustainability such that:

Question 1*: How do skills and competencies of the founders affect environmental sustainability? Which of them play a major role in contributing towards environmental sustainability?*

2.2 Collaboration with stakeholders and environmental sustainability

Network theories assist explain business networks, and networks have evolved as a result of the growing complexity of current company operations, which are massively integrated via information and data flows among network links. Trust, satisfaction, and shared decision-making all play a role in these networks' ability to promote environmentally sound behavior (Akhtar, Khan, Frynas, Tse, & Rao-Nicholson, 2018). Scholars have highlighted that these networks play an important role in mediating the access to valuable resources, thereby enabling innovation and a shift in the organization structure that contributes to the creation of knowledge associated with environmental sustainability (Powell, Koput, & Smith-Doerr, 1996). As a result, corporate networks might be crucial for disseminating and strengthening environmental outcomes by offering essential know-how that is shared.

There is still much to learn about the precise ways in which social networks impact sustainability metrics, despite their importance. As a result, there is still a lot to learn about the relationship between corporate networks and environmental sustainability, particularly in terms of how these relationship-based networks exchange best practices and create mutual trust.

A study carried out on 170 firms in the Basque Country region in Spain indicated the advantages of open innovation paired with alliance skills in achieving beneficial outcomes in sustainability-oriented innovation. While firms concentrating on incremental sustainability-oriented innovation might profit more from open innovation when working within their existing portfolio, alliance pro-activeness is helpful for seeking disruptive partners for radical sustainability-oriented innovation (Inigo, Ritala, & Albareda, 2020). Based on the empirical data from 248 technological start-ups, another study found that businesses with strong external environmental focus had greater networking frequencies and create larger networks. Smaller networks are associated with a high internal environmental focus, on the other hand (Dickel, Horisch, & Ritter, 2018). High-environment-concern startups were determined to be among the companies that will gain more attention and be more scalable. Researchers discovered that environmental orientation is a critical component of startup networking, even if the effects of exterior and interior environment orientation differ significantly (Sheoran & Kumar, 2020). As a result, there is a strong link between the environmental concerns of the start-up and networking, indicating the importance of environmental concerns in company operations.

Trust and the length of a connection have also been shown to have an essential influence in the exchange of resources between network partners. For example, it has been proposed that the density and strength of social relationships are key factors in the creation of innovation that is associated with long-term success (Akhtar, Khan, Frynas, Tse, & Rao-Nicholson, 2018). By leveraging business networks that are trustworthy and well-liked, companies get a competitive advantage by being able to respond quickly and effectively to market developments. These interconnected corporate partners gather, analyze, and integrate data to support their collaborative decision-making. This helps them to discover their operational shortcomings and enhance logistics influencing environmental components such as waste reduction, material efficiency and overall environmental performance (Li, Xie, Teo, & Peng, 2010). Incremental adjustments (e.g. commitment, trust and shared decision making) in such firms are likely to have beneficial effects on environmental sustainability because of the logic of business network sharing. Furthermore, a higher degree of contentment and confidence in business networks has been related to a more positive view of environmental issues (Rao, O' Castillo, Intal Jr, & Sajid, 2006).

In addition, Schoenherr and Speier-Pero (2015) stated that business networks provide a number of advantages, including greater visibility, decreased network complexity, cost savings, better demand planning, and other operational advancements that contribute to environmental sustainability. Networks like these aids companies in identifying environmental hazards and consumers who may be affected by environmental legislation. In business networks, long-term connections and mutual trust are perhaps the most important assets for responding to shifting environmental legislation and relevant supplier practices that have an impact on the overall sustainability of the network. Also, collaboration between universities and industries improves the performance of small and medium-sized businesses. More precisely, informal partnerships have a favorable impact on innovation performance since they do not limit the firm's innovativeness but are perceived as more effective for obtaining beneficial outcomes (Apa, Marchi, Grandinetti, & Sedita, 2021).

Using relationships as the foundation of the network, partners exchange insights and analytics that help them adopt creative methods to handle complicated business networks connected to contemporary data and information-driven operations. Their trust-based and shared decision-making strategy may help them deal with such modern operations more successfully, which in turn helps them acquire environmental benefits over rivals.

Thus, we propose the following linkages between corporate networks and their engagement with stakeholders, and environmental sustainability:

Question 2*: How does collaborations with stakeholders affect environmental sustainability? Which of them play a major role in contributing towards environmental sustainability?*

CHAPTER 4 – THE CASE OF ITALIAN ICT START-UPS

1. Methodology

The general goal of the study undertaken in this thesis is to assess the influence of the competencies of the founders and the collaborations that exist in the business with its stakeholders on the environmental performance of innovative start-ups in the ICT industry in Italy. Two questionnaires were distributed through CATI methods to a sample of innovative ICT start-ups situated in Italy for this purpose. The first questionnaire administered to the pool of start-ups has 24 questions. It contains personal information about the firm (e.g. company name, activity, year of incorporation, type, number of founders, number of employees, its current phase, financial information about sales and BEP). It also includes the forms of collaboration with outside actors (e.g., with universities, suppliers, or other start-ups), the company's core business (e.g., B2B, B2C, B2B2C), the adoption of innovative technologies (e.g., 4.0 technologies), and funding sources (e.g. personal funds or public funds). Finally, it comprises choices on the company's strategic direction (e.g., product development or increased turnover), operational (e.g., business model), and entrepreneurial (e.g., environmental sustainability initiatives). The second questionnaire administered to the pool of start-ups has 12 items divided into two sections. The first component contains personal information about the founders, such as previous experiences, academic qualifications, or skill level. The second portion is concerned with relational networks, network frequency (of interaction), network strength, and network governance systems. The two questionnaires can be found in the appendix of the thesis.

Table 1 ATECO Classification of sample data

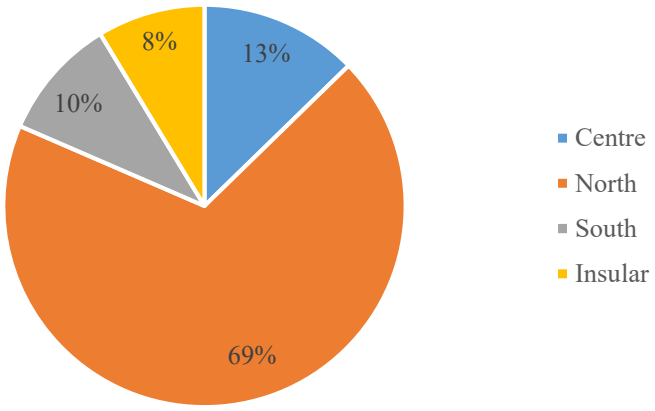
ATECO code	ATECO - Economic Activity	No. of Start-ups
62.01	Production of software not related to the edition	124
62.02	Consultancy in the field of information technology	20
63.1	Data processing, hosting and related activities; Web portals	1
63.12	Web portals	27
63.11.3	Hosting and provision of application services (ASP)	1
	Total	**173**

Source: (ISTAT, 2007)

2. Sample Data

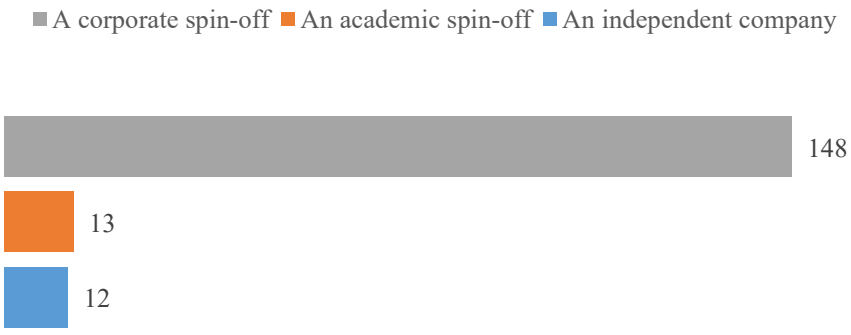
The sample data consists of responses from 173 start-ups in Italy, which are grouped according to ATECO codes (ISTAT, 2007) and the respective sector that they belong to, shown in the table above.

Figure 12 Distribution across different regions



According to the sample data obtained, the northern side leads in terms of company concentration and technical specialization. The bulk of the sample's creative start-ups are located in the north, with only 10% located in the south. Some distribution of the start-ups is also be found in Italy's central and insular regions.

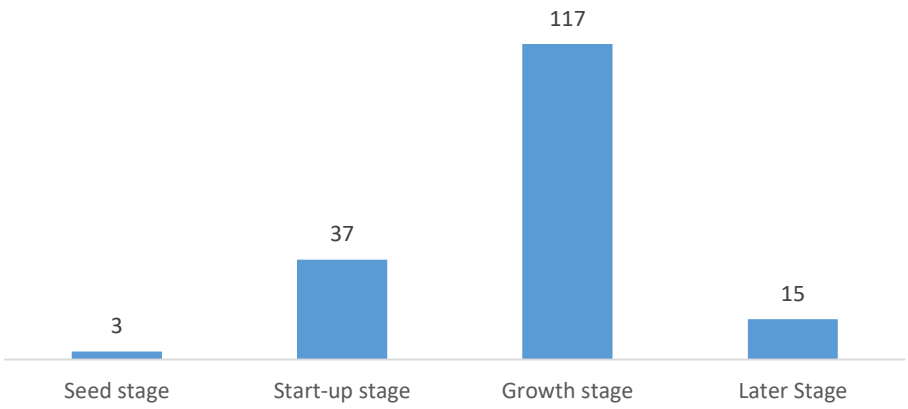
Figure 13 Origin of the Start-ups



148 of the start-ups were established as a consequence of a corporate spin-off, 13 as a result of an academic spin-off, and 12 of them started as an independent business, according to the data collected.

Among the start-ups, 3 of them were in the very early stage of their life cycle, i.e. seed stage, where the founders generate the ideas for the start-up and approach the investors to find the financial support necessary for their concept of the product. 37 of the start-ups from the collected sample data were in the stage where they were ready to offer the product / service of the start-up to the market, also known as the start-up stage. Most of the start-ups from the sample data were found to be in the growth stage, 117 of them. In this stage, the business would be generating a consistent source of income and could also be offering one or more products / services to the market. Lastly, 15 of the start-ups from the sample data, were found to be in the later stage of the life cycle where the start-ups broaden their horizon with expanded offerings and enter into new geographical areas.

Figure 14 Start-ups and their current stage in the life cycle



3. Preliminary analysis

On the data obtained from the survey, different analysis were done before performing the regression analysis. Firstly, KMO test was performed on the variables related to the collaborations and the skills, which was then followed by exploratory factor analysis to reduce the data to a smaller set of summary variables and to explore the underlying theoretical structure of the phenomena. For

the variables related to skills of the founders, two factors were obtained. The respective variables were then averaged to form two different variables, namely *nontech_skills and tech_skills.* Similarly, for the variables related to the collaborations, five factors were obtained. Their respective variables were averaged and five variables were formed, namely *coll_uni, coll_startup, coll_sup, coll_consul and coll_samefirm.*

The validity of resulting variables were tested by correlating the constructs and its component variables. All of the respective variables are highly correlated to their corresponding constructs. Furthermore, the reliability of each of the component variables were also tested. The results of the test for all of the variables were acceptable. Then, we performed regression analysis on the resulting variables.

4. The regression analysis

In order to test the relationship between environmental sustainability, founders' competencies and collaborations with various stakeholders of the business, we have estimated four regression models. These four regression models consists of different dependent and independent variables that helps us study the relationship among them and derive a conclusion such that we can understand which of them play a major role in contributing towards environmental sustainability.

4.1 Dependent variable(s)

On the basis of our survey, in order to study the micro-foundations of sustainability, we have taken two of the variables as the dependent variables. The first variable, **soc_sust**, explains the steps taken by the start-ups for the betterment of society. To be specific, the survey asked the start-ups if they were involved in supporting social and environmental projects in the area they operate, whether they carried out communication and community involvement activities, whether they granted liberty in favor of non-profit associations, whether they had activated with those non-profit organizations, whether they had implemented initiatives to support the enhancement of the territory and cultural heritage, whether they had created a non-profit or promoted voluntary activities at the

corporate level, and so on. These questions were asked in the survey to identify their level of involvement in the sustainability of the society they operate in.

The second variable, **env_sust**, explains the steps taken by the start-ups involved in the survey to demonstrate their commitment to the environment. They were asked whether they had used production processes that reduced the environmental impact, whether their suppliers were assessed from an environmentally sustainable perspective, whether they carried out training activities for their employees on environmental issues, whether they adopted policies that contributed toward the reduction of energy consumption, whether they encouraged the use of recycled materials, whether they monitored the amount of waste materials in relation to their production levels, and so on. These questions would help us represent their level of commitment toward the environment.

The data for both the factors were recorded based whether the startups performed the activities or not (i.e. yes or no). Then, the scores were summed up to form the variables *soc_sust* and *env_sust*.

4.2 Independent variable(s)

To study the micro-foundations of environmental sustainability, we have specifically taken into consideration two of the factors that contribute toward environmental sustainability. The first factor explains the skills and competencies that the founders of the start-ups possess, whereas the second factor explains the collaborations that the start-ups have with their stakeholders.

The role of skills and competencies. We have already discussed in our thesis that most start-ups are constrained financially. It is through the skills and competencies of the founder that they can contribute toward environmental sustainability. Thus, in order to find out how the skills and competencies of the founders affect environmental sustainability and which of the skills plays a major role in contributing toward environmental sustainability, we have taken into consideration two variables. The first variable, **nontech_skills**, determines the level of skills that the founders possess. This variable mainly includes the marketing, managerial, and relational skills that the founders have that could help the start-ups contribute toward environmental sustainability. The second variable, under the skills and competencies of the founders, **tech_skills**, determines the level of skills that the founders own in terms of information, communication, technology (ICT), and other technical skills. These variables were expressed on a Likert scale of 1 – 7 where 1 stands

for having no competence and 7 stands for having high competence for the skill. The two constructs, *nontech_skills* and *tech_skills*, were obtained by averaging the variables based on the results of the factor analysis.

The role of collaborations. We have also discussed the strong relationship between environmental concerns and the importance of networking in our thesis. Thus, in order to find how collaborations with different stakeholders of the start-ups affect environmental sustainability and which of these collaborations have played a major role in contributing toward environmental sustainability, we have taken into consideration four variables. The first variable, **coll_uni**, represents the average likelihood of collaboration with universities for information on market and technical reasons. Similarly, the second variable, **coll_startup**, represents the average likelihood of collaboration with start-ups in other sectors for information on market and technical reasons and start-ups in the same sector for information on the market. The third variable, **coll_consul**, represents the likelihood of collaboration with private consultants for information on market and technical reasons. Furthermore, the fourth variable, **coll_samefirm**, represents the likelihood of collaborations with firms in the same sector for information on market and technical reasons. Finally, the fifth variable, **coll_sup**, represents the likelihood of collaboration with the suppliers in the market for information on market and technical reasons. These variables were expressed on a Likert scale of 1 – 7 where 1 stands for having no collaboration at all and 7 stands for having strong collaboration with the stakeholders. The above constructs were then obtained averaging the variables based on the results of the factor analysis performed. A brief summary of the variables can be found in Table 5 in the appendix.

4.3 Results and discussion

In Table 3 and 4, the results of regression models can be checked; in addition to the p-value for each coefficient, each regression model has some metrics to check the validity and accuracy of the model. R squared and Adjusted R squared, in particular, are strong measures of the overall fit of the regression model (Cameron & Windmeijer, 1997). Table 2 shows the correlation coefficient, mean and standard deviation of the variables.

Table 2 Correation Matrix

	Mean	Std. Deviation	soc_sust	env_sust	nontech_skills	tech_skills	coll_uni	coll_sup	coll_consul	coll_samefirm	coll_startup
soc_sust	1.538	1.686	1.000	.202**	.195*	-0.004	0.093	0.107	.172*	0.144	.342**
env_sust	1.503	1.543	.202**	1.000	-0.031	0.027	0.106	0.018	.176*	0.123	0.110
nontech_skills	5.152	1.133	.195*	-0.031	1.000	.209**	0.012	.165*	.229**	0.031	.171*
tech_skills	5.217	1.411	-0.004	0.027	.209**	1.000	0.088	0.106	.164*	0.133	0.061
coll_uni	3.194	2.140	0.093	0.106	0.012	0.088	1.000	0.109	.173*	.232**	.259**
coll_sup	3.486	2.002	0.107	0.018	.165*	0.106	0.109	1.000	0.104	.266**	.260**
coll_consul	3.566	1.877	.172*	.176*	.229**	.164*	.173*	0.104	1.000	.173*	.185*
coll_samefirm	3.410	1.891	0.144	0.123	0.031	0.133	.232**	.266**	.173*	1.000	.240**
coll_startup	2.566	1.549	.342**	0.110	.171*	0.061	.259**	.260**	.185*	.240**	1.000

Source: Own elaboration

Table 3 Result from regression on commitment toward society

Independent Variables	soc_sust							
	Unstandardized Coefficients B		Standard Error		t value		p value	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	-0.337	-0.337	0.689	0.608	-0.49	-0.555	0.625	0.58
coll_uni	-0.006	-0.006	0.06	0.054	-0.105	-0.115	0.917	0.908
coll_sup	-0.01	-0.01	0.065	0.062	-0.156	-0.164	0.876	0.87
coll_consul	0.08	0.08	0.068	0.067	1.165	1.188	0.246	0.237
coll_samefirm	0.061	0.061	0.069	0.073	0.873	0.83	0.384	0.408
coll_startup	0.321	0.321	0.085	0.098	3.764	3.284	0	0.001
nontech_skills	0.207	0.207	0.114	0.102	1.824	2.031	0.07	0.044
tech_skills	-0.087	-0.087	0.089	0.079	-0.975	-1.105	0.331	0.271
R^2	0.151							
Adjusted R^2	0.115							

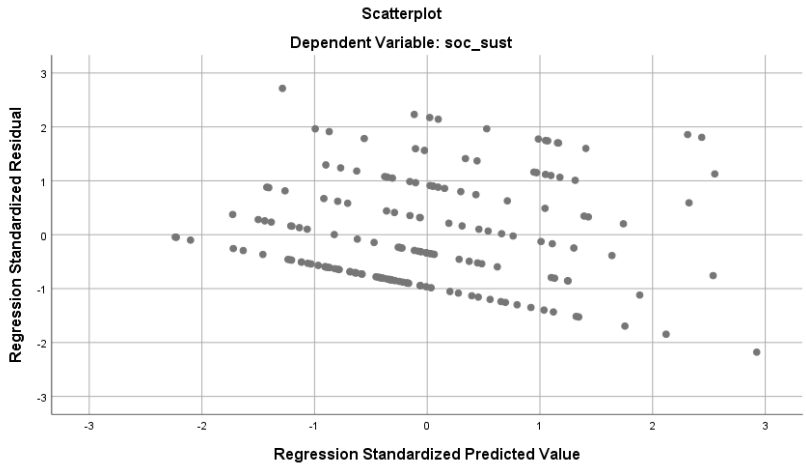
Source: Own elaboration

Analyzing the results from Table 3, Model 1 represents the multiple regression analysis carried out on SPSS where the dependent variable is “soc_sust” and the independent variables are coll_uni, coll_sup, coll_consul, coll_samefirm, coll_startup, nontech_skills, and tech_skills. From the values of the R-squared, the model explains 15.1% of the variation in the dependent variable. Looking at the coefficients, the t value and the p value, only the independent variable “coll_startup” with a p value less than 0.05 is statistically significant.

Testing for heteroscedasticity, from figure 15, the vertical spread of the residuals is relatively low for lower levels of predicted value of commitment towards society. As we move from left to right, the predicted value increases, we see that the vertical spread of the residuals also increases. This spread also shrinks somewhat at the higher levels of predicted value. This pattern in the variance of residuals means we have evidence of heteroscedasticity in Model 1 of Table 3.

The Model 2 from Table 3 is the result of multiple regression analysis with robust standard error. Analyzing the Model 2, two of the independent variables, coll_startup and nontech_skills, are statistically significant as their p values are less than 0.05. This implies that, in the data sample taken, the managerial, marketing and relational skills that the founders possess and the collaboration with the start-ups from the same sector as well as other sectors has a positive impact on the commitment toward the society.

Figure 15 Heteroscedasticity on commitment toward society



Source: Own elaboration

Analyzing the results from Table 4, Model 1 represents the multiple regression analysis carried out on SPSS where the dependent variable is "env_sust" and the independent variables are coll_uni, coll_sup, coll_consul, coll_samefirm, coll_startup, nontech_skills, and tech_skills. From the values of the R-squared, the model explains only 5.3% of the variation in the dependent variable. Looking at the coefficients, the t value and the p value, only the independent variable "coll_consul" with a p value less than 0.05 is statistically significant.

Testing for heteroscedasticity, from Figure 16, the vertical spread of the residuals is relatively low for lower levels of predicted value of commitment towards environmental sustainability. As we move from left to right, the predicted value increases, we see that the vertical spread of the residuals also increases. This spread also shrinks somewhat at the higher levels of predicted value. This pattern in the variance of residuals means we have evidence of heteroscedasticity in Model 1 of Table 4.

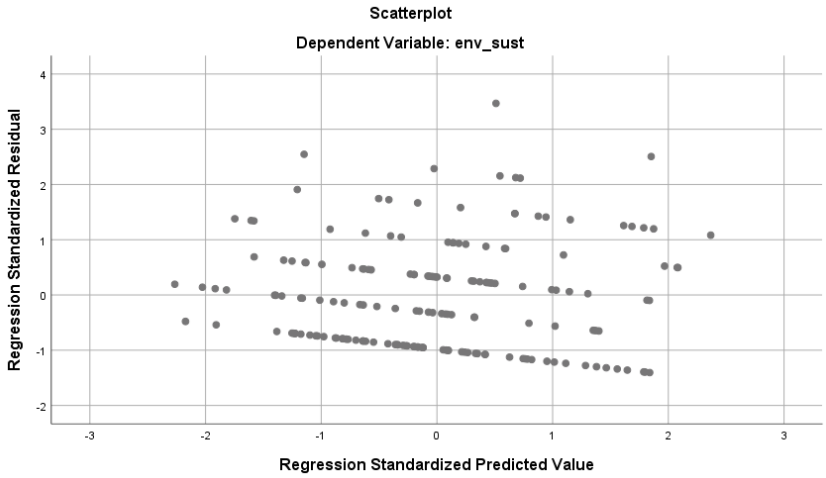
Table 4 Result from regression on commitment toward environment

	env_sust							
Independent Variables	Unstandardized Coefficients B		Standard Error		t value		p value	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	1.146	1.146	0.666	0.737	1.721	1.556	0.087	0.122
coll_uni	0.033	0.033	0.058	0.059	0.569	0.56	0.57	0.577
coll_sup	-0.023	-0.023	0.063	0.064	-0.364	-0.355	0.716	0.723
coll_consul	0.134	0.134	0.066	0.071	2.02	1.874	0.045	0.063
coll_samefirm	0.063	0.063	0.067	0.078	0.947	0.813	0.345	0.417
coll_startup	0.07	0.07	0.083	0.089	0.845	0.785	0.399	0.434
nontech_skills	-0.106	-0.106	0.11	0.111	-0.968	-0.955	0.334	0.341
tech_skills	0.001	0.001	0.086	0.094	0.015	0.014	0.988	0.989
R^2	0.053							
Adjusted R^2	0.012							

Source: Own elaboration

The Model 2 from Table 4 is the result of the multiple regression analysis with robust standard error. Analyzing the Model 2, none of the variables are statistically significant as every variable has p value greater than 0.05. This implies that, in the sample data, none of the considered independent variables have impact on commitment towards environment.

Figure 16 Heteroscedasticity on commitment toward environment



Source: Own elaboration

CONCLUSIONS

The entire work made significant additions to the literature on environmental sustainability and the business literature in general; these contributions may be found across all of the chapters. First, the importance of environmental sustainability has been emphasized and thoroughly described. With the growing concern for environmental sustainability, this thesis attempts to go through the history of the term "environmental sustainability" and discover how it was coined. Many authors acknowledged the significance of environmental sustainability; nevertheless, only a few of them presented tangible instances of the concept's implementation. The thesis also addresses how the traditional business model canvas falls short of helping businesses achieve environmental sustainability. Thus, it attempts to introduce the three-layered business model canvas that sets a general guideline to strive towards environmental sustainability.

Second, we addressed the trend of environmental sustainability in the workplace. The data and articles mentioned in this thesis, reflected how many firms were actively incorporating sustainability into their operations. Global corporate executives also pushed sustainability projects and practices in their organizations, recognizing the importance of platforms for a company's survival in a world of harsh competition. Businesses have recognized that businesses can play a critical role in reducing deteriorating environmental quality, poverty, and social inequality, as well as moving society toward sustainable development. It is also commonly acknowledged that without the backing of companies, society can never achieve sustainable development, as businesses are the economy's productive resources. All of the claims in the thesis are supported by actual data as well as theoretical advances in the field of business sustainability.

The focus then moves from big enterprises to small start-ups which is the main center of attention of the whole thesis. Many papers emphasized that start-ups are typically resource restricted since they are in the early stages of business operation. It was also mentioned that the founders play a crucial role in discovering, developing, and retaining critical relationships in order to achieve long-term goals. Eventually, the trend of start-ups in Italy were also studies.

Finally, the concept of micro-foundations was introduced. By decomposing the issue into further fundamental levels, the notion of micro-foundations assisted in explaining the process of a specific topic in terms of more fundamental phenomena. Hence, in this thesis, the skills and competencies that a founder possesses and the collaboration that the founder was able to form with their

stakeholders were treated as the micro-foundations that helped us study the macro phenomenon of environmental sustainability. Many empirical types of research were also addressed that already studied the micro-foundations that drive a business to commit toward environmental sustainability. As a result, it was established that employing the theory of micro-foundations assists us in defining the micro-economic factors relevant to certain macroeconomic variables. It was also discovered that very little thought had been given to how the resources and talents of leaders–owners, as well as micro-level interactions amongst individuals, could improve the environmental sustainability practices of small and medium-sized businesses. Consequently, the primary focus of this thesis is to investigate the relationship between the commitments of ICT start-up founders to environmental sustainability, the skills, and competencies that the founders possess, and their collaboration with their stakeholders to further strive for environmental sustainability.

Furthermore, there are also contributions on management implications and advice for start-ups and their founders. First, as we clearly understand by now, start-ups are in the very primary phase of their life cycle, which makes them financially constrained. They have to deviate from their traditional daily operations if they are to follow and implement sustainability-oriented goals. Thus, it depends solely on the non-technical skills of the founders, which include marketing, managerial, and relational skills, which they can use to lead the business toward environmental sustainability. These non-technical skills will help the start-ups manage their daily tasks as well as the operations that will help them achieve sustainability-oriented goals. These skills will also help them to portray their image in the society that they operate in, as those who are environmentally concerned. Moreover, these skills will help them form important relationships with their stakeholders, so that all of their stakeholders can co-exist and strive toward environmental sustainability.

Second, the collaborations that the start-ups form also plays an important role that will help them achieve their sustainability-oriented goals. These collaborations have a positive impact on their innovative performance as well as influence each other to strive towards economic, social and environmentally sustainable goals.

Lastly, all of the statistical analyses performed in this work encouraged a clear vision of environmental sustainability; through the results of the regression framework, start-ups and, in particular, founders can understand how their skills and competencies, as well as their collaborations with their stakeholders, affect environmental sustainability, and which of them play a major role in striving toward sustainability-oriented goals. Finally, cultivating the necessary skills

and competences, as well as selecting to construct the best connections with their stakeholders, is the key to developing a winning business plan and attaining long-term goals even in the early stages of a company's life cycle.

While this thesis contributed to recent literature on environmental sustainability, the skills and competencies of the founders, and the role of collaborations on several levels, there are some limitations and aspects that were not highlighted here; these latter features can serve as the starting point for future research by other authors. First, the study undertaken in this thesis was strictly limited to Italy; future research agendas might include an examination of other national settings to see if all factors behave differently. Indeed, many nations are profoundly impacted by the elements discussed in this article, which explains why two countries may have divergent outcomes when particular policies are adopted, despite the fact that these policies are nearly similar.

Second, only the skills and competencies of the founders and the role of collaborations with stakeholders were analyzed in the regression models; other author could also add in other variables such as change in business models, networking abilities and so on.

Third, while this thesis focuses on start-ups in the ICT industry, it will be fascinating to see if similar ideas apply to other sectors and major corporations. The founders' abilities and competences, as well as the role of teamwork, are critical for start-ups, particularly in their early phases, but this does not imply that this capacity can be simply recreated in a wider environment. Furthermore, we anticipate that the value of the founder's personal talents would diminish in larger companies: in this situation, managers are accountable for running the firm, whilst entrepreneurs are more focused on financial care. Furthermore, the kind of firm might be an interesting distinguishing factor: for example, in our sample, there are some spin-offs, while accounting for a small fraction of the total group of start-ups; this is also why this small subgroup is not examined individually in the regression framework.

Finally, it is necessary to convey some thoughts about the main character of the thesis, start-ups. For these reasons, and in recognition of their importance in the new paradigm of environmental sustainability and the ICT industry, it is essential to highlight how alternative types of companies are selected. Each other can significantly influence the final results of the thesis. It's not simply a matter of size; age and organizational structure also have a significant impact on the results we achieve at work.

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APPENDIX

The questionnaire used for the survey:

UNIVERSITÀ DEGLI STUDI DI PADOVA

DIPARTIMENTO
DI SCIENZE ECONOMICHE E AZIENDALI
"MARCO FANNO"

THE FOUNDERS of INNOVATIVE ITALIAN START-UPS IN THE SECTOR OF CREATIVE INDUSTRIES

Scheda da compilare per ogni fondatore.

SECTION A: DATA about FOUNDERS

1. Company name: _____

_____

CODE QUESTIONNAIRE: _____

2. How old were you when you founded the company? (insert numbers)_____

3. Is this the first company that you create?

1. yes 2. no **→ *question 5***

4. How many others?

_____

5. What kind of professional experience did you have at the time of creation of the company?

		yes	**no**
a)	none	1	2
b)	I worked in a family business operating in the same sector of the company	1	2
c)	I worked in a family business operating in another sector	1	2
d)	I worked in another company operating in the same sector of the company	1	2
e)	I worked in another company operating in another sector	1	2
f)	self-employed consulting activity	1	2
g)	foundation of another company operating in the same sector of the company	1	2
h)	foundation of another company operating in another sector	1	2

6. Education level:

1. Primary school
2. Secondary school
3. Tertiary education
4. University
5. PhD / post-graduate

7. Give an assessment of the level of skills possessed : *(1= nothing, 7 = high competence)*

		1 = nothing					**7 = high competence**
a)	ICT (information and communication technologies)	1	2	3	4	5	6 7
b)	managerial	1	2	3	4	5	6 7
c)	marketing	1	2	3	4	5	6 7
d)	technical	1	2	3	4	5	6 7
e)	relational	1	2	3	4	5	6 7

8. Indicate the source of acquisition of your skills and give an evaluation:

	education	previous work	other (personal interests and extra curriculum activities)	
a) ICT	_____%	_____%	_____%	100%
b) managerial	_____%	_____%	_____%	100%
c) marketing	_____%	_____%	_____%	100%
d) technical	_____%	_____%	_____%	100%
e) relational	_____%	_____%	_____%	100%

SECTION B: RELATIONAL NETWORKS

9. Give an opinion on the following statements *(1=I do not agree, 7=I completely agree)*

1 = I do not **7 = I completely agree**

Network orientation

a) I can't figure out problems without friends ..... 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

b) Network is as important as business itself ..... 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

c) Business dealing entail reciprocity ..... 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

d) To pay back favor is more urgent than repaying debts ..... 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

Network building

e) I am alert to market developments that create potential partnership opportunities 1 ..... 2 ..... 3 ..... 4 5 ..... 6 7

f) I always encourage my friends to introduce their friends to me .... 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

g) I have no problem introducing myself to strangers ..... 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

h) I present souvenirs to new friends to express good wishes when there is a marriage, promotion, birthday and so forth ..... 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

i) I always look for opportunities to have lunches or dinners with new friends ..... 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

j) I send greetings to new friends during holidays ..... 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

k) I often invite new friends to participate in various social activities . 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

Network maintenance

l) I can read others well and know how they are feeling in a given situation ... 1 ..... 2 ..... 3 ..... 4 ..... 5 6 7

m) I know well about what others need and try to do what I can for them ..... 1 ..... 2 ..... 3 ..... 4 ..... 5 6 7

n) when I have disagreements with my partners, I usually strive to be flexible accommodate to reach a mutually satisfactory compromise 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

Network coordination

o) I always analyzes what I would like to achieve with others ..... 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

p) In my friends, I know well whom I can trust and whom I can't ..... 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

q) I can well match my energy and resources to my different friends ..... 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 7

r) I have a clear mind about the interdependence among my friends 1 ..... 2 ..... 3 ..... 4 ..... 5 6

..... 7

10. How often do you interact with *(from 1=not at all to 7=very often)***:**

1 = not at all **7 = a lot**

a) other founders..... 1 ..... 2 ..... 3 ..... 4 ..... 5..... 6 7
b) other employees..... 1 ..... 2 ..... 3 ..... 4 ..... 5..... 6 7
c) external collaborators..... 1 ..... 2 ..... 3 ..... 4 ..... 5..... 6 7

11. How close and personal is the relationship between you and *(from 1=not at all to 7=very often)***:**

1 = not at all **7 = a lot**

a) other founders..... 1 ..... 2 ..... 3 ..... 4 ..... 5..... 6 7
b) other employees..... 1 ..... 2 ..... 3 ..... 4 ..... 5..... 6 7
c) external collaborators..... 1 ..... 2 ..... 3 ..... 4 ..... 5..... 6 7

12. Evaluate from 1 to 7 the following statements about your decision making process:

1 = never **7 = always**

a) I make decisions without consulting subordinates..... 1 ..... 2 ..... 3 ..... 4 ..... 5..... 6 7
b) I use authority and power when dealing with subordinates ..... 1 ..... 2 ..... 3 ..... 4 ..... 5..... 6 7
c) I ask for suggestions and opinions to my collaborators and employees.1 . .2 ..... 3 ..... 4 ..... 5..... 6 7
d) My employees should not disagree with my decisions ..... 1 ..... 2 ..... 3 ..... 4 ..... 5..... 6 7
e) I should not delegate important tasks to employees..... 1 ..... 2 ..... 3 ..... 4 ..... 5..... 6 7

Date of interview: _____

Il trattamento dei dati sarà effettuato in forma anonima e a livello aggregato per scopi di ricerca. In qualsiasi momento può esserne richiesta la consultazione, la modifica o la cancellazione scrivendo silviarita.sedita@unipd.it (Legge sulla Privacy D.Lgs 196/2003).

UNIVERSITÀ DEGLI STUDI DI PADOVA

DIPARTIMENTO
DI SCIENZE ECONOMICHE E AZIENDALI
"MARCO FANNO"

INNOVATIVE ITALIAN START-UP IN THE SECTOR OF CREATIVE INDUSTRIES

Nell'ambito del progetto di ricerca dell'Ateneo bando 2014 dal titolo "Moving knowledge into action: exploring the micro-foundation of an innovation ecosystem" è emersa la necessità di condurre un'indagine approfondita che mira ad individuare i fattori che portano a incrementare le performance delle startup innovative nelle creative industries. In particolare l'indagine si prefigge di indagare il ruolo svolto da due principali fattori: il network relazionale dell'impresa e dei suoi fondatori e le competenze e il background scolastico e lavorativo degli imprenditori.

SECTION A: DATA about COMPANY

1. Company name: _____

_____

C.F./P.IVA:
_____

2. What is the main activity of the company?
_____

_____

_____

3. The start-up is:

1. An independent company
2. An academic spin-off
3. A corporate spin-off

4 Year of creation: _____

5. How many founders does the company have?

1. Only one founder
2. Two founders
3. Three founders
4. Four founders
5. Five or more

6. How many of them are

men: _____

women: _____

7. Which is the present stage of the start-up?

1. Seed stage (idea generation)
2. Start-up stage (on the point of offering a product / service on the market)
3. Growth stage (one or more products / services on the market)
4. Later stage (one or more products / services on the market, in expansion or about to be acquired)

8. Indicate the number of employees (including the founders)

At the end of the first year of activity: _____

At the end of the second year of activity: _____

At the end of the third year of activity: _____

9. Indicate the percentage of graduates over total employees:

At the end of the first year of activity: _____ %

At the end of the second year of activity: _____ %

At the end of the third year of activity: _____ %

10. Indicate the turnover (on average, in Euro):

At the end of the first year of activity: _____

At the end of the second year of activity: _____

At the end of the third year of activity: _____

11. Did you reach the break even point?

1. yes 2. no **→ *question 13***

12. If yes, when?

1. At the end of the first year of activity
2. At the end of the second year of activity
3. At the end of the third year of activity
4. After the third year of activity

13. How would you describe the company main business?

1. B2B (business to business)
2. B2C (business to consumer)
3. B2B2C (business to business to consumer)

14. How deep is the collaboration with the listed partners for each of the following purposes? *(Likert scale from 1= no collaboration to 7= strong collaboration)*

	INFORMATION On the MARKET		**TECHNICAL INFORMATION**	
	1 = no collaboration	**7 = strong collaboration**	**1 = no collaboration**	**7 = strong collaboration**
a) suppliers	1 .... 2 .....3 .... 4 .....5..... 6 7		1 .....2.....3 .... 4 .....5..... 6	
b) clients	1 .... 2 .....3 .... 4 .....5..... 6 7		1 .....2.....3 .... 4 .....5..... 6	
c) startup in the same sector	1 .... 2 .....3 .... 4 .....5..... 6 7		1 .....2.....3 .... 4 .....5..... 6	
d) startup in other sectors	1 .... 2 .....3 .... 4 .....5..... 6 7		1 .....2.....3 .... 4 .....5..... 6	
e) companies in the same sector (no startup)	1 .... 2 .....3 .... 4 .....5..... 6 7		1 .....2.....3 .... 4 .....5..... 6	
f) companies in other sectors (no startup)	1 .... 2 .....3 .... 4 .....5..... 6 7		1 .....2.....3 .... 4 .....5..... 6	
g) private consultants	1 .... 2 .....3 .... 4 .....5..... 6 7		1 .....2.....3 .... 4 .....5..... 6	
h) Universities and other research institutions	1 .... 2 .....3 .... 4 .....5..... 6 7		1 .....2.....3 .... 4 .....5..... 6	
i) Other, please specify: _____	1 .... 2 .....3 .... 4 .....5..... 6 7		1 .....2.....3 .... 4 .....5..... 6	

15. The company was born within or passed through:

1. a technological science park

2. a private business incubator
3. a public business incubator

16. Which are the company's financial sources?

	yes	no
a) personal funding	1	2
b) friends and family	1	2
c) bank loans	1	2
d) risk capital (venture/seed capital/ business angel/private equity)	1	2
e) crowdfunding	1	2
f) public funding (local, national)	1	2
g) business incubator/accelerator	1	2
h) operating cash-flow	1	2
i) other companies	1	2

17. Your company:

	yes	no
a) it has entered an already existing market producing slightly improved goods / services	1	2
b) it has entered an already existing market producing radically modified goods / services	1	2
c) has launched one or more new goods / services that create a new market	1	2

18. The company uses one or more of the following technologies (industry 4.0)?

	yes	no
robotics in production (eg classic industrial robots (in cages), collaborative robotics, "intelligent" systems that adapt activities according to processes, eg robot with camcorders etc.)	1	2
b) additive manufacturing (3D printers, Stereolithography, etc.)	1	2
c) laser cutting	1	2
d) production / process data collection and processing systems (Big Data – cloud computing)	1	2
e) 3d scanner	1	2
f) augmented reality	1	2
g) Internet of things / Smart products /RFID	1	2

19. What are the main strategic objectives of the company?

	yes	no
a) rapid growth in terms of number of employees	1	2
b) rapid growth in terms of revenues	1	2
c) rapid growth in terms of number of clients	1	2
d) profitability growth	1	2
e) product / service development	1	2
f) communication development	1	2
g) technology development	1	2
h) increase the brand awareness	1	2
i) internationalization	1	2
j) become a member of a cluster / business ecosystem	1	2
k) develop partnerships with other start-ups in the same sector	1	2
l) develop partnerships with other start-ups in another sector	1	2
m) get a round of financing	1	2
n) other, please specify: _____	1	2

20. How many times did the company business model change?

1. none
2. 1 time
3. 2 times
4. 3 times
5. more than 3 times

21. How did the business model change?

	yes	no
a) the company moved towards the digital sector	1	2
b) the company developed strategic partnerships	1	2
c) the company developed new customer services (investments in pre and after sales, attention to customer care, creation of communities etc.)	1	2
d) invested in increasing the brand awareness	1	2

e) invested to improve the quality of the products .....1.....2
f) invested to improve the services offered.....1.....2
g) improved the relationship with suppliers .....1.....2
h) invested in new selling / distribution channels .....1.....2
i) invested in new markets (internationalization).....1.....2
j) market change .....1.....2

22. What is the main reason for this change? _____

_____
___

23. What is the company's commitment to the environment?

	yes	no
a) uses production processes with reduced environmental impact	1	2
b) suppliers are also assessed from an environmental point of view	1	2
c) carries out training initiatives for personnel on environmental issues	1	2
d) adopts policies to reduce energy consumption	1	2
e) encourages the use of recycled materials	1	2
f) it monitors the quantity of wastes in relation to production levels	1	2
g) it has achieved certifications such as EMAS, ISO 14000, Ecolabel	1	2

24. What is the company's commitment to the community of reference?

	yes	no
a) has received complaints from the local community regarding its activities (smells, noise, etc.)	1	2
b) supports social and environmental projects in the area	1	2
c) carries out communication and community involvement activities (corporate citizenship)	1	2
d) grants liberality in favor of not for profit associations, bodies or initiatives	1	2
e) has activated partnerships with non-profit organizations for the realization of special projects	1	2
f) has implemented initiatives to support the enhancement of the territory and cultural heritage	1	2
g) has created a corporate not for profit or promoted voluntary initiatives at corporate level	1	2

THANK YOU FOR YOUR COLLABORATION

The questionnaire was completed by:_____

Position in the company:_____

Phone: _____

E-mail: _____ WWW: _____

Address: _____

Date of the interview: _____

Il trattamento dei dati sarà effettuato in forma anonima e a livello aggregato per scopi di ricerca. In qualsiasi momento può esserne richiesta la consultazione, la modifica o la cancellazione scrivendo silviarita.sedita@unipd.it (Legge sulla Privacy D.Lgs 196/2003).

Table 5 Summary of the variables

Variable	Constructs	Label	Brief description
Dependent	Commitment towards environment	env_sust	Used production processes with reduced environmental impact
			Suppliers assessed from an environmental point of view
			Carried out training initiatives for personnel on environmental issues
			Adopted policies to reduce energy consumption
			Encouraged the use of recycled materials
			Monitored the quantity of wastes in relation to production levels
			Achieved certifications such as EMAS, ISO 14000, Ecolabel
	Commitment towards society	soc_sust	Received complaints from the local community regarding its activities
			Supported social and environmental projects in the area
			Carried out communication and community involvement activities
			Granted liberality in favor of non-profit associations, bodies or initiatives
			Activated partnerships with non-profit organizations for the realization of special projects
			Implemented initiatives to support the enhancement of the territory and cultural heritage
			Created a corporate not for profit or promoted voluntary initiatives at corporate level
Independent	Founders' competencies	nontech_skills	Includes the marketing, managerial, and relational skills that the founders have that could help the start-ups contribute toward environmental sustainability
		tech_skills	Level of skills that the founders own in terms of information, communication, technology (ICT), and other technical skills
	Collaboration with stakeholders	coll_uni	Average likelihood of collaboration with universities for information on market and technical reasons
		coll_startup	Average likelihood of collaboration with start-ups in other sectors for information on market and technical reasons and start-ups in the same sector for information on the market
		coll_consul	Likelihood of collaboration with private consultants for information on market and technical reasons
		coll_samefirm	Likelihood of collaborations with firms in the same sector for information on market and technical reasons
		coll_sup	Likelihood of collaboration with the suppliers in the market for information on market and technical reasons