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Master of Science in Management Engineering

Sustainable Entrepreneurship in the Agrifood Sector: A Study of Startups in Developing Countries with a Focus on sub-Saharan Africa

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Abstract

Promoting sustainable development represents one of the most relevant, actual, and challenging objectives humanity faces. This process is particularly urgent for the world's poorest regions, defined as developing countries, where economic, social and environmental issues are critical. Entrepreneurship represents a potential driver for fostering it, generating employment, innovation, inclusive growth and a widespread increase in welfare.

This thesis investigates how entrepreneurship in developing countries within the agrifood industry can lead towards sustainability, by studying startups that operate in it. The agrifood industry is chosen as the principal focus due to the vital importance it occupies in these areas. An in-depth analysis is dedicated to sub-Saharan Africa to understand the concentration and characteristics of sustainability-oriented agrifood startups, the barriers they face in developing their business and how the entrepreneur's characteristics and background influence the decisions and performances of these young ventures. Providing that little information regarding these topics has been identified in the current literature, this research is particularly relevant, introducing a valuable contribution to a research area of primary importance.

The results obtained show how a significant component of agrifood startups in developing countries tackle sustainability issues, a trend confirmed in sub-Saharan Africa. In both regions, most sustainable startups are service providers, adopting business models mostly oriented to increase agricultural productivity and small producers' income.

The main barriers to the development of agrifood startups in sub- Saharan Africa are the lack of adequate infrastructures, a regulatory framework not aligned with the business ecosystem, difficulties in accessing the market, an underdeveloped financial sector, the conservative environment in the agricultural sector, the lack of trust between the players in the supply chain, and the lack of farmers' capital to invest.

The entrepreneur's characteristics studied are the educational background, previous work experience, geographical origin and psychological traits.

Therefore, this thesis presents a comprehensive study of agrifood entrepreneurship in developing countries and sub-Saharan Africa. Starting from a broad analysis of the startups in this context, the focus narrows on the barriers in the business environment and eventually on the entrepreneur, to understand both the macro and micro determinants and provide a complete overview.

Abstract

Promuovere lo sviluppo sostenibile rappresenta una delle sfide più rilevanti, attuali, e al contempo complesse che l'umanità si trova ad affrontare. Questo processo è particolarmente urgente per le regioni più povere del mondo, definite come developing countries, in cui le problematiche economiche, sociali e ambientali sono estremamente accentuate. Un potenziale driver per promuoverlo è rappresentato dall'imprenditorialità, che può generare occupazione, innovazione, crescita inclusiva e un incremento generale del welfare.

La ricerca oggetto di questa tesi studia il fenomeno dell'imprenditorialità sostenibile nei paesi in via di sviluppo all'interno del settore agrifood, analizzando le startups che operano in esso. L'industria agrifood è stata scelta come ambito di analisi per l'importanza vitale che ricopre per la sostenibilità di queste aree. Il tema di analisi è stato maggiormente approfondito rispetto all'Africa sub-Sahariana, dove vengono studiate le barriere che le startups agrifood sostenibili incontrano e come le caratteristiche e il background dell'imprenditore influenzano le decisioni e le performance di queste aziende. Questa ricerca è particolarmente rilevante poiché nella letteratura attuale sono state individuate poche informazioni sui temi trattati, ed essa va dunque ad introdurre un contributo di valore ad un'area di ricerca di importanza primaria.

I risultati ottenuti mostrano come una componente significativa delle startups agrifood nei paesi in via di sviluppo affronti tematiche relative alla sostenibilità, un fenomeno riscontrato anche in Africa sub-Sahariana. In entrambe queste regioni la maggior parte delle startups sostenibili sono fornitori di servizi, ed esse sono principalmente orientate verso modelli di business che mirano ad incrementare la produttività agricola e i guadagni dei piccoli produttori.

Le principali barriere individuate che limitano lo sviluppo delle startups agrifood nell' Africa sub-sahariana sono la mancanza di infrastrutture adeguate, un quadro normativo non allineato con l'ecosistema aziendale, difficoltà di accesso al mercato, un settore finanziario poco sviluppato, l'ambiente conservativo nel settore agricolo, la mancanza di fiducia tra gli attori della filiera e la mancanza di capitale da investire da parte dell'agricoltore.

Le principali caratteristiche dell'imprenditore studiate sono il percorso di studi, le precedenti esperienze lavorative, l'origine geografica e i fattori psicologici.

Dunque, questa tesi riporta uno studio comprensivo dell'imprenditorialità nel settore agrifood nei paesi in via di sviluppo e in Africa sub-Sahariana. Partendo da un'analisi generale delle startups che operano in questo contesto, l'attenzione si concentra sulle barriere esistenti nell'ambiente di business e infine sull'imprenditore stesso, per capire le micro e macro-determinanti e fornire una prospettiva completa.

I. Executive Summary

I.1 Literature Review and Research Questions

This research studies how entrepreneurship in the agrifood industry can foster sustainable development in developing countries (DCs), focusing on a specific region within that area, sub-Saharan Africa (SSA). Achieving sustainability is a vital challenge for humankind, implying a concept of development where the economic, social and environmental dimensions are equally balanced. Therefore, addressing sustainable development demands creating new thought models, values, and patterns of behaviour combined with technological and productivity improvements (Brundtland Commission, 1987). Entrepreneurship plays a primary role in this process by diffusing innovative solutions to change unsustainable consumption and production patterns, protecting the planet, promoting social justice, and fostering inclusive growth. However, it requires an environment with favourable conditions to be effective. DCs are those areas of the world further behind in undertaking sustainable development, and firms in these regions face the most severe barriers to expansion. Therefore, understanding how to promote entrepreneurship to achieve sustainability in DCs is a particularly relevant and actual theme. Among the various industries, agrifood is the one with the highest impact in this area, as it provides the primary source of income to the population and is firmly bound to natural resources (FAO and OECD, 2019, p. 1; Pawlak & Kołodziejczak, 2020). The in-depth study of SSA is carried out because the region faces the most significant challenges to sustainability, to foster entrepreneurship, and is often neglected by researchers, enhancing this study's innovativeness and relevance.

The initial part of the research aims to develop a solid knowledge of general concepts such as low-income economies, entrepreneurship, sustainability, and the agrifood industry.

No univocal definition of DCs exists, and the most important human development organisations approach this taxonomy differently. In fact, the definitions provided by the World Bank, the United Nations Developing Program (UNDP), and the International Monetary Fund (IMF) adopt different criteria to select DCs.

- The World Bank dismissed this division in 2016 (Khokhar & Serajuddin, 2015), but it has always grouped countries according to the yearly Gross National Income (GNI) per capita in low income, lower-middle income, upper-middle income, and high income. Even if there is no formal definition anymore, the low and lower-middle groups were generally taken together and referred to as the "developing world" until 2016 (Khokhar & Serajuddin, 2015).

- The UNDP does not define developed or developing countries, but it classifies them into four categories according to their value of the Human Development Index

(HDI) (Khokhar & Serajuddin, 2015). The HDI is a composite index combining three components: health, education, and the standard of living.

- The IMF classifies the world's countries into two major groups: advanced economies, and emerging market and developing economies. The principal grouping criteria are per capita income level, export diversification, and degree of integration into the global financial system. However, these elements are not the only ones included (International Monetary Fund, s.d.-a), and the methodology for setting the classification is not explicitly disclosed.

This thesis defines developing countries according to their yearly GNI per capita, similarly to the classification used by the World Bank before 2016, and low and lower-middle income economies are considered "developing".

The definition of entrepreneurship provided by academics has evolved since the first introduction of the term to include new relevant characteristics of this phenomenon. The crucial features reported in the literature are (i) the risk-taking nature of the phenomenon (Mokaya, Namusonge, & Sikalieh, 2012; Swanson, 2017, p.7), (ii) managing as a primary but not unique activity (Mokaya, Namusonge, & Sikalieh, 2012; Swanson, 2017, p.8), (iii) the strong connection with innovation (Swanson, 2017, p.9), (iv) the identification of unnoticed opportunities as the trigger of entrepreneurship, which arises by implementing solutions to address them (Kirzner, 1973, p. 30-39), (v) and the necessity of creating an organisation (cited in Mokaya, Namusonge, & Sikalieh, 2012). The entrepreneurship's definition adopted in this thesis is: "The process of starting a business, using the ability and willingness of individuals, on their own, in teams, within and outside existing organisations, to perceive and create new economic opportunities and to introduce their ideas in the market, in the face of uncertainty and other obstacles" (Aidis, 2003).

Provided the breadth of this phenomenon, two other important distinctions are reported. The first one regards the reason why starting the business, dividing between "necessity" entrepreneurs, who decided to be self-employed as a mean to escape the lack of wage employment, and "opportunity" entrepreneurs, who decided to pursue an opportunity (Olafsen & Cook, 2016; Vivarelli, 2016; Naudé, 2010). The second one concerns the legal form, differentiating between formal and informal enterprises. This research focuses on opportunity entrepreneurship in the formal sector. Although informal and "survivalist" entrepreneurs might have a role in poverty alleviation, they are unlikely to provide high-impact solutions to drive sustainable development.

The third key concept investigated is sustainability, intended as the long-term goal that humanity must achieve to continue its existence on the planet, balancing the environmental, economic, and social dimensions. Sustainability is strictly related to sustainable development, representing the process necessary to achieve the long-term goal. A globally adopted definition of sustainable development was given by the Brundtland Commission in 1987, as "Development

that meets the needs of the present without compromising the ability of future generations to meet their own needs".

The last key general concept reviewed is the agrifood industry, defined as the value chain spanning "from farm to fork" (FAO, s.d.-a). This sector is vital for sustainable development and faces many challenges, such as (i) providing enough quality and safe food to a growing population while reducing resource consumption (FAO, 2018, p. 31), (ii) adapting to and mitigating the impact of climate change (Pawlak & Kołodziejczak, 2020), and guaranteeing a source of income to fight poverty in many DCs and rural areas (FAO and OECD, 2019, p. 1-3).

Table I.1 summarises the highlights reported in the literature regarding the key concepts and the definition provided.

	Developing Countries	Entrepreneurship	Sustainability	Agrifood Industry
Definition	Low and lower-middle economies, according to the yearly GNI per capita.	The process of starting a business, using the ability and willingness of individuals, on their own, in teams, within and outside existing organisations, to perceive and create new economic opportunities and to introduce their ideas in the market, in the face of uncertainty and other obstacles.	the long term goal that humanity must achieve to continue its existence on the planet, balancing the environmental, economic, and social dimensions.	the value chain spanning "from farm to fork".
Key Highlights	No univocal definition of DC exists, and the most important human development organisations approach this taxonomy differently.	• Risk-taking nature of entrepreneurship. • Managing as a primary but not unique activity. • Strong connection with innovation. • Identifying unnoticed opportunities triggers entrepreneurship, which implements solutions to address them. • Entrepreneurship requires creating an organization. • "Necessity" vs "opportunity" entrepreneurs. • Formal vs informal entrepreneurship .	Link with sustainable development, the process necessary to achieve sustainability, that is defined by the Brundtland Commission in 1987, as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs".	The sector is vital for sustainable development and faces many challenges. • providing enough quality and safe food to a growing population while reducing resource consumption . • adapting to and mitigating the impact of climate change . • Guaranteeing a source of income to fight poverty.

Table I.1 summarises the highlights reported in the literature regarding the key concepts and the definition provided.

Once developed a solid knowledge of the theoretical elements at the base of this research, crucial factors to understand the relationships between entrepreneurship and sustainable development, particularly in DCs, have been analysed.

Entrepreneurship can foster sustainable development by (i) stimulating economic growth, (ii) promoting innovation that generates employment, inclusive growth and welfare effects (Dutz, Kessides, O'Connell, & Willig, 2011; infoDev, 2016, p. 10-14; Olafsen & Cook, 2016; Naudé, 2009), (iii) and reallocating the resources toward the most productive activities,

potentially driving a structural change in the economy (Olafsen & Cook, 2016; Naudé, 2009; Naudé, 2010; Vivarelli, 2016; Dutz, Kessides, O'Connell, & Willig, 2011; infoDev, 2016, p. 10). However, the possibility of generating an impact depends on the context's condition. Although this is true for all the countries, the general environment plays a more crucial role in those developing, since firms in this region face much more severe limitations (Vivarelli, 2016; Aterido, Hallward-Driemeier, & Pagés, 2009).

Identifying which factors hinder business development in DCs is fundamental to comprehend entrepreneurship in this area. According to the literature analysed, the most severe barriers are the lack of adequate transport and ICT infrastructures (Naudé, 2009; Dutz, Kessides, O'Connell, & Willig, 2011; Vivarelli, 2016; Ripoll, et al., 2017), difficulties in accessing finance (Naudé, 2009; Dutz, Kessides, O'Connell, & Willig, 2011; Vivarelli, 2016; Cravo & Piza, 2016; infoDev, 2014, p. 58-79; infoDev, 2016, p. 18-23), the uncertain or ill-designed regulatory framework (Naudé, 2009; Dutz, Kessides, O'Connell, & Willig, 2011; Vivarelli, 2016; Cravo & Piza, 2016; infoDev, 2016, p. 18; Quak, 2018), and the limited access to markets (Naudé, 2009; Dutz, Kessides, O'Connell, & Willig, 2011; Cravo & Piza, 2016; Quak, 2018; Ripoll, et al., 2017; infoDev, 2014, p. 72-73).

However, focusing the analysis only on market mechanisms and the business environment would lead to neglecting the individual level's decision-making process. Therefore, the entrepreneur's background and characteristics have been investigated to complement the environment's determinant (Evans, 1989; Blanchflower & Meyer, 1994; Vivarelli, 2016). Personal motivations and psychological traits, education, previous job experience, and geographical origin are considered the most significant factors of the entrepreneur's background, influencing its decision to become self-employed and the post-entry level of performance. According to the literature, the relationship between the level of education and the frequency of self-employment in the formal sector is positive, and firm's results are generally better as the education level increases (Bates, 1990; McPherson, 1996; Van der Sluis, Van Praag, and Vijverber, 2005; Vivarelli, 2016). However, a question emerges on whether better results are driven by acquiring a specific or general knowledge type, for which different thoughts exists. Some authors argue that specific skills are better predictors of improved post-entry performance (Colombo & Grilli, 2004; Balconi & Fontana, 2011), while others claim that multidisciplinary education advantages entrepreneurs since they must manage different people and tasks and must possess various abilities (Lazear, 2005; Wagner, 2003). Concerning the previous job experience, it affects entrepreneurship by driving better performances and generating "sectorial inertia" (Roberts, Klepper, & Hayward, 2011), a predisposition to creating businesses in the previous sector of employment. The data regarding the importance of geographical origin suggest that entrepreneurs tend to locate their business in the area where they grew, a phenomenon defined as "geographical inertia" (Michelacci & Silva, 2007), and companies perform better, survive longer and generate higher profits when located in regions where their founders have lived longer (Vivarelli, 2016).

While providing significant insights into the topic explored, the literature presents some limitations and gaps. First, most of the entrepreneurship research is dedicated to developed countries, with little data available on DCs. Second, the entrepreneurship's impact is mainly assessed by adopting an economic perspective, while human development encompasses also the environmental and social dimension, whose relationships with entrepreneurship have not been understood yet (Neumann, 2020). In this regard, few information has been found dedicated to sustainable agrifood entrepreneurship in DCs.

Finally, the influence of the entrepreneur's background elements for the business are studied regardless of the firm's typology, without concentrating on those committed to generating an impact and fostering sustainable development.

This thesis's first contribution consists of addressing the lack of information on entrepreneurship in DCs. Being the research objective to investigate the relationship between entrepreneurship and sustainability, and considering the essential role innovation occupies in this process, the selected unit of analysis are startups, defined as five or fewer years old firms. Through extensive research and mapping in the agrifood sector, startup entrepreneurship is compared between developing and developed countries. Followingly, the attention of the research is directed to SSA. The study highlights how many startups aim to foster sustainable development, which issues they direct their attention to, and their distribution across the agrifood supply chain.

Secondly, it is verified whether the insights reported on the literature regarding the barriers of entrepreneurship in DCs and the entrepreneur's background hold true in the agrifood sector of those DCs located in SSA. Moreover, the research presents some solutions the startups have adopted to overcome these barriers.

All the analysis performed aims to answer the following research questions that constitute the structure of the study.

RQ1: "What are the main differences and similarities in the agrifood startups between developing and developed countries?"

RQ2: "What are the main barriers for startups in SSA, and how are these companies addressing.

them?

RQ3: "How do the background and competences of the entrepreneurs influence the creation of startups in SSA countries?".

Gaps Identified	Corresponding Research Question
Few researches are focused on how agrifood entrepreneurship can drive sustainable development in developing countries	**RQ1:** "What are the main differences and similarities in the agrifood startups between developing and developed countries?"
The impact of entrepreneurship is mainly assessed by adopting an economic perspective, neglecting the environmental and social dimension. Few researches are dedicated to sustainable agrifood entrepreneurship in DCs and sub-Saharan Africa	**RQ2:** "What are the main barriers for startups in SSA, and how are these companies addressing them?"
The importance of the entrepreneur's background elements for business creation and development are studied regardless of the firm's typology.	**RQ3:** "How do the background and competences of the entrepreneurs influence the creation of startups in SSA countries?".

Table I.2 illustrate the gaps identified linked with the research questions developed to address them.

I.2 Methodology – The Sustainable Startups Database

A specific methodology has been followed to address the three research questions illustrated.

First, to compensate for the lack of data on entrepreneurship in DCs and to approach RQ1, an agrifood startups database has been used. This tool updates a pre-existing version, developed by the Food Sustainability Observatory of Politecnico di Milano in 2017 (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017) and yearly revised by thesis students' teams. The startups included in the database have been identified using Crunchbase, a business intelligence tool containing information on more than 675,000 firms. The data collected through this web platform has been integrated with information from secondary sources, such as the companies' website and their social media page, to obtain the current database of 4,909 agrifood startups, among which 1,157 adopting a sustainable business model. This version covers DCs to a better extent than the previous one.

The database creation follows an established methodology presented by Bartezzaghi et al. (2018), Segatta and Tanara (2017), and Caliceti (2017). This methodology includes a procedure to identify and analyse the sample based on specific definitions of startup, agrifood supply chain and sustainability.

The startups are allocated is an extended version of the agrifood supply chain, where both primary and supporting activities are considered (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017). Primary activities are those stages involved in the direct flow of food. They provide the main inputs and generate the outputs for producing, transforming and delivering food to final consumers. Support activities comprise all those suppliers and service providers concerned with enabling and enhancing the interactions between actors of the primary activities or improving their productivity (e.g. by providing technology). Each of these stages encompasses a set of economic activities taken from the "Nomenclature Statistique Des Activités Économiques Dans La Communauté Européenne" (NACE). The NACE is the system including the standard and uniform definitions of economic activities in the European Union (EU). NACE has been explicitly designed to provide a framework for collecting and presenting a large number of statistical data according to the economic activity, and therefore it is particularly suitable for the methodology applied (Eurostat, 2008, p. 14).

The sustainability orientation is an essential category of the database, which allows to interpret and compare actual data on how entrepreneurship has moved in this direction. The framework used to determine the startups' sustainability is based on the Sustainable Development Goals (SDGs), a set of goals developed by the United Nations (UN). The Goals and Targets most related to the agrifood industry have been selected and assigned to companies to assess their sustainability orientation and show the issues they tackle (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017).

Startups from the agrifood industry have been recognised by interrogating the Crunchbase database through appropriate filters. Those resulting from this investigation have been extracted and assessed one-by-one to (i) establish whether they belong to the agrifood industry, (ii) establish the supply chain stage where they operate, (iii) determine whether they adopt a sustainable business model and the SDGs addressed, and (iv) assign the country of origin.

The final database of 4.909 agrifood startups has been investigated through statistical analysis to understand how entrepreneurship in the agrifood sector differs between developed and DCs. An additional study focused on entrepreneurship in SSA has been performed. The analyses have been executed by crossing the data in the database to compute (i) the incidence of sustainable startups in the database and how this metric has evolved over the years, (ii) the number of startups addressing each of the SDGs Goals and Targets selected, and (iii) the allocation of startups along the stages of the extended agrifood supply chain.

I.3 Methodology – Case Studies and Interviews

The investigation method selected to address RQ2 and RQ3 is the explanatory case study. Indeed, this method aims to collect empirical evidence to verify the data collected from the literature analysis through the interviewees' data. Three sustainable agrifood startups operating in SSA have been chosen as units of analysis to test the literature information regarding the

barriers to entrepreneurship in DCs and the most important characteristics and background factors of entrepreneurs in the specific context of sustainable agrifood entrepreneurship in SSA. Semi-structured interviews were conducted following the structure of a pre-designed questionnaire including questions about (i) the company's general information, (ii) the business model, (iii) the barriers, solutions, and enabling factors to entrepreneurship, (iv) and the background and network of the entrepreneur. The Social Business Model Canvas (SBMC) has been selected as a tool to structure the analysis and represent the startups' business model. This framework derives from the well-known Business Model Canvas developed by Osterwalder and Pigneur, and it is used to effectively communicate a sustainable firm's objectives and their coherence with the enterprise's resources and strategy (Sparviero, 2019).

The case study has been complemented with the perspective of experts in the sector, persons who worked for private or public organisations operating in SSA and focused on agrifood startups. The experts have been chosen to support the research through a different perspective and triangulate the information reported by entrepreneurs. They provide insight into the enabling environment around startups to study the phenomenon of interest with the contribution of actors dealing with the ecosystem's barriers and working to mitigate them. Moreover, their informed opinions are helpful to understand whether the data presented by entrepreneurs are aligned with their knowledge of the sector.

All the interviews have been attended remotely via video calls and held in Italian or English. Two researchers from Politecnico di Milano participated in each of them together with the interviewee. The persons interviewed for the case study are the startups' founder, and both their interview and the experts' interviews lasted approximately one hour. The interviews have been recorded with the respondents' consent to avoid missing information and provide a complete and accurate representation of the topics discussed. The registrations have been transcribed and then codified according to two systems, depending on whether the information regards RQ2 or RQ3. Afterwards, the primary information stemming from the interviews has been confronted with the literature's theory. The barriers identified in the literature have been compared to those reported in the case study and by the experts to address RQ2 by verifying their applicability to sustainable agrifood startups in Developing SSA and whether new barriers not previously identified emerged. This operation allowed creating a model representing the barriers to agrifood entrepreneurship in SSA, complemented by the solutions reported by the startups interviewed to overcome them.

A similar process has been followed to address RQ3. The interviews' findings have been compared with the literature to develop an in-depth comprehension of the links between the entrepreneur's background and the business decisions presented in a model.

The three startups included in the case study are presented below.

- Farmshine has been the first startup interviewed. It was founded in 2017 by Luca Alinovi, Andrea Alinovi, Chris Mimm, and Alessio Colussi. Even if the founders are

international, Farmshine is headquartered in Thika, Kenya, and operates primarily in this country. It has created a program that allows skipping many intermediary steps in the agrifood supply chain. The company aggregates farmers' production and sells it in a structured way to large commodities traders, transferring a higher share of revenues to smallholder farmers. The activities and exchanges between Farmshine's users are managed through a digital platform.

- Moringa Wave has been the second startup interviewed. It was founded in 2016 by Franco Emilio Russo and a group of his friends. Once again, the firm's founders are international, but the company is headquartered in Antananarivo, Madagascar and works principally in this region. It is involved in the final transformation, logistics, marketing and sales of products derived from the Moringa Oleifera. This tree is grown in Madagascar by local farmers and purchased by the firm through a contract farming agreement.

- Seekewa, founded by Fred Zamble and Serge Zamble, is a startup headquartered in Abidjan, Côte d'Ivoire. The two founders are both from SSA and have created a participative platform for smallholders in African countries to help them find all the resources they need to sustain their projects. Seekewa provides them directly with goods and services through a model based on a vouchers' exchange between investors and the platform.

Moreover, as mentioned before, experts have been interviewed to enrich the research through a different and complementary perspective. The three experts that participated in the research are presented below.

- Debisi Araba has been the first expert interviewed. He is the Managing Director at the African Green Revolution Forum (AGRF), the world largest multilateral platform focused on Agricultural Transformation in Africa. AGRF mission is to co-create a public sector-enabled-private sector-led process for agrifood transformation. Debisi's role is to lead the strategy, coordinating the secretariat's activities and ten thematic platforms, divisions of AGRF that advance the agency's mission specialising in specific areas of the agrifood industry.

- The second expert is Ritta Sabbas Shine, country support manager in SUN Business Network (SBN). Her role is to assist country networks from a global perspective, ensuring that advocacy activity at the national level is planted in global initiatives. Scaling Up Nutrition (SUN) is a global movement to fight malnutrition, which collaborates with the private sector and governments to identify firms' policy constraints to advocate for an improved enabling business environment.

- The last expert interviewed is Dennis Treau, who worked with Seeds&Chips to create their African division. Seeds&Chips was an international summit for designing the future of feeding, born as a continuation of the initiatives undertaken during the Expo

of Milan in 2016, "Feeding the Planet, Energy for the life". However, the movement ended in 2020. In addition to his activity Dennis Treau has been managing his non-profit organisation focused on training projects, named Okapia, in Rwanda.

Research Questions	Methodology Adopted
RQ1: "What are the main differences and similarities in the agrifood startups between developing and developed countries?"	Updating of an agrifood startups database including 4,909 agrifood startups from all over the world. A statistical analysis has been performed concerning: • The concentration of agrifood startups oriented to sustainability • Most pursued SDGs and Targets by sustainable agrifood startups • Distribution of sustainable agrifood startups along the supply chain
RQ2: "What are the main barriers for startups in SSA, and how are these companies addressing them?"	• Case study focused on sustainable agrifood startups from sub-Saharan Africa • Interview to rxperts of the sector

Table I.3 summarises the methodology adopted to address the three research questions.

I.4 The Results of Analysis on the Agrifood Startups Database

Through the statistical analysis performed on the agrifood startups database it has been possible to highlight differences between developing and developed countries, and understanding the state of sustainable agrifood entrepreneurship in SSA.

Sustainable agrifood startups in developed countries has an incidence rate of 24.3%, a higher value than in DCs, where it accounts for 20.1% of firms. However, the percentage of sustainable startups in DCs is significant, demonstrating that sustainable entrepreneurship is no longer a niche in the agrifood industry. Regarding the sustainability orientation, Goal 2: "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" and Goal 12: "Ensure sustainable consumption and production patterns", are the most addressed regardless of the company's location. What differs between the two groups is the incidence of sustainable startups reported in each of the SDGs Targets. The five Targets where most of the startups concentrate are the same in developed and DCs.

- **Target 2.3:** "by 2030 double the agricultural productivity and the incomes of small-scale food producers, particularly women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and

inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment".

- **Target 2.4:** "by 2030 ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and that progressively improve land and soil quality".

- **Target 12.2**: "by 2030 achieve sustainable management and efficient use of natural resources".

- **Target 12.3**: "by 2030 halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains including post-harvest losses".

- **Target 12.4**: "By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment".

Nevertheless, there is a relevant discrepancy between the two regions regarding the incidence of firms addressing each of the Targets. Sustainable startups in DCs tend to focus on Target 2.3, accounting for 51% of the companies, while those in developed countries have a balanced sustainability orientation. In the former group, Target 2.3 is the most diffused too, representing 18% of the total sustainable startups. This divergence may be caused by the different environment where startups operate. In DCs, the agrifood industry is the sector that employs most people and provides the primary source of income to the population (FAO and OECD, 2019, p. 1). However, it mainly exists as informal entrepreneurship, where actors, concentrated in the first stages of the supply chain (FAO and OECD, 2019, p. 1), live in poverty with shallow stability and protection. Thus, target 2.3 is more vital than in developed countries, where companies focus on it primarily for doubling agricultural productivity using innovative solutions than raising producers' income.

The last area analysed is the distribution of sustainable agrifood startups along the supply chain stages. In developed countries, service providers constitute 38% of sustainable startups, with food processing companies and technology suppliers as second and third stages, accounting respectively for 21% and 16% of the startups. Service providers includes most agrifood startups in DCs as well, representing 51% of them, while the second and third stages in this region are retailers (14%) and technology suppliers (12%). Even if service providers account for the highest number of firms in both developed and DCs, the incidence in the two groups differs significantly, as in the latter, the share of service providers is much higher than in the first one. Other meaningful differences are found in food

processing companies, diffused in developed countries but rare in DCs, and retailers, relevant players in DCs but not in the other group. Most companies are service providers because this stage includes all the startups providing digital services and data analysis. To build these firms, the capital required is often significantly lower than for other stages (for instance, food processing), and they are easier to scale. Therefore, most of the startups tend to focus on this part of the agrifood supply chain. The different allocation of startups in the food processing stage between developed and DCs is due to these regions' different food habits. In developing countries, processed food is much more common than in DCs, justifying the discrepancy. Finally, retailers represent the second group per incidence of sustainable startups in DCs they. The main sustainable feature of their business model they adopt the short-supply chain model adopted by the retailers, that directly source their product from farmers, increasing their revenues.

When focusing on SSA, many interesting findings emerge. First, the incidence rate of sustainable agrifood startups is significantly higher than in the other regions, accounting for 40% of the startups in the sample, compared to 24% in developed countries and 17% in other developing countries outside SSA. This data demonstrates that formal agrifood entrepreneurship in this region is already concerned about sustainability, and the two phenomena are deeply connected. It also enhances the importance of studying sustainable entrepreneurship in SSA as a relevant solution to spur sustainable development in the region.

The most addressed Target by sustainable agrifood startups in SSA is Target 2.3, accounting for 72% of the database's firms. This value is significantly higher than in developed and other DCs, and can be interpreted considering what has been said about DCs. In fact, the agrifood industry employs a higher share of people in SSA than in the other DCs, and the largest contributor to the industry is informal agriculture (OECD, 2016). Agriculture employs more than half of the total labour force, a large part of which is constituted by small- scale producers from the rural population. Small farms constitute approximately 80% of all SSA farms and directly employ about 175 million people, primarily in the informal sector (OECD, 2016). Thus, Target 2.3 assumes higher importance than in the other regions of the world since increasing agricultural productivity is required to satisfy the growing demand of the increasing population and to ensure a decent livelihood for food producers is vital (United Nations, 2019).

For what concerns the supply chain stage distribution, most of the agrifood startups in SSA are service providers, accounting for 62% of the companies, and the second most common stage is retailers, with an incidence of 13.5%. In the DCs of SSA, the startups' distribution focuses more on service providers than in all the other world's regions. The same motivations provided for the differences between DCs and developed countries can be applied to this group to justify its supply chain composition.

Table I.4 illustrates the main findings of the statistical analysis on the agrifood startups database.

	Developed Countries	Developing Countries	Developing SSA
Incidence rate of agrifood startups in the sample	24%	20%	40%
Sustainability Orientation	Balanced among the different Targets	Focused on Target 2.3 (51% of sustainable startups)	Focused on Target 2.3 (72% of sustainable startups)
Supply chain composition	• Predominance of Service providers (38% of startups) • Food Processing as the second stage (21% of startups)	• Predominance of Service providers (50% of startups) • Retailers as the second stage (14% of startups)	• Predominance of Service providers (62% of startups) • Retailers as the second stage (13.5% of startups)

Table I.4 illustrates the main findings of the statistical analysis on the agrifood startups database.

I.5 The Findings of the Case Study

The methodological approach selected to address RQ2: "What are the main barriers for SSA startups, and how are these companies addressing them?" and RQ3: "How do the background and competencies of the entrepreneurs influence the creation of startups in SSA countries" is a multiple case study. The units of analysis investigated are sustainable agrifood startups headquartered in SSA. The research has been enriched by the contribution of sector's experts, who provided their knowledge of the agrifood startups and their comprehension of the agrifood industry's environment.

Four elements compose the initial group of barriers to entrepreneurship reported in the literature: the difficult access to market, the lack of access to finance, the lack of adequate transport and ICT infrastructure, and the adverse regulatory framework. Through a cross case analysis, it is understood which of them applies to sustainable agrifood startups in SSA and which new relevant elements characterise this specific context. Moreover, the interviewees' have displayed the solution implemented by their startups to overcome the obstacles they reported.

All the barriers included identified in the literature have been identified in the case study, confirming their validity for companies operating in SSA. In fact, all these elements have been reported by the interviewees. However, even if the case study validates them, other elements have emerged, suggesting that the model is incomplete. Several factors hindering entrepreneurship have been reported outside the group stemming from the literature review, such as (i) the lack of trust among the supply chain players, (ii) the lack of farmers' capital to invest, (iii) and the conservative environment.

To face some of these barriers, the startups interviewed implemented specific solutions. The list below describes these solutions linking them to the barrier they address.

- Trust among agrifood supply chain players:

    - *Traceability and transparency within the business model*: Farmshine addresses this barrier by forcing the actors in its platform to play legally. If a farmer or a buyer wants to sign to the platform, it must accept to make its activity transparent and traceable.

- Farmers' capital to invest:

    - *Improving the supply chain's efficiency*: Farmshine identified that the agrifood supply chain in Kenya is composed of many intermediary steps that do not add value to the final customer but significantly reduce the share of revenues obtained by producers. By reducing the length of the supply chain and enhancing its efficiently, it is possible to transfer a more significant part of the revenues to producers. Once they improve their condition, they can save some money to invest.

    - *Formalisation of an informal market*: Formalisation is crucial to the development of the sector and benefits the poorest actors, giving them an identity and data about their business that they did not have before. By formalising the business, farmers can create a credit score to access services and benefits they did not have before.

- Conservative environment:

    - *Involvement of women in the project*: Providing that men in the community were not interested nor trusted the project of Moringa Wave, the company decided to involve women. In fact, they have more time available and see its activities as an opportunity to increase the family's salary. This solution has a double value, allowing to overcome the barrier of the conservative environment while generating a social impact.

- Access to the market:

    - *Partnership with civil society organisations*: These partnerships allowed Moringa Wave to acquire the knowledge required to enter the market. As stated by Debisi Araba, managing director of AGRF, they play a primary role for

entrepreneurship in SSA, as they can be critical partners for the private sector. The knowledge they have of the local market and the social environment can compensate for the informal sector's lack of official information.

- Regulatory framework:

    - *Direct provision of resources*: The regulations in Cote d'Ivoire prevented Seekewa from carrying out the traditional crowdfunding model. Thus, instead of providing the money to buy the necessary resources for realizing farmers' projects, the company supplies goods and services directly.

- Access to finance

    - *Accelerator programs*: accelerator programs represent an interesting solution indicated by Seekewa as a channel to obtain funding. These programs can be very important for startups in SSA, considering their difficulties in directly accessing finance.

The case studies have also been used as a methodology to test and enlarge the literature understanding of the impact the background factors and the characteristics of the entrepreneur has on entrepreneurship, focusing on founders of sustainable agrifood startups in SSA.

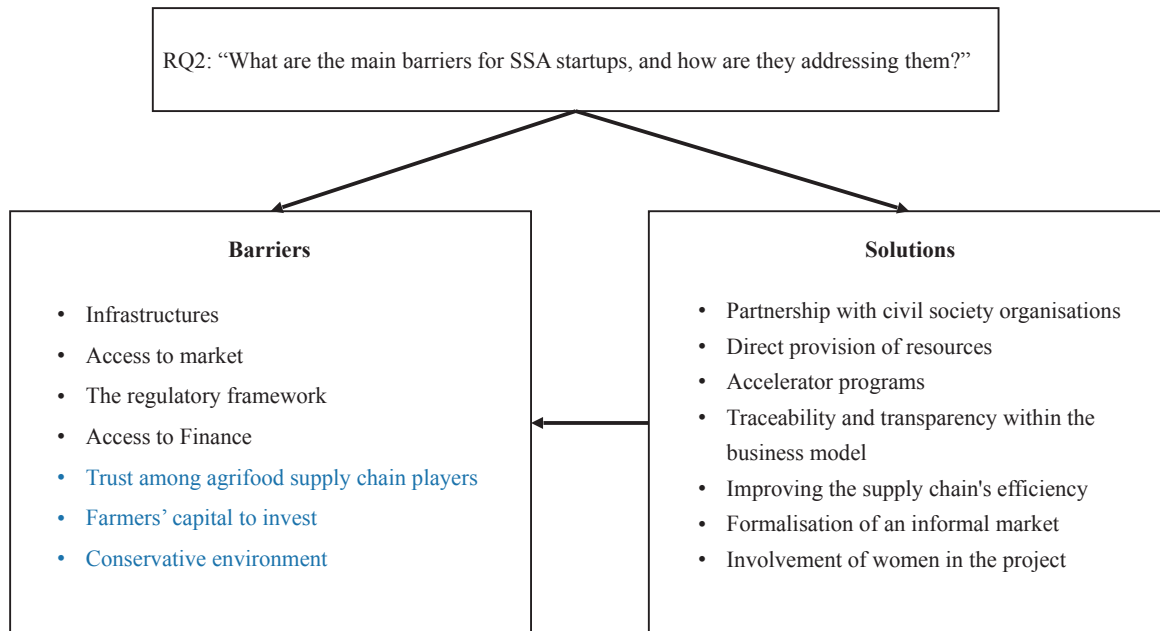All the interviewees highlighted the importance of education for the development of

RQ2: "What are the main barriers for SSA startups, and how are they addressing them?"

Barriers

- Infrastructures
- Access to market
- The regulatory framework
- Access to Finance
- Trust among agrifood supply chain players
- Farmers' capital to invest
- Conservative environment

Solutions

- Partnership with civil society organisations
- Direct provision of resources
- Accelerator programs
- Traceability and transparency within the business model
- Improving the supply chain's efficiency
- Formalisation of an informal market
- Involvement of women in the project

Figure I.1 – Barriers and solutions identified. Those highlighted in blue are those resulting from the case study

their business. Whether specialized or generic knowledge better predicts the performance of entrepreneurs remains an open question. In the case analyzed, two entrepreneurs acquired a generic knowledge, while one followed a specialized educational path. However, it must be noticed that rather than considering a single entrepreneur the group of founders is a more accurate unit of analysis. The cases analysed suggest a startup operating in the agrifood sector in SSA performs better if its founders possess diverse and complementary educational backgrounds.

The results concerning the importance of geographical origin are controversial. While an interviewee reported that it had no importance for his entrepreneurial career, another one stated that it influenced his decision on the company's sector. An interesting perspective on the discussion is proposed by the experts, which affirms that the geographical origin is not relevant, but what matters is the entrepreneur's curiosity, which enables them to overcome the initial lack of knowledge on the market by stimulating search of information and partners.

Volunteering has been pointed out as s significant experience for becoming an entrepreneur of a sustainable company in SSA. This element is particularly interesting since it is not reported in the literature. The potential of volunteering for influencing the decision to become an entrepreneur stems from the possibility to visit SSA countries and look at firsthand the issues in them. Moreover, it is also an element contributing to a firm's performance since it permits understanding these countries' social texture and market conditions.

Eventually, the experts highlighted the importance of psychological traits over competences and geographical origins for entrepreneurs in SSA. They consider resilience and curiosity as primary characteristic of entrepreneurs operating in these areas for the company's success. These traits are vital to overcome failures and challenges and to collect the information required to understand the business's environment, seize profitable opportunities, and implement innovative solutions to address them.

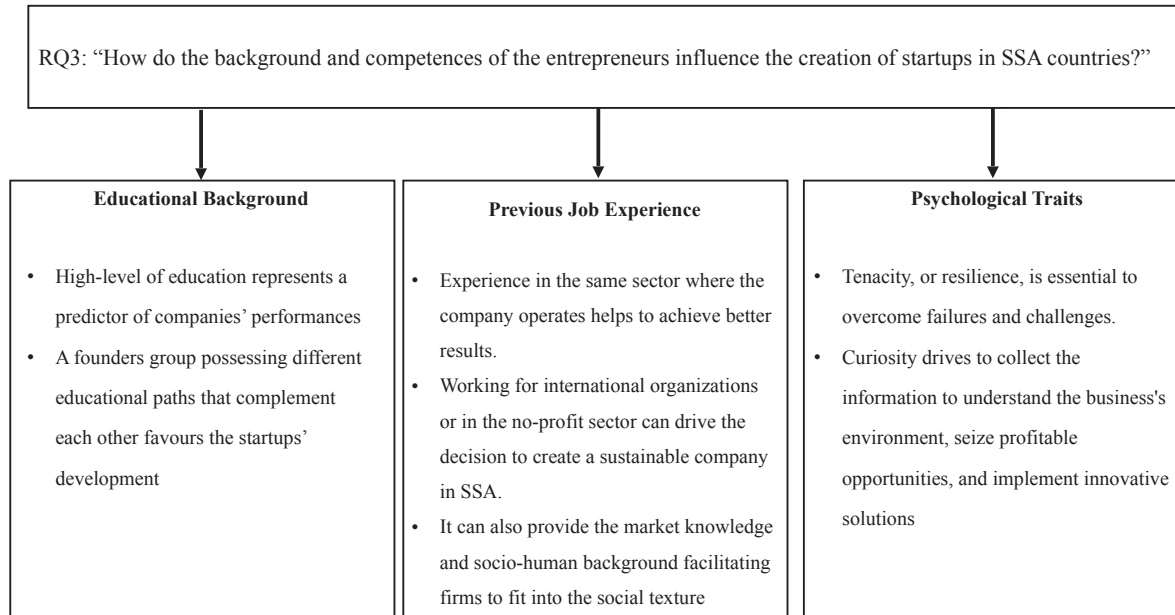Figure I.2 summarises the findings reported from the case study regarding RQ3.

RQ3: "How do the background and competences of the entrepreneurs influence the creation of startups in SSA countries?"

Educational Background	Previous Job Experience	Psychological Traits
• High-level of education represents a predictor of companies' performances • A founders group possessing different educational paths that complement each other favours the startups' development	• Experience in the same sector where the company operates helps to achieve better results. • Working for international organizations or in the no-profit sector can drive the decision to create a sustainable company in SSA. • It can also provide the market knowledge and socio-human background facilitating firms to fit into the social texture	• Tenacity, or resilience, is essential to overcome failures and challenges. • Curiosity drives to collect the information to understand the business's environment, seize profitable opportunities, and implement innovative solutions

Figure I.2 – Most signficant enterpreneur's charateristic and background factors reported in the literature and in the case study

I.6 Implications

The findings of this research have both scientific and practical implications.

The academic contribution is provided by collecting extensive data and presenting the statistical analysis results to enhance the understanding of agrifood entrepreneurship in DCs and SSA. Moreover, the thesis formulates two novel models, one representing the barriers to agrifood entrepreneurship in SSA and the other describing the most significant background factors and personal characteristics of this context's entrepreneurs. These contributions are particularly important considering that most of the entrepreneurship's studies concentrate on developed countries, and therefore a gap in the existing literature has been identified regarding the topics analysed.

The practical implications of this research regard policymakers and entrepreneurs. Policymakers are supported in the understanding of how to promote entrepreneurship growth by identifying the most relevant barriers hindering entrepreneurship development in SSA that should be mitigated to generate an enabling environment. Concerning entrepreneurs, the thesis provides an overview of the environment influencing startups in SSA, which helps them design a business model aligned with the context. Furthermore, it presents solutions adopted by startuppers to address the reported barriers, beneficial to entrepreneurs facing similar constraints.

I.7 Limitations

Despite the attempt to develop a comprehensive study regarding the topics covered within the thesis, some limitations emerged.

First of all, the small sample size of the case study constitutes a relevant barrier. Provided the breadth of the region and industry investigated, the findings obtained may not express the context's conditions but only those of the specific sample. Nevertheless, the aim of the study is to provide a general overview of agrifood entrepreneurship in DCs and draw attention to the topics addressed rather than presenting an in-depth investigation.

The choice of CrunchBase to collect the startups' data used for updating the database may have biased the analysis, excluding those companies with a scarce digital component. Provided that the research identifies startups potentially contributing to sustainable development, to include digitally-oriented firms can constitute an element of value rather than a limitation.

The case study on the importance of the sustainable agrifood entrepreneurs' background and personal characteristics in SSA has been realised interviewing principally international founders, limiting the results' generalizability. To compensate, a specific question has been posed regarding the importance of geographical origin to consider how it impacts the entrepreneurial path.

I.8 Further Research

The innovative nature and the breadth of the analysis open up various interesting research fields

- Given that this research analysed entrepreneurship in a specific time interval, it would be interesting to continue the analysis monitoring the evolution over the following years.

- This thesis has compared agrifood entrepreneurship in developed and DCs on the sustainability orientation and supply chain composition. Future practitioner could expand the study by integrating others dimensions.

- A relevant contribution would be to further validate the set of barriers to entrepreneurship collecting information on a greater number of agrifood startups in SSA.

- An interesting research area for practitioners is to develop a general model of solutions to entrepreneurship's barriers in Developing SSA. Starting from those identified in this thesis the focus should expand to understand which ones are better for specific circumstances, to compensate the relevant differences among SSA countries.

- Finally, the research could be expanded to other industries in SSA and other regions of the world to understand their peculiar characteristics and confront each other.

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1. Introduction

The world is facing many urgent challenges to which an answer must be provided. Poverty and unemployment, growing inequalities, conflicts and wars, natural resource depletion, environmental degradation, and climate change are just some of the factors menacing our environment's survival and humankind's activities (UN General Assembly, 2015).

To answer these challenges and guide the society towards a fair and healthy world, the concepts of sustainability and sustainable development has been developed. Sustainability is the long-term goal that humanity must achieve to continue its existence on the planet, balancing the economic, social, and environmental dimensions. Sustainable development indicates the process necessary to realise it, defined in 1987 by the Brundtland Commission as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Sustainable development is an actual challenge and one of the most relevant of our period, requiring to rethink the concept of growth in order to make it less material and energy-intensive and more equitable in the allocation of costs and benefits it generates. It demands developing new methods of thinking, new values, and new patterns of behaviour combined with technological and productivity improvements (Brundtland Commission, 1987).

In this process, the private sector plays a primary role, contributing to all three sustainability dimensions. Business is the main driver of economic growth by increasing productivity, creating job, and changing the economic structure of society. It can reduce environmental impact by modifying unsustainable consumption and production patterns to make them more environmentally friendly, and spur socially inclusive growth through innovation that that generally improves welfare (Dutz, Kessides, O'Connell, & Willig, 2011; infoDev, 2016, p. 10-14; Olafsen & Cook, 2016; Naudé, 2009).

The importance of sustainable development is particularly relevant in the world's poorest countries, where economic and social inequalities are widely accentuated, and consumption patterns, both at the individual and industrial level, do not often consider the impact on the environment. Therefore, a relevant focus for the study of sustainability concerns how to stimulate it in these areas, defined as developing countries (DCs).

An industry strongly related to sustainable development is agrifood, especially in DCs. This industry significantly impacts poverty reduction and food security and plays a crucial role in preserving natural resources. It is the first employer in DCs, where it constitutes the primary source of income to the population, especially in rural regions, where it is also considered the principal sector capable of providing jobs for the youth people in the near future, on the condition that it will become more attractive, productive, and profitable. Nowadays, the industry faces several challenges that it must overcome to drive sustainable development.

First, it has to produce enough safe and nutritious food for the following years, when the global population is predicted to grow. At the same time, it has to reduce its environmental stress, consume fewer resources, and mitigate climate change effects while adapting to it. Eventually, it must provide a source of income and jobs, fostering poverty eradication in rural areas. The private sector's action is essential to address all these challenges, as it is the primary engine of innovation necessary to improve the sector's structure.

However, several factors limit the diffusion of entrepreneurship in DCs, hindering its potential to lead sustainable development. Although the private sector represents a possible driver for sustainable and inclusive growth, the opportunity to generate an impact largely depends on the context's condition. Even if this is valid for every country, the general environment plays a more crucial role in DCs, where firms face severe limitations. The reduced possibility of expanding affects sustainable private sector-led growth because if companies cannot scale, they will not be able to roll out their solutions, remaining tied to a small environment.

Therefore, understanding the characteristics of entrepreneurship in DCs and stimulating its growth is vital for sustainable development. In this regard, a relevant field of study consists of investigating the context where companies operate and identifying the most significant factors hindering firms' progress.

This research aims to study agrifood entrepreneurship in DCs focusing on sub-Saharan Africa (SSA). The decision to concentrate part of the research on SSA relies on the fact that this region faces significant challenges for pursuing sustainable development and the agrifood industry plays a primary role for fostering this process (Pawlak & Kolodziejczak, 2020). Sustainability-oriented entrepreneurship in agri-food sector in DCs and SSA is analysed by assessing startups according to different perspectives. In this thesis, startups has been considered as five or fewer years old organizations. First, the study considers the sustainability orientation of the startups and their allocation along the agrifood supply chain. The sustainability orientation highlights the sustainability development goals companies are most focused on, while the allocation along the supply chain refers to the specific stage of the supply chain startups belong to and operate. A second part is dedicated to identifying the most relevant barriers to entrepreneurship in these countries, and reporting solutions firms adopt. Finally, to complete the study and provide a more comprehensive vision, the entrepreneur's most relevant characteristics and personal factors influencing the business are investigated. This last point complements the business environment's analysis through the study of the companies' founders. In particular, the factors influencing the decision-making at the individual level are examined for comprehending the motivation to start a new business and which personal elements can support the firms' development. In line with the scope of the research, the attention focused on DCs and SSA too.

The methodology adopted to study agrifood entrepreneurship in DCs and reporting the

differences with developed countries consists of statistical analyses on a database encompassing information on agrifood startups from all over the world. The database of sustainable agrifood startups was created by applying a pre-defined methodology (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017). The representation of the agrifood industry provided in this research consists of an extended supply chain model, including primary and secondary activities.

- Primary activities are those actors involved in the direct flow of food. They provide the main inputs and generate the outputs for producing, transforming and delivering food to final consumers.
- Support activities comprise all those suppliers and service providers concerned with enabling and enhancing the interactions between actors of the primary activities or improving their productivity.

The Sustainable Development Goals (SDGs) framework (UN General Assembly, 2015) has been adopted to evaluate the sustainability orientation of companies, selecting a set of Goals and Targets that fit the agrifood industry.

The startups included in the analysis have been identified using CrunchBase, a business intelligence tool containing information on more than 675,00 firms. The companies have been assessed to establish the supply chain stage where they belong and their sustainability orientation, defined as the main Goal and Target from the SDGs they address.

Once updated the database, a statistical analysis has been carried out to gather information on entrepreneurship in DCs and comparing it to developed countries. The analysis reveals the portion of agrifood startups oriented to sustainability, the most addressed SDGs targets, and the agrifood supply chain stages where companies concentrate. A specific focus is dedicated to SSA, examining the state of sustainable agrifood entrepreneurship in this region and the distribution of startups along the supply chain.

After studying entrepreneurship in DCs and SSA adopting a general perspective, the attention has turned to the barriers to startups development in these regions. The existing literature reported several barriers that have been grouped to form an initial framework based on different authors' contribution. This set's validity has been tested in the specific context of SSA through a case study methodology applied to sustainable agrifood startups operating in SSA. The contribution of experts in the sector, persons who worked in these regions for private or public organisations supporting agrifood startups, has complemented the case studies. They provide insight into the business ecosystem, allowing to include in the analysis the perspective of those players working to create an enabling environment. The investigation's results have been compared with the barriers identified from the literature to develop a model of the factors that hinder these regions' startups development.

Within the case study, part of the attention has been dedicated to the startups' founders, to understand the role of their main background's factors and personal characteristics in leading the decision to start a new business and driving the development of startups in SSA. An initial group of elements has been retrieved from the literature, to create a framework to be investigated and validated through the interviews with the founders of the startups selected for the case study analysis. The experts' contribution integrated the case study's content in this phase too, providing a relevant perspective since they have worked with many startups for years.

In addition to the importance of the topic addressed, my research is particularly significant and innovative as it investigates an area in which few other studies concentrate. The literature review has shown that most of the theoretical knowledge and data available describe entrepreneurship in developed countries, with significantly smaller attention directed towards DCs. The innovativeness of the field of this thesis also stems from the perspective through which entrepreneurship is analysed. The study focuses on sustainable development, while entrepreneurial research traditionally approaches this phenomenon adopting an economic perspective. Finally, my work provides an original interpretation of the overall entrepreneurial process in the analysis area, presenting the determinants of business development from the level of the individual, the entrepreneur, to the general environment where startups operate.

The thesis is divided into 5 chapters, and this one represents the first. The contents of the following are presented below.

- Chapter 2 illustrates the literature review carried out on the established concepts of low-income economies, sustainability, agrifood sector and development, and on specific topics of entrepreneurship in developing countries. It displays the current understanding of the themes and highlights the gaps in the literature that are addressed.
- Chapter 3 explains the methodology adopted to address the research questions resulting from the literature analysis, describing how data has been collected and interpreted.
- Chapter 4 displays the key findings deriving from the analysis performed and interpret them to formulate an answer to the research questions addressed in this thesis.
- Chapter 5 summarises the thesis findings and illustrates their implications for the academic community, entrepreneurs, and policymakers. Eventually, it presents the limitations of the study and possible future research areas.

2. Literature Review

This chapter contains a literature review that is divided into two parts. Firstly, established concepts on low-income economies, sustainability, agrifood sector and development are presented. Secondly, a review of the literature on entrepreneurship in developing countries (DCs) is conducted. The objectives are to illustrate the current understanding of the aforementioned topics, highlighting potential gaps in the literature that could be addressed, and creating a solid knowledge base that motivates and supports the analysis that has been carried out.

The literature review has been carried out according to a specific structure. First, attention is dedicated to the background key concepts of "Developing countries", "Entrepreneurship", "Sustainability", and "Agrifood Sector", studied from a general perspective. Then, it concentrates on collecting information regarding specific aspects of entrepreneurship, such as the positive impacts that it can generate to foster development, what are the main factors representing a barrier to entrepreneurship in DCs, and how the background of the entrepreneur influences his/her path.

Given the research area's breadth, it was decided to develop a solid and univocal knowledge of the pillar concepts sustaining the topics at the centre of the thesis. Once given enough information on them, it was possible to enter into more detailed investigations. The three areas of entrepreneurship studied are: (i) the outcomes of the entrepreneurship process may promote the development of countries or local communities, (ii) which factors of the business environment in DCs may hamper the enterprise growth, (iii) the mechanisms through which the decision to create a business is taken at the level of the individual. Therefore, the aim is directed to entrepreneurship, presenting the entire process from birth to the interaction with the surrounding context, capturing a comprehensive vision of the phenomenon.

2.1 Key Background Concepts

2.1.1 How Are Developing Countries Defined?

Since this thesis is focused on DCs, the first action required was to define what this term means. In this subchapter, the objective is to present the principal taxonomies existing for then explaining the criteria adopted in this thesis when assigning the status to countries. While necessary for the sake of clearness, any decision in this domain is subjective since a universally accepted definition of this concept is still missing, and different organisations adopt different criteria.

The first step has been to look at how the most well-reputed agencies for human development classify countries. The selected agencies have been the World Bank, the United Nations Developing Program (UNPD), and the International Monetary Fund (IMF). They have been chosen because of their global importance and recognition as well as their influence in the research of this topic.

The World Bank does not provide a definition of what a developing country is anymore (Khokhar & Serajuddin, 2015), but it has always classified countries by income group in low, lower-middle, upper-middle, and high income. Even if now there is no formal definition, the low and middle groups were generally taken together and referred as the "developing world" until 2016 (Khokhar & Serajuddin, 2015). In fact, the agency used to adopt this framework when disclosing its publications and to provide important aggregate indicators (e.g. poverty rates). However, starting in 2016, the World Bank decided that it would not use this differentiation in the presentation of the data, but it would only use the income grouping. (Fantom, Khokhar, & Purdie, 2016). This latter distinction is made depending on the yearly Gross National Income (GNI) per capita in U.S. dollars, using the Atlas method to apply the currency exchange, and the organisation updates this classification every year on July 1st. The GNI is computed as the gross domestic product (GDP) plus the factor incomes earned by foreign residents minus the income earned in the domestic economy by non-residents (Todaro & Smith, 2011). The Atlas Method is a conversion factor that is used by the World Bank instead of exchange rates, with the purpose of reducing the effect of their fluctuations when comparing the national incomes of different countries. As the World Bank explains: "The Atlas conversion factor for any year is the average of a country's exchange rate for that year and its exchange rates for the two preceding years, adjusted for the difference between the rate of inflation in the country and international inflation; the objective of the adjustment is to reduce any changes to the exchange rate caused by inflation". The GNI used is computed from World Bank 's economists in the country units, while the size of the population is estimated from multiple sources. Countries with less than $1,035 GNI per capita annually are classified as low-income countries, those between $1,036 and $4,085 as lower-middle income countries, those between $4,086 and $12,615 as upper-middle income countries, and those with incomes of more than $12,615 as high-income countries.

The UNPD does not set criteria for defining a country as developed or developing as well, but it classifies them in four categories according to their value of Human Development Index (HDI) (Khokhar & Serajuddin, 2015). This indicator aims at representing the multifaced nature of development by including various dimensions rather than just economic measures. In fact, the HDI is a composite index combining three components: the health dimension, measured through the life expectancy index (LEI); the education dimension, proxied by the education index (EI), and the standard of living dimension, through the income index (II). How these indexes are computed is represented by the following formulas (2.1-2.5).

$$LEI = \frac{LE - 20}{(85 - 20)}$$

2.1

$$EI = \frac{MYSI + EYSI}{2} \qquad \text{2.2}$$

$$MYSI = \frac{MYS}{15} \qquad \text{2.3}$$

$$EYSI = \frac{EYS}{18} \qquad \text{2.4}$$

$$II = \frac{\ln(\text{GNIpc}) - \ln(100)}{\ln(75000) - \ln(100)} \qquad \text{2.5}$$

Where LE is Life Expectancy at Birth, MYSI is Mean Years of Schooling Index, EYSI is Expected Years of Schooling Index, MYS is Mean Years of Schooling (i.e. years that a person aged 25 or older has spent in formal education), EYS is Expected Years of Schooling (i.e. total expected years of schooling for children under 18 years of age), and GNIpc is the Gross National Income per capita.

$$HDI = \sqrt[3]{LEI * EI * II} \qquad \text{2.6}$$

Eventually, the HDI is computed as the geometric mean of the standardized indexes (formula 2.6).

The HDI has a value between 0 and 1 and determines the classification of a country within one of four possible categories: very high for HDI of 0.800 and above, high from 0.700 to 0.799, medium from 0.550 to 0.699 and low below 0.550.

The agency, in its report *"Human Development Report 2010"*, designated developed countries as countries in the top quartile in the HDI distribution, those in the bottom three quartiles are considered DCs, without clearly explain the reasons behind this distinction (Nielsen, 2011). But in the last version of the report – Human Development Report 2019 – this differentiation is not present anymore, and countries are grouped just according to their human development index in very high, high, medium, and low (United Nations Development Program, 2019, p. 30). So, it is possible to notice once again how an international organisation decided to abandon the taxonomy of DCs in favour of other kind of classification.

The IMF classifies the country of the world into two major groups: advanced economies, and emerging market and developing economies. As the organisation explains (International Monetary Fund, 2020a), the main criteria used for the classification are per capita income level, export diversification, and degree of integration into the global financial system. However, these evaluation points are not the only one, in fact they also state: *"these (per capita income, export diversification, degree of integration into the global financial system) are not the only factors considered in deciding the classification of countries. […] This classification is not based on strict criteria, economic or otherwise, and it has evolved over time. The objective is to facilitate analysis by providing a reasonably meaningful method of organizing data."* (International Monetary Fund, s.d-b)

The IMF provides a clear and marked division between advanced and developing economies, listing some of the criteria that matters for the choice. Nevertheless, the method used for setting the classification is not explicitly disclosed, making impossible to understand what approach is followed by the IMF in designating the status of a country (Nielsen, 2011). Even if in this case the organisation distinguishes between developed (advanced) and DCs, the basis upon which the classification is built are not transparent.

Therefore, for what have been seen, it is possible to conclude that international organisations approach the construction of a development taxonomy very differently. The criteria set for defining what a developing country is change from one to another, and some of them even abandoned the use of this two-way distinction, considering it obsolete (Fantom, Khokhar, & Purdie, 2016). In Table 2.1 it is presented a recap of the criteria used by the institutions for dividing countries, the clusters they identify and what are DCs according to them.

Organisation	Criteria of Division	Grouping	Developing Countries
World Bank	GNI per Capita	Low Income: less than $1,036 Lower-Middle Income: $1,036 - $4,085 Upper-middle income: $4,086 - $12,615 High Income: more than $12,615	Low and Lower-Middle Income (until 2016)
UNDP	Human Development Index (HDI)	Very High: more than 0.800 High: 0.700-0.799 Medium: 0.550-0.699 Low: less than 0.550	Not present
IMF	Combination of heterogeneous indicators, but not disclosed	Advanced Economies Emerging Markets and Developing Economies	Emerging Market and Developing Economies

Table 2.1 - Definitions of developing countries provided by international agencies

The reason for this diversity can be found in the lack of a clear definition provided by the economic theory, which does not set parameters to classify countries as being either "developed" or "developing", providing little guidance. As a consequence, the three organizations considered

before adopt three distinct classifications, and since they have different objectives and roles, they approach this issue from different perspectives, according to what fits better their purpose (Nielsen, 2011). For the work of the thesis, it was necessary to set clear boundaries defining what a developing country is. Thus, I assumed that a country is either "developed" or "developing" according to its GNI per capita disclosed by the World Bank, identifying the low and lower-middle income economies as "developing". This choice was made to base the definition upon clear and univocal criteria, which are easy to use for performing the following analysis. Moreover, it is in line with what the World Bank was disclosing before 2016, even if they stopped adopting this framework. The other classifications proposed by the other institutions were discarded for the following reasons: the UNDP classifies countries according to their HDI and then ranks them, but it does not provide any guidance to establish which of them should be considered a developing country, while the IMF does not explicitly disclose the criteria for performing its classification, making the process of selection not transparent to external entities.

2.1.2 How Is Entrepreneurship Defined?

The second key concept to be understood and clarified in this initial phase is entrepreneurship. Despite its wide diffusion in many different contexts, there is not a common agreement of what this term means, even among academics of the sector (Mokaya, Namusonge, & Sikalieh, 2012; Gartner, 1990). In fact, given its highly multifaced nature, it is complicated to describe it through a limited framework, and the economic theory does not provide any official definition. The complexity in drafting a shared and universally accepted definition emerges from the multidimensionality and continuous evolution of the phenomenon across time. The different interpretations formulated by researchers include different aspects, depending on their purpose and research area, and each of them includes certain aspects while neglecting others (Mokaya, Namusonge, & Sikalieh, 2012). Thus, it is now required to specify what entrepreneurship is and who entrepreneurs are before starting to study them. In first place, it is interesting to analyse how the understanding of entrepreneurship evolved in the literature by looking at some of the most significant definitions provided by researchers, to highlight the components of this concepts which emerged throughout the time.

The first introduction of the term "entrepreneur" is commonly attributed to the French economist Richard Cantillon in his work 'Essai sur la Nature du commerce en General' published in the mid eighteenth century. He defines the entrepreneur as an individual who generates profits through exchanges and who takes risk from buying at certain prices and selling at uncertain prices, with the difference being its profit (or loss) (cited in Swanson, 2017, p.7). In the period the main "entrepreneurs" were farmers and intermediaries who moved products from the farms to the cities, selling those acquired in big quantity in smaller lots at a higher price (Mokaya, Namusonge, & Sikalieh, 2012). The focus of this definition is on the risk-taking nature of the activities which the entrepreneur has to manage, one of his/her most

important and distinctive characteristics.

Almost half a century later, in 1803 Jean Baptiste Say continued the work of Cantillon providing a significant addition to this field of research. According to him, the development of a product is a three-stage process that is manged by the entrepreneur. It starts from a scientific approach where someone has the knowledge about the product. The second stage is where the entrepreneur intervenes, applying the knowledge for delivering a useful purpose, and the last one is the manufacturing of the product. Thus, the task of the entrepreneur is that of managing, crucial for bringing together the factors of production (cited in Mokaya, Namusonge, & Sikalieh, 2012; Swanson, 2017, p.8).

Knight contributed to this debate by setting the distinction between an entrepreneur and a manager, based on bearing the uncertainty and taking responsibility. According to him, a manager becomes an entrepreneur when his/her judgment is subject to errors and he/she assumes the responsibility for the results of the choices. Entrepreneurs calculate the risks associated with uncertain business situations and make decisions with the expectations that, if correct, they would earn a profit (cited in Swanson, 2017, p.8).

Another important addition to this topic was made by Schumpeter, who has indissolubly linked entrepreneurship and innovation in his theory of economic development (1912). In his vision, entrepreneurs play a central role for economic development by generating innovation through new combinations of the factors of production. The Austrian economist represented entrepreneurs as individuals which disrupt how things are done by creating new and better combinations that improve the previous standards (cited in Swanson, 2017, p.9).

But as time passed and both society and market paradigm changed, it was necessary to introduce and review the features within the concept of entrepreneurship. For this purpose, Krizner defined the entrepreneur as an individual, in a world where perfect knowledge does not exist, which is alert to spot unnoticed profit opportunities and implements actions to fulfil unsatisfied market needs or to perform activities more efficiently than what is already being done (Kirzner, 1973, p. 30-39). So, entrepreneurship was associated with perceiving and seizing market opportunities, a novel aspect of great importance.

According to Gartner, entrepreneurship is the creation of organisations, and what differentiate entrepreneurs from non-entrepreneurs is exactly the creation of organisations (cited in Mokaya, Namusonge, & Sikalieh, 2012).

Eventually, to present the common understanding of entrepreneurship outside the research world, it may be useful to look at the definitions provided by some of the world's most important dictionaries. Merriam-Webster describes the entrepreneur as "one who organizes, manages, and assumes the risks of a business or enterprise". The Cambridge Dictionary, instead, defines entrepreneurship as "skill in starting new businesses, especially when this involvesseeing

new opportunities". As we can see, even dictionaries differ from the classification of this concept, each of them underlining some of the characteristics illustrated before rather than others.

After presenting how this concept has evolved over the years and the central traits it embodies, it is necessary to provide a definition that will be referential for this thesis. Thus, to include the relevant aspects expressed before, it was selected that provided by Aidis (2003), who describes entrepreneurship as *"The process of starting a business, using the ability and willingness of individuals, on their own, in teams, within and outside existing organizations, to perceive and create new economic opportunities and to introduce their ideas in the market, in the face of uncertainty and other obstacles"*.

Table 2.2 summarizes the contributions to the debate of what entrepreneurship is by the authors aforementioned, highlighting which is the main point of their perspective.

Author	Year	Definition of Entrepreneur	Key Highlight
Richard Cantillon	1755	Individual who generates profits through exchanges and who takes risk from buying at certain prices and selling at uncertain prices	Risk-Taking nature of Entrepreneurship
Jean Baptiste Say	1803	Agent who applies the knowledge of a product for delivering a useful purpose	Managing as a key activity of the Entrepreneur
Joseph Schumpeter	1912	Manager who assumes the responsibility of the results of the choices	Distinction between Manager and Entrepreneur
Frank Knight	1921	Individual who disrupts how things are done by creating new and better combinations that improve the previous standards	Link between Entrepreneurship and Innovation
Israel Krizner	1973	Individual alert to spot unnoticed profit opportunities and implements actions to fulfil unsatisfied market needs or to perform activities more efficiently than what is already being done	Entrepreneurship starts by spotting unnoticing opportunities and then implements them
William B. Gartner	1990	Creator of organisations	Entrepreneurship requires to create an organization
Ruta Aidis	2003	Individual who starts a business, using his/her ability and willingness, on their own, in teams, within and outside existing organizations, perceiving and creating new economic opportunities and introducing ideas in the market, in the face of uncertainty	Comprehensive definition of entrepreneurship

Table 2.2 – Contributions to the definition of entrepreneurship over time

2.1.3 Opportunity Entrepreneurship in the Formal Economy

After choosing the definition, the area of focus of the present work has been circumscribed. In fact, this concept is too broad and encompasses many different activities, requiring establishing the most important in this study.

A first separation can be made on the reason why starting the entrepreneurial activity. A common distinction defines "necessity" and "opportunity" entrepreneurs, with the former who decides to be self-employed as a mean to escape the lack of wage employment because all other work opportunities are absent or unsatisfactory, while the latter is self-employed by choice, to pursue an opportunity (Olafsen & Cook, 2016; Vivarelli, 2016; Naudé, 2010). Necessity entrepreneurship does not have the objective of creating any change to the society, but just aim at obtaining the resources needed for subsistence, whilst opportunity entrepreneurship is oriented to drive transformations and expand beyond the boundaries of the entrepreneur, employing other people and generating an income for all the employees (Olafsen & Cook, 2016). This thesis analyses the phenomenon of opportunity entrepreneurship, given that the purpose of the study is to identify innovative solutions that may have a significant scale impact on sustainability in the agrifood industry. In fact, opportunity entrepreneurship is the only one that can provide outcomes that are oriented towards improving the status quo, being at the same time scalable and sustainable (Naudé, 2009). Necessity entrepreneurship has a limited impact scale, often bound to the single entrepreneur and its family, and has no other purpose than providing subsistence. Even if it is an important phenomenon, it has not the potential to be the driver of these solutions.

The second distinction to be made regards the legal form, dividing between formal and informal enterprises. It is particularly important for DCs, in which the informal sector covers a large part of the economy. For instance, in Sub Saharan Africa (SSA), the International Labour Organisation estimates that more than 66% of the total employment is in the informal sector (Kathage, 2018). This research, then, will just focus on formal entrepreneurship, first because there are no easily accessible data for informal companies, considering that they live hidden from the radar, and then because these firms have very little potential to provide widespread solutions for sustainability.

This thesis will focus on the formal sector and opportunity entrepreneurship within the broad range of entrepreneurship. Even if informal and "survivalist" entrepreneurs might have a role in poverty alleviation, they are unlikely to provide high-impact solutions.

2.1.4 Entrepreneurship as a Component of Sustainable Development

Nowadays, the world is facing many urgent challenges to which an answer must be given. As the UN General Assembly stated (2015, p. 5), billions of people live in poverty, opportunity, wealth, and gender inequalities within and among countries exist and are growing. Unemployment, particularly young unemployment, has remained a key challenge in many areas, global health is threatened, and conflicts and wars continue to take human lives and destroy territories. Natural resource depletion, the adverse impacts of environmental degradation and climate change, which led to more frequent and intense natural disasters, menace our environment's survival and strongly affect all the activities of humankind.

The concepts of sustainability and sustainable development has been developed to provide a framework for answering these issues. From the middle of the last century, when these issues started to gain global recognition, they attracted growing attention until craving a prominent role in the political and economic debate and many other contexts (Purvis, Mao, & Robinson, 2019). However, what exactly is sustainability? The word itself comes from the verb "to sustain", and it can be intended as something which implies to carry on, to be continued over time. The concept is strictly related to that of sustainable development, for which a definition that is adopted globally was given by the Brundtland Commission in 1987, as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs". This statement does not set boundaries or criteria to decide whether specific actions can be considered sustainable or not, but it is voluntarily expressed in general terms according to the phenomenon's broadness (Brundtland Commission, 1987). This one is not the only definition provided during the years, since an "official" universally accepted does not exist yet, but the concept is still open with a myriad of interpretations and context-specific understanding (Corvellec, 2016; Purvis, Mao, & Robinson, 2019). Therefore, sustainability is often thought as a long-term goal which humanity must achieve to continue its existence on the planet, while sustainable development is the process necessary to achieve it, now and in the future, for all persons making up the society, and across communities and countries.

A representation of sustainability that has become almost ubiquitous is that in which it is placed at the intersection between the environmental, social, and economic dimensions, illustrated in Figure 2.1. This perspective emerged from the gradual understanding that the economic development cannot be decoupled from considerations on natural resource exploitation and social inequalities, but these three areas are very much linked (Brundtland Commission, 1987; UN General Assembly, 2015, p. 3). Economic development cannot subsist in the long term upon a deteriorating environmental resource base, and the environment cannot be protected if growth does not consider the costs of environmental destruction (Brundtland Commission, 1987). Environmental stress and uneven economic development can increase social tensions, and it could be even argued that the distribution of power and influence within society lies at the heart of most environment and development challenges (Brundtland Commission, 1987). Although part of the environmental stress is produced by the increasing wealth and richness, demanding more resources than the planet has to offer, poverty pollutes too, but in a different way. Those who are poor and hungry will often destroy their surrounding environment in order to survive: they will cut down forests, their livestock will overgraze grasslands, and they will overexploit marginal land (Brundtland Commission, 1987).
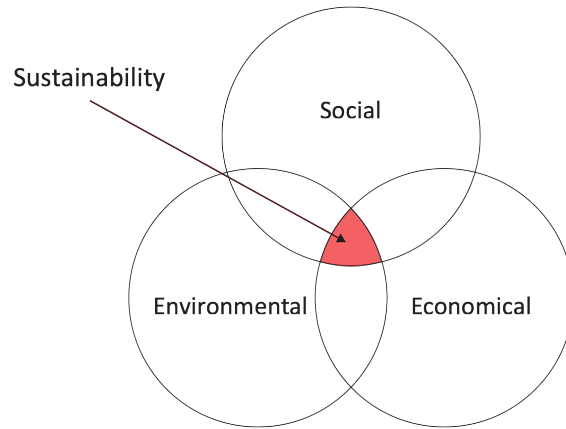
Figure 2.1 – Sustainability as the intersection of the environmental, social, and economic dimensions

These problems cannot be treated separately, but a complex cause and effect mechanism bound them. DCs are the most affected, and global development cannot neglect them anymore, but it is necessary to find a way to address the structural, economic, and environmental problems present there (UN General Assembly, 2015, p. 27). A world in which poverty and inequity are widespread will always be susceptible to ecological and economic crises. To provide a satisfactory standard of life to all the people is crucial for sustainable development, as it is stated in the report "Our Common Future" (1987): *"Sustainable development requires meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for a better life. Living standards that go beyond the basic minimum are sustainable only if consumption standards everywhere have regard for long-term sustainability. Yet many of us live beyond the world's ecological means, for instance in our patterns of energy use. Perceived needs are socially and culturally determined, and sustainable development requires the promotion of values that encourage consumption standards that are within the bounds of the ecological possible and to which all can reasonably aspire"*

As Purvis, Mao, & Robinson pointed out (2019), it cannot be identified a single point of origin of this triple-bottom-line conception, but rather a step-by-step emergence during the years from the needs of two different streams: on the one hand, the various critiques of the economic status quo from the academic literature concerning both social and ecological perspectives, and on the other the effort to redirect economic growth as a solution to social and ecological problems by the United Nations (UN). In 2015, this agency declared: "*We are committed to achieving sustainable development in its three dimensions – economic, social and environmental – in a balanced and integrated manner. A world in which consumption and production patterns and use of all natural resources – from air to land, from rivers, lakes and aquifers to oceans and seas – are sustainable. One in which democracy, good governance and the rule of law, as well as an enabling environment at the national and international levels, are essential for sustainable development, including sustained and inclusive economic growth, social development,*

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environmental protection and the eradication of poverty and hunger" (UN General Assembly, 2015, p. 3). This statement was made when the UN decided to create an operative framework to foster sustainable development: The Sustainable Development Goals (SDGs). This document comprises seventeen objectives that must be reached by 2030, supporting policymakers and private companies to guide their decisions towards sustainability. Each of these objectives is divided into goals and target, and together they represent an unprecedent effort for a global partnership in pursuing sustainable development. The SDGs will be analysed more in detail in Chapter 3 when describing the methodology used for creating the Database.

Therefore, sustainable development involves more than just growing, it requires rethinking the growth content to make it less material and energy-intensive and more equitable in its impact. The Sustainable Development Goal 8 of 2030 Agenda claims that a fast yet equitable and environmentally-friendly growth process should be followed, highlighted by the words "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all". New methods of thinking, new values, and new behaviour patterns must be developed to solve global problems. It is not sufficient to promote improvements in technology efficiency and knowledge, but what is most important is the formation of new value (Brundtland Commission, 1987).

Finally, it is essential to underline that in this process, a primary role is played by the private sector, acknowledged in the 2030 Agenda for Sustainable Development. Private businesses must change unsustainable consumption and production patterns since they are the primary driver of productivity, inclusive economic growth and job creation through investment and innovation. In the report, the international organisation addresses them by stating: "We acknowledge the diversity of the private sector, ranging from micro-enterprises to cooperatives to multinational. We call upon all businesses to apply their creativity and innovation to solving sustainable development challenges. We will foster a dynamic and well-functioning business sector, while protecting labour rights and environmental and health standards" (UN General Assembly, 2015, p. 29). Formal entrepreneurship is a pillar of the 2030 Agenda vision of economic development, as shown by one of the targets of Sustainable Development Goal 8, namely Target 8.3, which reads: "Promote development-oriented policies that support (…) entrepreneurship, (…) and encourage the formalization and growth of micro-, small- and medium-sized enterprises, (…)".

2.1.5 Agrifood Sector and Development

The agrifood sector is the food value chain, comprising all the business activities *"from farm to fork"* (FAO, s.d.-a). It includes the supply of agricultural inputs, the production and transformation of raw materials into the final product, marketing, and the delivery to the final consumer, together with all the necessary supporting services (FAO and OECD, 2019, p. 3).

This sector has high importance for sustainable development, with a much more

significant impact on reducing poverty and improving food security than all the others (Pawlak & Kołodziejczak, 2020), while conserving natural resources. (FAO and OECD, 2019, p. 1). It is also considered the principal sector capable of providing jobs for the youth people in rural areas in the near future, on the condition that it will become more attractive, productive, and profitable. This element is particularly true in SSA, where the number of youth people in rural areas is predicted to increase dramatically. Only a small portion of them can be absorbed outside the agrifood sector, while the rising levels of land scarcity together with the current productivity suggests that not all of them will be able to operate their own farms Ripoll, et al., 2017). In this situation, a valid answer to the request of employment for those exiting agriculture may emerge from the other stages of the agrifood value chain, including the supply of agricultural inputs, food processing, marketing, logistics, and all the other necessary supporting services. As labour moves out of farms, it will be required to create alternative jobs, and the closest activities regard off-farm agriculture-related activities like food processing and trading. Food industries have proliferated in the developing world in the past three decades. The Agrifood industry accounts for more than 50 percent of total manufacturing value-added in low income countries and 30 percent in middle income countries (FAO, 2018, p. 15). The growing food demand, and the dietary transition driven by urbanization from staple to processed foods can present an important opportunity for industrialization, with a high potential to create decent employment (FAO, 2018, p. 15). Therefore, it is crucial to improve the productivity and competitiveness of the sector, enabling all the actors in the value chain to adopt better practises and have good access to services, infrastructures and industrial activities, possibly linked with domestic agri-food systems to creating additional value.

Aside from its potential for poverty alleviation through employment and growth, the agrifood sector may have other beneficial impacts for development, provided that giving an answer to the many challenges it faces, which are more numerous and complex than ever, will help mankind moving towards sustainability.

First, it has to provide sufficient safe and nutritious food for the following years, when the global population has been forecasted to grow, resulting in an increase of the food demand. Then, it has to do it while reducing its environmental stress, consuming fewer resources, and mitigating the effects of climate change while adapting to it: doing more with less. Eventually, as it was analysed before, it must provide a source of income and jobs contributing to the poverty eradication in rural areas (FAO and OECD, 2019, p. 1-3).

Fighting hunger and food security is one the most pressing action our world is facing, and represent the second SDG set by the UN: zero hunger. In 2018, according to the data available from FAO, around 10.8% of the world population was suffering from undernourishment, defined by FAO as the situation in which "a person is not able to acquire enough food to meet the daily minimum dietary energy requirements, over a period of one year", with peaks of 23%

in SSA (FAO, s.d.-b), meaning that in that region almost one in four person suffers from this problem. In the future the situation can become even worse if actions are not taken. The world population is predicted to grow up to 9.7 billion by 2050 (United Nations, 2019), a plus 26 percent increase which will potentially raise the food demand by 40-54 percent (FAO, 2018, p. 31). Therefore, food production will need to increase substantially in the following years to balance this trend. It must be noticed that this data is not evenly distributed among all the countries, but those facing a larger increase of the population are the DCs, which at the same time have the highest rate of undernourishment and whose food production systems are the least efficient (Pawlak & Kołodziejczak, 2020). The challenge of maintaining food security has the highest urgency, as well as difficulty of resolution, in DCs with a high share of agriculture in their GDP, adverse conditions hindering agricultural production and deficient infrastructure. In fact, in these areas the income for the population working in agriculture is typically very low, indicating a lack of resources to invest in improving farm productivity and a lack of purchasing power of consumers (Pawlak & Kołodziejczak, 2020). These countries are mainly located in Africa, in particular SSA, where despite a relatively large arable area per capita, the lack of capital and infrastructure led to food shortages in almost 40% of the inhabitants (Roser & Ritchie, 2018).

But increasing food production will not be enough, since great attention must be given to the impact on natural resources and the whole natural environment, locally and globally. This impact is indeed huge, and it works in both directions. Agricultural production directly depends on the quality and availability of natural resources, and the sector is one of their biggest consumers. According to the data of FAO, agriculture is the largest user of freshwater resources worldwide accounting, on average, for 70 percent of total freshwater withdrawals, even reaching much higher figures in some DCs, whose economy is mainly based on that sector (cited by Roser & Ritchie, 2018). It is also a major source of water pollution from nutrients, pesticides, and other contaminants, which if unmanaged can lead to significant social, economic, and environmental costs (Pawlak & Kołodziejczak, 2020). Furthermore, approximately 33 percent of the world's land is moderately to highly degraded due to the erosion, salinization, compaction, acidification, and chemical pollution of soils. By 2050, soil erosion may result in 10.25 percent of crop loss, equivalent to the removal of 150 million hectares from crop production (Pawlak & Kołodziejczak, 2020). Both water and soil problems are highly related to inadequate agricultural practices, which are also the most diffused, putting an excessive stress on the natural environment (FAO, 2018, p. 35). Looking back at the innovations promoted in the 1970s throughout the Green Revolution, such as the introduction of fertilizers and pesticides, mass mechanization and monocrop, they turned out to be unsustainable in the longer term, generating negative externalities in spite of the positive effect of productivity growth. The results of these proceedings coupled with the rapidly changing environmental conditions caused by climate change, are putting serious pressure on agricultural productivity and the livelihoods of billions of people (infoDev, 2014, p. 60). Most of them live in DCs,

which will suffer the most from the effect of climate change, whose impact will be uneven across regions and countries. In low latitude regions, where most DCs are located, agriculture is already being adversely affected by climate change, suffering by a higher frequency of natural calamities such as droughts and floods. For many DCs, climate change could therefore increase the lack of food security they already experience, widening existing inequalities and the gap between developed and developing (FAO and OECD, 2019, p. 46).

Given that the output of agricultural activities strongly depends on the characteristics of land, which may be very heterogeneous across different areas, it is not often possible to standardize and scale up uniform solutions, but each area should address the problem with tailored interventions. As it was seen before, to mitigate the agrifood impact on natural resources imply to modify the existing practises, and adopting sustainable ones does often require change on the behavioural side rather than creating and implementing technological breakthrough innovation (infoDev, 2014, p. 62).

Concluding, a new orientation for agricultural development must be sought, taking into account the postulates of sustainable development in all countries, with special attention regarded to the developing ones. Investments and innovation are the central driving force which will transform agri-food systems, to lift the rural poor out of poverty, and help the world to achieve food security (FAO and OECD, 2019, p. 21). Spreading and developing better practises, technologies, and organisation along the value chain is a key lever for making the agrifood sector more productive, competitive, and sustainable (infoDev, 2014, p. 69). It needs to both widen the adoption of modern technologies and practices, and implement break-through innovation to overcome the three interlinked challenges of increasing agricultural productivity to meet global food demand, shifting towards a sustainable production while adapting and mitigating the impacts of climate change, and contributing towards economic growth and employment, especially in developing regions (FAO and OECD, 2019, p. 21)..

2.2 Literature on Entrepreneurship in Developing Countries: The Search Method

Once the key findings on the background concepts have been presented, this second part of the literature review investigates specific aspects of entrepreneurship. Here, the focus is on entrepreneurship in DCs, particularly on the impact of entrepreneurship for development, barriers and enablers of entrepreneurship in DCs, and how the background of the entrepreneur influences his/her business (again, with some implications for entrepreneurship in the developing world).

The study has been carried out investigating the publications available on the most important international human development institutions' databases. It was decided to proceed in this direction rather than using other research databases (e.g. Scopus) since the objective was to acquire a general understanding of this broad phenomenon instead of searching for

specific and narrower topics. The databases selected were those of the World Bank, Institute of Development Studies (IDS, a reputable academic centre focusing on development in the UK), FAO, InfoDev (an innovation and entrepreneurship program of the World Bank), and Empretech (an entrepreneurship program of the United Nations Conference on Trade and Development - UNCTAD).

The query was structured considering the period between 2010 and 2020, publications in English and entrepreneurship as the main topic. Given that the databases are different, they required a specific selection of the filters to apply, illustrated below.

World Bank:
- Filters Applied: (Document Date: From 1st January 2010 to 12th May 2020) AND (Document Type: "Policy Research Working Papers" OR "Working Papers" OR "Research & Policy Briefs" OR "Policy Research Reports") AND (Keywords: "Entrepreneurship" OR "Startup")
- Results produced: 192

IDS UK:
- Filters Applied: (Document Date: From 1st January 2010 to 12th May 2020) AND (Document Type: Publications) AND (Keywords: "Entrepreneurship" OR "Startup")
- Results: 27 Publications

FAO:
- Filters Applied: (Year of Publication: From 2010 To 2020) AND (Agrovoc Keywords: "entrepreneurship" AND "Developing Countries")
- Results: 1288 Publications

InfoDev:
- Filters: (Streams: Agribusiness Entrepreneurship) AND (Date: From 2010 To 2020)
- Results: 17

Empretech:
- Filter: (Document Type: Publications)
- Results: 19

Among all the articles, it was decided not to consider FAO's publications since the results were too broad, and most of them concerned agricultural practices. On the other hand, to not lose FAO's contribution, their annual reports "The State of Food and Agriculture" from 2010 to 2019 were included since they summarise the organisation's yearly research.

The resulting 264 publications were screened to identify those which would have been analysed in-depth. This selection process started with an initial skimming of all the documents, reading their abstract to exclude the following publications.

- Publications that address entrepreneurship as a secondary topic, and do not mention

the enablers, barriers, or effects of entrepreneurship.

- Publications that present a single project or intervention of the organisation without providing general indications on the themes of analysis.
- The manuals and technical guides on how to do a certain action (e.g. which interventions an institution should adopt in certain circumstances to obtain a desired effect).

This initial process's results were 88 publications that address the barriers, enablers, and effects of entrepreneurship in DCs, most of which focus on the agrifood sector.

- *World Bank:* 42 articles selected out of the initial 192 (22%)
- *IDS UK:* 9 publications selected out of the initial 27 (33%)
- *FAO's Annual Report "The State of Food and Agriculture":* 1 report selected out of the initial 9 (11%)
- *InfoDev:* two publications selected out of the initial 17 (12%)
- *Empretech:* three publications selected out of the initial 19 (16%)

The executive summary of these publications was then read to perform a second screening, accepting just those that provide significant insights on the themes of the impact of entrepreneurship, drivers and enablers, and effects of the entrepreneur's background for the business. This final analysis brought to 11 articles read in detail, and a backward research of the most relevant sources cited by their authors has been performed to deepen the knowledge of. Eventually, the numbers of papers read and cited in this part is 27.

Figure 2.2 summarizes the process of research and selection of the publications used for chapter 2.3, 2.4, and 2.5.

World Bank   IDS UK   FAO   InfoDev   Empretech

264 Publications

88 Publications

11 Publications

15 Publications

26 Publications

World Bank = "Entrepreneurship" OR "Startup"
IDS UK = "Entrepreneurship" OR "Startup"
InfoDev = Stream: "Agribusiness Entrepreneurship"
FAO = Report: "The State of Food and Agriculture"
Empretech = Publications

Publications Excluded:
- Entrepreneurship as a secondary topic
- Presenting a single project or intervention without general indications
- Manuals and technical guides

Publications providing significative insights on:
- Impact of entrepreneurship for Development
- Drivers and enablers for entrepreneurship in SSA
- Influence of the background of the entrepreneur

Backward research

Final number of publications cited

Figure 2.2 - The process to select the publications

2.3 Impact of Entrepreneurship for the Development

The idea that entrepreneurship is indispensable for economic development is commonly accepted worldwide, and the study of the link between them has attracted much attention from both researchers and policymakers, which started to investigate it in-depth in the last few decades (Neumann, 2020). This field of research is still developing and growing, and given its complexity, its understanding is far for being completed (Naudé, 2010; Neumann, 2020). Many governments and international institutions have considered the promotion of entrepreneurship to foster growth, as witnessed by the importance it occupies in policy programs all around the world (Henrekson & Stenkula, 2010). The study of the relationship between entrepreneurship and development is not an easy task because the outcomes of their interaction depend on the particular conditions of the context in which the entrepreneurial activity is carried out and whose degree of impact is affected by many determinants (Neumann, 2020). The same intervention may have different results if performed in a different context, and it is not very easy to predict which entrepreneurial solutions will generate specific outcomes for society.

Even if this research field has been recently set at the centre of the debate on development economics, it is quite a novel topic. The research streams on entrepreneurship and economic development have advanced in the literature without analysing the links between the two of them for many years, with the former more concerned on the process of entrepreneurship, "how to do it", and the latter focalized on the global and country-level determinants of economic performance (Naudé, 2009). Thus, although both development economics and entrepreneurship research grew very fast since the '60s, they did it in relative

isolation (Naudé, 2009). Nevertheless, during the present review it was possible to identify two major impacts that entrepreneurship can generate.

- Technical change. Entrepreneurship fosters the creation and diffusion of innovations (Dutz, Kessides, O'Connell, & Willig, 2011; infoDev, 2016, p. 10-14; Olafsen & Cook, 2016; Naudé, 2009) (i.e. technical change).

- Structural change. Entrepreneurship causes the reallocation of resources and production means across industries and locations to the most promising opportunities thus raising the productivity and employment (i.e. structural change). More specifically it drives structural transformation of an economy from being predominantly rural and agriculturally-based to being urban, manufacturing and service-based (Olafsen & Cook, 2016; Naudé, 2009; Naudé, 2010; Vivarelli, 2016; Dutz, Kessides, O'Connell, & Willig, 2011; infoDev, 2016, p. 10).

Innovation can be an important driver of growth, increasing employment, providing better and lower cost products to customers, and having a general improvement of the welfare (Dutz, Kessides, O'Connell, & Willig, 2011; infoDev, 2016, p. 10-14; Olafsen & Cook, 2016; Naudé, 2009). Despite being generally perceived as benefiting high-tech firms, the most skilled workers and eventually the wealthiest part of the population, the result of empirical studies suggests the opposite, showing that innovation can generate inclusive growth impacting the poorer part of the society. A study performed by Dutz, Kessides, O'Connell, & Willig (2011) on a sample of more than 26,000 manufacturing firms across 71 countries, both developed and developing, found that those innovating in products or processes exhibit higher employment growth than the others. Moreover, the employment growth in innovative companies was significantly positively associated with the share of the unskilled firms' workforce. This result is against the conventional idea of non-inclusive innovation-driven growth since it does not create jobs just for those possessing higher qualification levels.

Innovation is not just about producing products or developing processes new-to- the-world, but it can assume the dimension of new-to-the company or new-to-the-local economy (Dutz, Kessides, O'Connell, & Willig, 2011). For development to occur, it is not required to concentrate on the former, but entrepreneurship can focus on adopting and diffusing existing products, processes, organizational methods, and technologies unknown to the domestic context. This action is crucial for inclusive growth, since it can help to drive enterprise growth and spread good practices among the less developed economies, with already proved solutions, and therefore less risky and costly to develop, providing new employment and consumption opportunities (UN General Assembly, 2015, p. 31; Dutz, Kessides, O'Connell, & Willig, 2011). Thus, it is possible to state that the impact of innovation, which is diffused by entrepreneurial activities, is significant for DCs, whose populations have a big share of unskilled workers and adopt less advanced practices. In particular, DCs can benefit from it by providing products and

services that satisfy the population's needs at an affordable price, the increase in employment, and the adoption of better practices, driving inclusive growth.

The idea that entrepreneurship directs the resources towards the most productive firms, driving the employment and changing society's economic structure, dates back to the middle of the nineteenth century. Schumpeter defines it as the process of creative destruction: "the process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one." (Schumpeter, 1942, cited in Swanson, 2017, p. 4). This model starts with the idea that the most productive firms will have an advantage on the market by selling products or providing services at a higher price with the same costs or keeping the same price with lower costs. With time those less productive will exit from the market, and the surplus-labour will be absorbed by the more productive firms, which will grow and generate more employment by satisfying a growing demand, driven by the multiplier effect these firms have on the surrounding economy.

This process, in particular in DCs, can drive a structural transformation in the society, transforming it from being predominantly rural and agricultural-based to being urban and manufacturing and service based (Naudé, 2009; Naudé, 2010; Dutz, Kessides, O'Connell, & Willig, 2011; Olafsen & Cook, 2016; Vivarelli, 2016; Ripoll, et al., 2017). However, first of all, what is structural transformation, and how does it affect economic growth? Ripoll, Jens, Badstue et al. (2017) conceptualize structural transformation as beginning with agricultural productivity growth, led by productive farmers (agricultural entrepreneurs) who can generate surplus earnings in the market. This income gain increases the demand for non-farm goods and services, and then migration from rural to urban areas is stimulated by the demand for non-farm labour, driving urbanization. The less efficient farmers will likely exit farming first, and the movement of labour from agricultural to other sectors may bring more efficient producers to obtain land from less efficient producers, stimulating an overall increase of efficiency in the sector. This slow shift in the workforce from farm to non-farm activities is reflected in the country's economy by a declining share of agriculture in the total gross domestic product (GDP) and employment growth. Therefore, structural transformation results in productivity increases since labour productivity rises as labour migrates from less productive to more productive activities. Additionally, it causes the emergence of new sectors that diversify a country's economy, thus increasing its resilience. Unfortunately, this development model does not often reflect the reality, with just a few countries of Asia (e.g. China or Vietnam) as examples of a successful structural transformation. However, in most cases, surplus labour from agriculture goes into lower-value services or informality, offsetting the agricultural sector's growth (Ripoll, et al., 2017). Nevertheless, this framework can guide the development of poorer countries if they are able to create a good business environment and support entrepreneurship.

2.4 Barriers to Entrepreneurship in Developing Countries

As shown in the previous section, entrepreneurship can positively impact society through many outcomes, representing a possible driver for sustainable and inclusive growth. However, that is not always true, and the possibility of generating an impact and its degree depends on the context's conditions and many other determinants. Although this is true even for developed countries, the general environment plays a more crucial role in DCs, with an effect that grows as the economy's income decreases, since firms in these areas face much more severe limitations (Vivarelli, 2016). Moreover, these constraints have a higher impact on small businesses than big firms, and considering that in DCs there are more small and medium enterprises (SME) than in those developed, their effects are even worse on this group (Aterido, Hallward-Driemeier, & Pagés, 2009).

The diminished firms' possibility to expand influences the sustainability of private sector-led growth too. Without this possibility to grow, even if a firm has achieved lower costs or higher value products through innovation and increased productivity, its only way to gain is by maintaining the same output while pursuing cost-saving or value-enhancing improvements in its factors of production (Vivarelli, 2016). In this case, companies will be stimulated to invest in better jobs for those with skills appropriate to the technological advance while generating fewer jobs for those without higher education. This advance is perhaps consistent with growth, but being a potential cause of inequalities, it is not consistent with sustainable and inclusive growth (Dutz, Kessides, O'Connell, & Willig, 2011). Identifying which factors may constitute a barrier to business development is fundamental for a better understanding of the phenomenon of entrepreneurship in DCs, and link it with sustainable growth.

In the literature analysed, several elements of the context hindering entrepreneurship in DCs have been reported, such as the lack of infrastructures, both for transport and ICT (Naudé, 2009; Dutz, Kessides, O'Connell, & Willig, 2011; Vivarelli, 2016; Ripoll, et al., 2017), the difficult access to finance (Naudé, 2009; Dutz, Kessides, O'Connell, & Willig, 2011; Vivarelli, 2016; Cravo & Piza, 2016; infoDev, 2014, p. 58-79; infoDev, 2016, p. 18-23), the uncertain or ill-designed regulatory framework (Naudé, 2009; Dutz, Kessides, O'Connell, & Willig, 2011; Vivarelli, 2016; Cravo & Piza, 2016; infoDev, 2016, p. 18; Quak, 2018), and the difficult access to markets (Naudé, 2009; Dutz, Kessides, O'Connell, & Willig, 2011; Cravo & Piza, 2016; Quak, 2018; Ripoll, et al., 2017; infoDev, 2014, p. 72-73).

Poor infrastructures represent a significant obstacle for enterprises operating in DCs, reducing their potential to grow and hindering the interactions with other actors (Naudé, 2009, Ripoll, et al., 2017; Vivarelli, 2016; Dutz, Kessides, O'Connell, & Willig, 2011). Infrastructures are fundamental for many essential aspects of the business, such as having a reliable provision of energy, water, and other primary resources, guaranteeing fast communications, and decreasing the time and cost for travelling and transporting goods. Limão and Venables (2001) found that

poor infrastructure accounts for 40 per cent of the transport costs for coastal economies and 60 per cent for landlocked countries. Thus, to improve them would imply a considerable reduction in transport costs.

The lack of adequate transportation and communicational facilities in many DCs creates a proximity gap, which is amplified by the absence of agglomeration of economic activities and hampers the interactions between the firms and all the other actors of the value chain (Naudé, 2007). Investments in this direction would help to fill this gap, resulting in an increase of firms' productivity and growth (Naudé, 2009). As Aterido, Hallward-Driemeier and Pagés (2009) found, this problem affects small and medium enterprises more than those larger, as is shown by the higher frequency of power outages and losses in transit in the former. Big firms can have access to alternative electricity provision sources, like an owned generator, and can spend more money to use better transportation means, reducing the losses (Naudé, 2007).

Infrastructure projects have a cross-border nature, and therefore regional cooperation is essential in order to promote them. It is urgent to create an international commitment to creating joint infrastructure projects, transport corridors, and facilitate trade. Therefore, the different regions should work together to achieve closer proximity and higher productivity, improving access to foreign markets while expanding the internal one (Naudé, 2007). To enlarge the eachable market of a company beyond their local borders is very important for firms in DCs since the domestic demand is often limited, and once they reached this ceiling, they must expand in other markets if they want to continue to grow (infoDev, 2016).

The regulatory framework is an essential factor for any activity in the private sector, and depending on the specific norms in a context, it can hinder business development, regardless of whether a country is developing or not (infoDev, 2016, p. 18). In particular, it is recognised that a regulatory environment that is not transparent concerning labour market rules and taxation, which has too strict and rigid procedures and criteria for conformity to formal rules, and with redundant and overly burdensome norms, can represent an obstacle for the entrepreneurship (Naudé, 2009; Aterido, Hallward-Driemeier, & Pagés, 2009; infoDev, 2016, p. 19). A study by Ardagna and Lusardi (2010), which worked with Global Entrepreneurship Monitoring (GEM) microdata from 37 countries, including eight DCs, showed that stringent entry regulation, soft contract enforcement rules, and labour market rigidities hamper entrepreneurship, enforcing the negative impact of risk aversion. Furthermore, the regulatory framework may generate counterproductive policy measures for small firms through regulations that were initially intended to support them but ended with preventing their growth. In fact, it may be not convenient to grow over a certain threshold which would make them subject to the effects of red tape and higher taxes, and therefore small business could prefer to not increase their dimension in order to "hide" from these regulations (Aterido, Hallward-Driemeier, & Pagés, 2009). Indeed, the presence of subsidies addressed to SMEs may push entrepreneurs to keep the firm's size below a given value to maintain government funding eligibility. Eventually,

heavy legislation in terms of business creation and taxation tend to burden negatively on the rate of new firm entry and formalisation, and companies can decide to stay informal since informal firms are often able to function by circumventing government regulations and taxation (Naudé, 2009; infoDev, 2016, p. 18-19)

Market access, which requires trade openness, represents a significant barrier for many enterprises in DCs, particularly for small firms, which do not have the resources necessary to reach regions outside their local areas. The importance of improving it is witnessed by the fact that two targets of the SDG number 17 are related to this topic: the Target 17.11 "Significantly increase the exports of developing countries, in particular with a view to doubling the least developing countries (LDCs)' share of global exports by 2020" and target 17.12 "Realize timely implementation of duty-free-quota-free market access on a lasting basis for all least developing countries consistent with World Trade Organization (WTO) decisions, including by ensuring that preferential rules of origin applicable to imports from Least Developing Countries (LDCs) are transparent and simple, and contribute to facilitating market access". Improvements should be achieved both in the access to the domestic and international market, overcoming the issues deriving from poor infrastructure, which hinder the transportation and storage of goods, and informational asymmetries, that prevent firms from accessing external markets. Hence, trade openness is one of the most critical levers for fostering the industrialisation of DCs, since it can favour exports that compensate for the low domestic demand. Being able to access external markets generates exports that may lead to increased production, which in turn are thought to impact firm profits and employment creation. For that purpose, the contribution should come from the governments, which should open their trade, improve the trans-border and internal infrastructures, and invest in creating a commercial network.

Access to finance is a critical factor for business development, determining the firm's ability to operate and expand. The availability of credit is needed for enterprises to have the necessary working capital for carrying out their daily activities, to acquire new productive assets, to access complimentary business services, to develop innovation and hire new employees, investments that are likely to lead to productivity and size growth (Cravo & Piza, 2016). As it is almost impossible for companies to rely exclusively on their revenues to finance their activities, every good business environment must develop a financial marketable to provide the required resources. Financial markets can be described through different characteristic. Čihák, Demirgüç-Kunt, Feyen and Levine (2012) report the size of financial institutions and markets (financial depth); the degree to which individuals can and do use financial institutions and markets (access); the efficiency of financial institutions and markets in providing financial services (efficiency); the stability of financial institutions and markets (stability). DCs suffer from poor financial access and service provision, and a lower depth defines their financial markets. This former characteristic is often measured through the ratio of bank deposits to GDP (Čihák, Demirgüç-Kunt, Feyen, & Levine, 2012; Vivarelli, 2016). Moreover, these regions

are characterised by a lower efficiency stemming from the low level of competition between financial intermediaries, which generates the misallocation of funds (Vivarelli, 2016), and low access, because of information asymmetries generated from institutional and infrastructural underdevelopment (Vivarelli, 2016). This issue affects more significantly smaller firms, which in DCs are often credit and equity rationed because their financial markets are underdeveloped (Vivarelli, 2016).

Financial markets occupy a crucial role in the economy's growth by allocating resources to firms since if they can select the best prospects and make them expand, this will positively impact the overall economy. Economic development will strongly occur if the most talented individuals will use their abilities in the most productive methods. Differences in capital markets' ability to select and finance the most promising entrepreneurial projects may lead to essential differences in the level and quality of entrepreneurship across countries. For this purpose, market failures prevent the most talented individuals from accessing the right opportunities: without adequate financial development, individuals with high entrepreneurial potential may not be able to create their business, leaving entrepreneurship for the untalented wealthy. As such, in the absence of financial development, wealth inequalities could prevent proper matching between entrepreneurial talent and productive technologies (Vivarelli, 2016; Naudé, 2009).

2.5 The Influence of the Entrepreneurs' Background

The last part of this literature review has been focused on understanding how the entrepreneur's characteristics and background influence his/her capability to start and develop a business. This study complements what has been discussed in the previous section, since the analysis of the market mechanisms and business environment as potential barrier or enabler neglected the process of decision making at the level of the individual, ignoring the factors behind the entrepreneur's motivation in starting a new business (Vivarelli, 2016) New firm founders differ concerning previous work experience, education, geographical origin, and personal motivation or psychological traits. About the latter, many studies demonstrated the relevance of personal motivations on the choice of becoming an entrepreneur. Researchers identified the desire to be independent, the search for autonomy in the workplace, an aspiration to full exploitation of previous job experience and acquired ability, and a desire to be socially useful and to acquire improved social status as key characteristics to spur entrepreneurship, which in some cases may counterbalance adverse environmental conditions (Evans, 1989; Blanchflower & Meyer, 1994; Vivarelli, 2016).

Education plays a fundamental role in improving both the survival chances of an

enterprise and its post-entry performances (Bates, 1990; McPherson, 1996; cited by Vivarelli, 2016). This is particularly true when considering companies operating in high-tech and digital sectors and knowledge-based. Colombo and Grilli (2004) performed an empirical study on 506 Italians young firms, which demonstrated that the founder's human capital is a crucial driver of high-tech start-ups' post-entry growth.

Once recognized the importance of human capital for new companies, a second question emerges on whether better results are driven by acquiring a specific or general type of knowledge. This issue has not a univocal answer but is quite controversial. Some authors argue that specific skills are better predictors of improved post-entry performance, especially for new technology-based firms (Colombo & Grilli, 2004; Balconi & Fontana, 2011). In these studies, the fields of study considered were economic/managerial and technical/scientific. At the same time, others theorized that for creating a successful business, it is better to have a multidisciplinary education in various fields, since entrepreneurs must manage different people and tasks and so they must possess a variety of abilities (Lazear, 2005; Wagner, 2003). Wagner (2003) found that students who ended up as entrepreneurs had studied a broader spectrum of subjects than those who ended up working as salaried employees.

Turning our attention to DCs, it is essential to distinguish between formal and informal business. In fact, if the latter is included, in most cases, the relationship between the level of education in an area and the number of new firms created is negative. Van der Sluis, Van Praag, and Vijverberg (2005) noticed in their comprehensive survey of the previous literature in DCs that a higher level of education increases the managerial capabilities necessary to run a business, enhancing the propensity to opportunity entrepreneurship. However, it also creates opportunities for wage employment in the formal sector, offsetting the latter's impact and producing an overall negative relationship. Thus, it derives that most new enterprises in low-educational areas are informal and necessity businesses created for the lack of other options than self-employment. However, studies that excluded this kind of firms from the grouping (in line with this thesis's purpose) obtained opposite results. Goedhuys and Sleuwaegen (2000) performed a study on the owners of 141 manufacturing firms in Côte d'Ivoire, showing that the probability of being an entrepreneur is strongly stimulated by formal education, with the positive effects increasing from lower to higher levels of education. On the other hand, the relationship between education and the post-entry performance of new businesses in DCs is uncontroversial: the more educated the entrepreneur, the better results the firm will achieve, both in terms of income generated and size (Van der Sluis, Van Praag, & Vijverberg, 2005; Goedhuys & Sleuwaegen, 2000).

The previous job experience heavily influences the entrepreneur, impacting both the post- entry level of performance and the business sector's choice. There is little doubt that previous job experience helps develop the business, particularly when it regards an area similar to that of the new firm, and this positive link is also confirmed in the case of DCs. McPherson (1996) highlighted a positive relationship between annual employment growth and previous

experience of the founder in similar economic activities for enterprises in Swaziland and Botswana, while and Goedhuys and Sleuwaegen (2000) found that job experience previously acquired in the same industry both increases the likelihood of creating a new business and improve firm's performance in Côte d'Ivoire. Moreover, compared to individuals creating their first company, spinoffs entrepreneurs (those who left a mother firm to found a new one) and founders who have previously run other businesses may have an advantage. Spinoffs are characterized by larger entry sizes and lower exit rates, and serial entrepreneurs are more likely to achieve success than single-venture entrepreneurs. Serial entrepreneurs who succeeded in their prior business are more likely to repeat it than those who failed (Gompers, Kovner, Lerner, & Scharfstein, 2006; Vivarelli, 2016).

The other effect of previous work experience is the sectorial inertia. As Vivarelli (2016) states: "Individuals starting a new firm in the same sector as they were previously employed/ located in are more likely to be characterized by a deeper understanding of firm organization in that specific sector. […] Therefore, entrepreneurship is strongly characterized by sectoral inertia, thus turning out as a phenomenon affected by a significant persistence". This sectoral inertia is far from being a disadvantage since it generates above-the-average post-entry performance due to better skills and information (Roberts, Klepper, & Hayward, 2011).

The last relevant element of the entrepreneur's background found in the literature is the entrepreneur's geographical origin (i.e. how where he/she is born and raised influence the entrepreneurial choices and performances). Entrepreneurs tend to locate their business in the area where they grew, and, more importantly, firms created by locals are tendentially larger, more valuable, more capital-intensive, and better financed than their non-locals counterparts (Michelacci & Silva, 2007). The explanation may be that local entrepreneurs can, on average, better exploit the economic and financial opportunities available in the region where they were born, and they may have a better understanding of the inner and 'relational' features of the business environment in which the new firm will operate (Vivarelli, 2016). At the same time, it has been found that companies perform better, survive longer and generate higher profits when located in regions in which their founders have lived longer, with an effect similar to those of the previous experience in the same sector (Vivarelli, 2016)..

2.6 Summary of Main Concepts

The purpose of my review was to investigate the existing literature in order to create a solid knowledge of the key concepts of DCs and entrepreneurship and to analyse the main contribution of researchers regarding the impact entrepreneurship can have on the development, the barriers and enablers to entrepreneurship in DCs, and how the characteristics and background of the entrepreneur influence the decision-making process and post-entry performances.

I have shown that there is no univocal taxonomy regarding the definition of DCs, and the most important human development organisations, World Bank, UNDP, and the IMF, approach it differently. The classification adopted here is based on the GNI per capita, similarly to the one used by the World Bank before 2016, when they were still disclosing data and aggregate indicators for the developing world, and encompasses all the economies that are label as "low income" or "low-middle income" by the organisation.

Regarding the concept of entrepreneurship, I have presented an overview of the definitions provided from its first introduction and an analysis of the critical entrepreneurial features they highlight. Followingly, it was decided to set the definition of entrepreneurship in this thesis as: "The process of starting a business, using the ability and willingness of individuals, on their own, in teams, within and outside existing organizations, to perceive and create new economic opportunities and to introduce their ideas in the market, in the face of uncertainty and other obstacles". Eventually, after classifying the types of entrepreneurship according to the motivations of creating the business and the formal status, I decided to concentrate the analysis on just opportunity and formal entrepreneurship.

For the other key concept, sustainability, I decided on the triple bottom line representation, in which sustainability is posed at the intersection between the environmental, economic, and social dimensions. This conception did not emerge in a unique moment but gradually from researchers and development institutions' critiques. Then, I have presented the SDGs framework, providing a line of action for sustainable development.

Last, I have introduced the agrifood sector's background concept, defined as the value chain spanning "from farm to fork". This sector is vital for sustainable development and faces many challenges, such as providing enough quality and secure food to a growing population while reducing resource consumption, adapting to and mitigating the impact of climate change, and guaranteeing a source of income to fight poverty in many DCs and rural areas.

Then the attention shifted to specific topics related to entrepreneurship. Regarding its effects, it has been found that it can stimulate economic growth by promoting innovation, which may generate employment, inclusive growth and welfare effects, by reallocating the resources toward the most productive activities and potentially driving a structural change in the economy. Followingly, the main barriers for entrepreneurship in DCs were identified in the lack of infrastructure, difficulties in access to market and international trades, in ill-designed regulatory framework and problems in access to finance. Eventually, personal motivation and psychological traits, education, previous job experience, and geographical origin were considered the most significant factors of the entrepreneur's background, influencing its decision to become self-employed and post-entry performances. The research shows that the relationship between education and frequency of self-employment is positive just if informal businesses are excluded and that the firm's results are generally better as the education level increases. Concerning

the previous job experience, it affects entrepreneurship by driving better performances and generating "sectorial inertia", a predisposition to creating a business in the sector of previous employment.

2.7 Research Questions

While providing significant insights into the topic explored, the literature analysed still presents some limitations and gaps, a part of which the present thesis will attempt to fill. First, most of the theoretical knowledge and data available on entrepreneurship concentrate on developed countries, with a much smaller focus on DCs. Second, entrepreneurship's impact is mainly approached by adopting an economic perspective, while human development is a broader concept, also encompassing the environmental and social dimension, whose relationships with entrepreneurship have not been understood yet (Neumann, 2020). Finally, the importance of the background elements for business creation and development are studied in general samples of firms, without concentrating on those committed to generating an impact and fostering societal development.

This thesis's first contribution to the existing literature is addressing the lack of information on DCs startups through extensive research and mapping in the agrifood sector to compare their evolution between developing and developed countries. In this assessment, I have focused on sustainability, a crucial topic that has not gained enough attention concerning entrepreneurship in DCs. Another step that I have performed in this study is analysing agrifood entrepreneurship in SSA through quantitative assessments.

Secondly, I have attempted to discover whether the findings of extant research in the literature on the barriers of entrepreneurship in DCs and the entrepreneur's background, which have been investigated regardless of the specific sector, hold true in the agrifood sector of DCs. To this aim, I analysed the two topics for a specific developing region, SSA, for which little information is available, and that is particularly important since it faces the biggest challenges for pursuing sustainable development in the future. Part of the research concentrated on understanding which solutions the startups have adopted to overcome the barriers reported. Said so, it is possible to formulate the following research questions about startups for agrifood sustainability.

RQ1: "What are the main differences and similarities in the agrifood startups between developing and developed countries?"

RQ2: "What are the main barriers for startups in SSA, and how are these companies addressing them?

RQ3: "How do the background and competences of the entrepreneurs influence the creation of startups SSA countries?".

3. Methodology

This chapter explains the methodology adopted to address the research questions. The literature review highlighted a lack of information on entrepreneurship in DCs (developing countries, Chapter 1). Starting from a pre-existing database, developed by the Food Sustainability Observatory of Politecnico di Milano in 2017 (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017) and regularly updated on a yearly basis by teams of thesis students. The Food Sustainability Observatory is a multiannual research project focused on sustainability-oriented innovation in the agrifood system collaborating with established agrifood companies and startups, no-profit organisations and public institutions. I contributed to update the database. The current version database includes 4,909 agrifood startups, and covers to a better extent the DCs. Afterwards, this tool was investigated through statistical analysis to study differences between agrifood entrepreneurship in developed and DCs. Section 3.1 describes which firms are considered "startups" in this thesis, how the database has been updated, how the data has been collected, and how it has been analysed to answer the RQ1: "What are the main differences and similarities in the agrifood startups between developing and developed countries?". Afterwards, Section 3.2 presents the methodology followed to address the RQ2: "What are the main barriers for startups in SSA, and how are these companies addressing them?", and RQ3: "How do the background and competences of the entrepreneurs influence the creation of startups in SSA countries". The research methodology selected to approach these research questions has been the multiple case study, and the chapter explains how the cases have been chosen and how data has been collected and analysed.

3.1 The Agrifood Startups Database

During the systematic literature review regarding entrepreneurship, one of the main gaps identified was the lack of available data and evidence regarding startups in DCs. This vacancy could have strongly hindered the research purpose of this thesis, and for that reason, it was decided to use a tool encompassing extensive information on agrifood startups. The tool exploited is an agrifood startups database that I contributed to update (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017) Given that agrifood startups are the focus of the thesis, before entering in the details of the analysis it must be specified what this sector includes. The agrifood sector definition is provided in Section 2.5.1, and Section 3.1.1 illustrates the stages of the supply chain and the activities performed in each of them. Thus, it remains to establish what typology of companies are considered startups.

Entrepreneurship is defined in Section 2.1.2 as: "The process of starting a business, using the ability and willingness of individuals, on their own, in teams, within and outside existing organizations, to perceive and create new economic opportunities and to introduce

heir ideas in the market, in the face of uncertainty and other obstacles" (Aidis, 2003). This definition's essential points are the creation of companies, the perception of opportunities, and the implementation of market solutions in the face of uncertainty. The concept of startups is associated with all these features, and therefore these entities are suitable to assess entrepreneurship.

However, even though this term proliferates across popular and academic debates on entrepreneurship, technology, and many other fields, it does not have a rigorous definition (Mokaya, Namusonge, & Sikalieh, 2012; Gartner, 1990). A study performed by Cockayne (2019) on a sample of startup workers in America found that employees of these enterprises do not have a clear idea of what startups are. However, a common association is the transitional nature of the status: a firm is not a startup forever, but this condition is temporary, before moving towards a traditional company. Moreover, Cockayne highlights some recurrent characteristics among the definitions provided by the interviewees of his research. He reports that the most diffused ones regard the firm size, the duration of operations, and growth. According to the study, startups typically have a small-medium size and spend between three to five years before entering the transition. Growth-based definitions are prevalent in this taxonomy, considering startups as those companies that expect high growth rates, but have not yet reached that stage.

Blank (2010) provides a definition acknowledged by business schools, where he defines startups as *"temporary organization designed to search for a repeatable and scalable business model"*. This classification highlights several characteristics of these entities.

- The temporary nature of a startup: as it said before, a startup is not forever, but it is a temporary condition before transitioning to a regular company.

- The search for a business model: startups do not have an established business model yet, but they are searching for one. Once they find a feasible business model and start to execute it, the transition to a regular company starts.

- A repeatable and scalable business model: a startup is born to grow big, and its business model must be able to handle increased demand and provided repeated sales.

While this definition points out relevant aspects and describes the main elements a startup must possess, it does not provide a practical criterion for establishing whether a company is a startup or not, unless having access to its internal data. Since in this research such information was not accessible, a different and more quantitative principle was chosen. Thus, the status of startup has been attributed to five or fewer years old organizations (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017). This decision fits the objective of this research considering that: (i) to map out the evolution of entrepreneurship during time is one of the purposes of the database, and (ii) transitional status is a predominant characteristic of a startup. A more detailed analysis was performed on those firms spotted as possible subjects of the case study, for which the business model has been investigated in-depth.

The database used for the statistical analysis performed in this thesis updates developed by the Food Sustainability Observatory of Politecnico di Milano in 2017 (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017). Firms' information is divided in (i) general information, (ii) step of the supply chain occupied and the activity performed, (iii) sustainability commitment and orientation, and (iv) funding status developed by the Food Sustainability Observatory of Politecnico di Milano in 2017 (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017). Provided the purpose of this thesis, a new category has been added to the database regarding the startups' geographical information. This category includes the country of origin, the geographical area, and the country's level of income.

The tool used to collect the data was the web platform CrunchBase, a business intelligence tool containing information on more than 675,00 firms.

This previous version of the database contains data on companies founded from 31/12/2013 to 31/12/2018. Compared to that version, firms founded from 31/12/2013 to 30/12/2014 have been excluded, while those founded from 1/01/2019 to 31/12/2019 have become part of the database. Moreover, the firms contained in the previous database that closed or unsubscribed from Crunchbase have been eliminated, while those newly registered to the business intelligence platform have been added. All the data of the companies in the previous database regarding the general information of firms, the step of the supply chain that they occupy and the activity they perform, their sustainability commitment and orientation, and their funding status has been maintained. The geographical information, instead, has been added to those previously analysed.

3.1.1 The Stages of the Agrifood Supply Chain

All the startups that have been registered in the database have been characterized through the inclusion of information on the supply chain stage. The agrifood supply chain is defined in Chapter 2.5.1 as comprising the business activities "from farm to fork", including the supply of agricultural inputs, the production and transformation of raw materials into the final product, marketing, and the delivery to the final consumer, together with all the necessary supporting services. To provide a representation of the supply chain in line with this definition, the Food Sustainability Observatory developed an extended model of the supply chain, including both primary and support activities. Primary activities encompass those actors involved in the direct flow of food. They provide the main inputs and generate the outputs for producing, transforming and delivering food to final consumers. Support activities comprise all those suppliers and service providers that are concerned with enabling and enhancing the interactions between actors of the primary activities, or with improving their productivity (e.g. providing technology).

Defining what this classification includes is very important for two main reasons.

First, it establishes the scope of the analysis, presenting a decisional criterion for clearly stating which startups to include in the database. Then, it is central for studying the evolution of the supply chain. In fact, it is not sufficient to look at the number of startups for understanding how entrepreneurship in the sector has changed, but it is necessary to deploy and examine the supply chain to assess where these changes have occurred. If the absolute number of startups would have been the only parameter taken into account for deciding whether entrepreneurship is growing or not, then the analysis would have neglected how the agrifood sector structure is evolving. This information is of great importance, especially in DCs, considering that one of the outcomes through which entrepreneurship can drive development presented in the previous chapter is structural transformation (Olafsen & Cook, 2016; Naudé, 2009; Naudé, 2010; Vivarelli, 2016; Dutz, Kessides, O'Connell, & Willig, 2011; infoDev, 2016, p. 10). Therefore, understanding the positioning of startups within the supply chain assumes a key role in evaluating entrepreneurship.

The agrifood supply chain definition provided before is broad, and covers a wide range of activities, from those directly involved in the production, transformation, and distribution of food to those supporting this flow, providing inputs, complementary services, and technology. The possible supply chain stages attributed to the startups in the database are (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017)

- Input companies, providing primary assets like seed or fertilizers to farmers, breeders and fishers.

- Farmers, breeders and fishers.

- Food processing companies: the processor of inputs from farmers, breeders and fishers to obtain finished products.

- Retailers, delivering the finished products to final consumers.

- Food service: firms which provide meals or drinks fit for immediate consumption, like the Ho.Re.Ca. channel.

- Service providers, helping the actors involved in the production, transformation and delivery of food through the provision of services.

- Wholesalers: intermediate actors representing an alternative channel to the direct exchange of food or finished products at different stages of the supply chain.

- Support activities, intervening to help production and sales.

- Technology suppliers, for agriculture and food processing.

The actors included in primary activities are input providers, farmers, breeders and fishers, food processing companies, retailers, and food service. Those involved in supporting activities are wholesalers, service providers, support activities, and technology providers (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017).
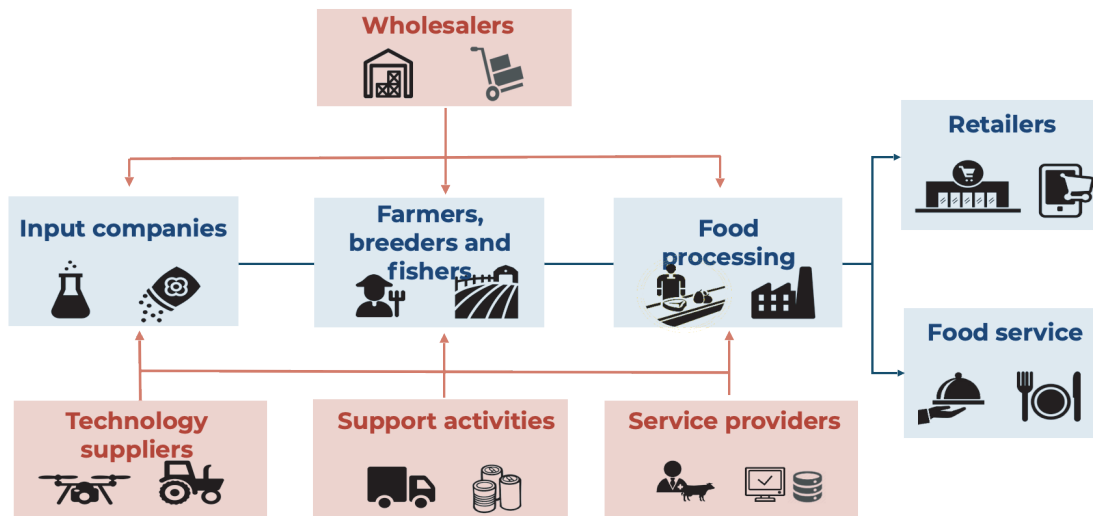
Figure 3.1 illustrates the agrifood supply chain.

Since this grouping provides a low level of granularity, it could have created problems deciding whether a startup belongs to the agrifood sector or not and in which step of the supply chain it should be inserted. Thus, in the followed methodology a second level of detail is added, represented by the economic activities included in each of the stages. An economic activity is defined by the Eurostat (2008) as it follows: *"an economic activity takes place when resources such as capital goods, labour, manufacturing techniques or intermediary products are combined to produce specific goods or services. Thus, an economic activity is characterised by an input of resources, a production process and an output of products (goods or services)"*. The standard reference selected is the "Nomenclature Statistique Des Activités Économiques Dans La Communauté Européenne" (NACE).

3.1.2 The NACE Classification

The NACE classification is the general system used to standardize and uniform the definition of economic activities in the European Union (EU), developed since 1970. This thesis adopts NACE Rev. 2, a revised version created at the end of 2006 to catch up with the evolution of the society and applied to all relevant statistical domains of the EU. NACE was designed for the specific purpose of providing a framework for collecting and presenting a large number of statistical data according to the economic activity, and therefore it is particularly suitable for the methodology applied. The characteristics which make it appropriate for categorizing the startups in the database are its exhaustive coverage, allowing to map all the possible activities in the agrifood value chain, and the design of mutually exclusive categories, so that each firm is univocally defined (Eurostat, 2008, p. 14). Moreover, being part of an integrated system of statistical classification, developed under the UN, statistics produced based on NACE are

comparable both at the EU and world level (Eurostat, 2008, p. 13).

The NACE framework is a hierarchical classification composed of four different levels, each of them providing growing details (Eurostat, 2008, p. 20-21).

- The first level consists of 20 sections identified by an alphabetical code (all the letters from A to U), depending on the general characteristics of the goods and service produced.

- The second level consists of 64 divisions identified by a two-digit numerical code, depending on the following characteristics of the activities of production units:

- The characteristics the goods and services produced, accounting for the physical composition and stage of fabrication of the items, the needs served by them, the uses for which the goods and services are intended, the inputs, the process and technology of production.

- The third level consists of 177 groups identified by a three-digit numerical code, with the same criteria adopted for the Divisions,

- The fourth level consists of 235 classes identified by a four-digit numerical code, depending on the production process and technology employed, meaning that activities are grouped when they share production processes and use similar technologies for delivering goods or services

The section level is not shown in the NACE code, which identifies the division, the group and the class describing a specific activity. For instance, the activity "Growing of grapes" is identified by the code 01.21, where 01 is the code for the division, 01.2 is the code for the group and 01.21 is the code of the class. Section A, to which this class belongs, does not appear in the code.

To clarify the organization of NACE, Annexe 8.1 shows its broad structure, highlighting the codes of the different sections, and the divisions they encompass.

When the database has been updated, each new startup has been assigned with one of these codes, representing the activity performed, which in turn made it possible to automatically enter the companies in the respective stage of the supply chain.

The NACE's classes included in each stage of the agrifood supply chain model, together with a description of the activities they incorporate, is provided in Annexe 8.2.

3.1.3 Sustainability Framework: The Sustainable Development Goals

As anticipated before, one of the dimensions through which the startups in the database are analysed is sustainability. This element, included in the structure of the database has a great importance for this thesis. In fact, it allows to collect actual data on how entrepreneurship has evolved, observing how many companies have decided to tackle sustainability problems and where their effort is directed. For that purpose, a framework applicable to the agrifood industry has been established to classify companies as sustainable and to show the issues they are aiming to solve (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017).

The framework used for the sustainability classification is based on the Sustainable Development Goals (SDGs, Chapter 1), a set of goals developed by the United Nations (UN, Section 2.1.4) representing the core of the 2030 Agenda for Sustainable Development. The Agenda is a document ratified in September 2015 representing a call to action for transitioning towards a more sustainable and resilient world, pursuing the people and the planet's prosperity. All the 193 countries in the UN declared their commitment to take part in this change, to reach the goals within the next 15 years, before 2030 (United Nations, 2015). The official start of this program was at the beginning of 2016. The three features making the 2030 Agenda an important and unprecedent effort towards global sustainability are shown below.

1. <u>Universality</u>: The SDGs are universal, in the sense that they concern every nation and every sector. Every actor is included in this call to action: from the business sector to public authorities and any type of public and private organisations.

2. <u>Integration</u>: Since the Goals represent huge, complex and interconnected challenges, integration among the SDGs is key. This means that it is not possible to achieve just one Goal, neglecting the others, but they must be achieved together to foster sustainable development.

3. <u>Transformation</u>: Lastly, it is recognised that achieving these Goals involves making big and deep transformations in our society and in the way we live on the Earth.

The SDGs represent the core of this Agenda, providing a guideline that illustrates where the effort for achieving sustainability has to be focused. The UN established 17 Goals, and each of them has attached a set of targets and indicators. In total, there are 169 specific targets and 231 unique indicators (but the sum of the indicators per Goal is 247 because 12 indicators repeat under two or three different targets). At the base of this framework, there are four pillars, and each of them has a group of SDGs, targets and indicators assigned.

1. Social Pillar: it encompasses 6 Goals, 55 Targets, and 92 Indicators.

2. Economic Pillar: it encompasses 5 Goals, 45 Targets, and 62 Indicators.

3. Environment Pillar: it encompasses 4 Goals, 38 Targets, and 45 Indicators.

4. Law and Governance Pillar: it encompasses 2 Goals, 31 Targets, and 48 Indicators

The 17 SDGs are listed in Annexe 8.3, and Annexe 8.4 illustrates their logical division into Pillars, Goals, Targets, and Indicators.

Finally, the motivations justifying why the framework proposed by Bartezzaghi et al. (2018), Segatta and Tanara (2017), and Caliceti (2017) fits the scope of the database exploited in thesis are explained below.

- First, it embraces the triple-bottom-line model adopted to define sustainability. In fact, the Agenda states that sustainable development requires a conjunct and balanced progress in the three dimensions of environment, society and economy. *"We resolve, between now and 2030, to end poverty and hunger everywhere; to combat inequalities within and among countries; to build peaceful, just and inclusive societies; to protect human rights and promote gender equality and the empowerment of women and girls; and to ensure the lasting protection of the planet and its natural resources. We resolve also to create conditions for sustainable, inclusive and sustained economic growth, shared prosperity and decent work for all, taking into account different levels of national development and capacities"* (United Nations, 2015, p. 4).

- Second, it is a comprehensive framework mapping all the possible dimension of sustainability. Providing that startups in the database belong to an extended version of the agrifood supply chain, adopting many different business models and performing a broad spectrum of activities, this feature assumes great relevance. For instance, the sustainability issues targeted in the stages of farmers, wholesalers and support activities are very likely to be diverse, driving to the selection of a broad framework.

However, since the SDGs are intended to cover the sustainability dimensions entirely, not all the goals and targets they comprise are related to the agrifood sector, requiring to select those to include. Thus, the methodology adopted, developed by Segatta and Tanara (2017) and Caliceti (2017), comprises 9 Goals and 23 related targets selected as referring to the agrifood sector. Those they included in the database are shown in Table 3.1.

SDG	Target	Description
Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture		
2	2.1	By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round
2	2.2	By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons

2	2.3	By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment
2	2.4	By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality
2	2.5	By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed
Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all		
4	4.4	By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship
Goal 6. Ensure availability and sustainable management of water and sanitation for all		
6	6.3	By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
6	6.4	By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all		
8	8.5	By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value
8	8.8	Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment
8	8.9	By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation		

9	9.4	By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities
Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable		
11	11.4	Strengthen efforts to protect and safeguard the world's cultural and natural heritage
Goal 12. Ensure sustainable consumption and production patterns		
12	12.2	By 2030, achieve the sustainable management and efficient use of natural resources
12	12.3	By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses
12	12.4	By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment
12	12.6	Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle
12	12.8	By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature
Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development		
14	14.4	By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably		
15	15.1	By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements
15	15.6	Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed
15	15.8	By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species
Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development		

17	17.7	Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed

Table 3.1 – SDGs and targets selected for the agrifood supply chain. Sources: United Nations, (2015), (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017).

3.1.4 Collection of Startups Data

After establishing the categories through which the companies have been analysed, divided in (i) general information, (ii) stage of the supply chain they occupy, (iii) sustainability orientation, (iv) funding state, (v) and geographical location, the following step was to identify the startups to include in the database, for then collecting the data.

This operation has been performed using Crunchbase, a business intelligence tool containing information on more than 675,00 firms. Startups from the agrifood industry have been spotted by interrogating the Crunchbase database through appropriate filters. The filters used have been taken from the methodology used to extract the startups' data inserted in the previous version of the database (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017). The enterprises resulting from this investigation have been extracted and analysed one-by-one to (i) assess whether they belong to the agrifood industry, (ii) attribute the supply chain stage they occupy, (iii) establish their sustainability commitment and orientation, (iv) and assign the geographical classification. Thus, an initial sample of startups has been composed by integrating those maintaned in the previous version of the database with those resulting from the Crunchbase extraction. Thanks to the access provided by Politecnico di Milano to the premium version of Crunchbase, it was possible to retrieve the following information about the companies selected, grouped according to the division mentioned at the beginning of this section.

- General information: Company name, Company name URL, Founded Date, Headquarters location (city, region, state), Email contact, Phone Number, Website, Status, Number of Employees, Number of Founders

- Financial information: Number of funding rounds, Number of lead investors, Last funding date, Last funding amount, Last funding type, Last equity funding amount, total equity funding amount, Total funding amount.

- Data Assigned by Crunchbase: Category groups, Categories, Description

CrunchBase contains information on a large number of companies, of all ages, industries and geographies. To obtain a sample of firms compliant to the characteristics established in this thesis for agrifood startups, it has been required to narrow down the research. For doing so, Crunchbase was queried through a filtered research. These filters refer to the foundation date

of the company, its status, and its business model. Foundation date and status were fixed for every interrogation, while those to look for agrifood business models changed according to the purpose of the specific inquiry.

- Foundation Date: FROM 31/12/2014 TO 31/12/2019

  This filter has been set to select firms included in the definition of startup provided. It was decided to exclude startups from 2020 because the extraction was made in March 2020, and this dissertation compares yearly data on entrepreneurship. Thus, it would not have been significative to represent the yearly results through the data on the first three months.

- Status: INCLUDE ANY "Operating", "IPO", "Acquired"

  This filter has been set to include only active company, excluding those that closed.

After setting these filters, fixed for each extraction and aimed at identifying active startups, it was necessary to structure the research to choose enterprises belonging to the agrifood sector. For doing so, two complementary approaches have been followed: one based on the category group of the companies, and the other on keyword research (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017). A category is a label, often described by one or two words, that provides an identification of the output the company produces, or the kind of activity it performs (e.g. "seed", "meat", "farmers market"). A category group, instead, encompasses a set of categories that refer to the same industry or economic area (e.g. "Agriculture and Farming" is the category group for "seed", "meat", "farmers market"...). Each firm within Crunchbase is attributed to these two labels and a brief description of the company work. By exploiting these tags it was possible to identify potential agrifood companies.

The first method consisted in an extraction based on category groups, and two groups have been picked: "Agriculture and Farming", and "Food and Beverage" (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017). Thus, the first two extractions have been performed applying the filters shown in table 3.2.

Extraction	Filters
1st extraction	• Foundation date: between 31/12/2011 and 31/12/2016 • Status, include any: Operating, IPO Acquires • Category group include any: Agriculture and Farming
2nd extraction	• Foundation date: between 31/12/2011 and 31/12/2016 • Status, include any: Operating, IPO Acquires • Category group include any: Food and Beverage

Table 3.2 – Extraction of startups in Crunchbase through category groups

The result of this query was refined by eliminating companies included in both the categories, leading to a total number of 7,508 startups. Among those firms, 4,241 were already present in the previous database, while 3,267 startups had not yet been analysed.

The second method of extraction leverages keywords, structuring the queries according to the presence of a particular word in the CrunchBase company's description (Bartezzaghi et al., 2018; Segatta and Tanara, 2017; Caliceti, 2017). All the firms registered to Crunchbase have a description of their activity, and the platform provides the possibility to base the research considering the words it encompasses. The list of keywords used has been provided by the Food Sustainability Observatory of Politecnico di Milano, and the startups selected were those including at least one of these agrifood keywords in their description. The keywords have been selected to represent the activities included in the NACE's classes. This extraction aimed to identify startups belonging to the agrifood industry but classified neither as "Agriculture and Farming" nor in the "Food and Beverage" CrunchBase category group. Many of them are support activities in the supply chain, participating in the extended agrifood supply chain but not in the production, transformation, and delivery of food. This process was carried out using one keyword at a time, setting the filter "Description" to "INCLUDE ANY (Keyword_X)" (where Keyword_X stands for the keyword set as a filter at the query number X). These filters have been used concurrently to those on the foundation date and status to consider active startups and avoid companies already extracted through the category groups. Two additional filters excluded startups belonging to the category groups of "Agriculture and Farming" and "Food and Beverage". An example of research with the keyword "seed" is provided to clarify this second extraction method.

- Foundation date: FROM 31/12/2011 TO 31/12/2016.
- Status: INCLUDE ANY "Operating", "IPO", "Acquired".
- Category groups: DOES NOT INCLUDE "Agriculture and farming".
- Category groups: DOES NOT INCLUDE "Food and Beverage".
- Description: INCLUDE ANY "Seed"

The number of startups identified through keywords is 7,123, including 121 already analysed in the previous database and 7,002 not analysed yet. However, this amount contained companies counted more than once because their description included several keywords, resulting in multiple instances. After eliminating the duplicates, the remaining sample included 5,467 startups.

The final number of startups extracted from Crunchbase is 13,096, and a summary of the process described before is illustrated in Figure 3.2.
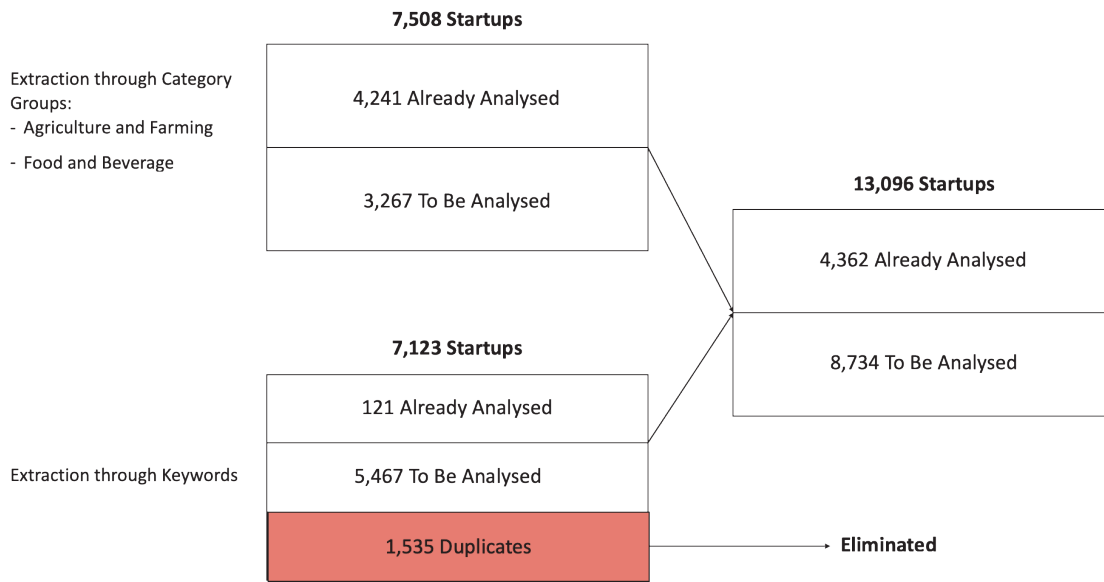
Figure 3.2 - The process followed to build the database of agrifood startups

3.1.5 Assessment of the Startups in the Database

After identifying a set of possible agrifood startups to include in the database, the last step was to assess them to (i) establish whether they belong to the agrifood sector, (ii) assign a stage of the supply chain, (iii) determine whether they adopt a sustainable business model, and in case they do, to assign the SDGs addressed, and (iv) determine the country of origin, classified according to the level of income and geographical region location.

Before entering further analysis, it was necessary to establish which startups among those extracted fit the agrifood supply chain model defined in Section 3.1.1. All the firms selected through category groups have been initially supposed as part of the industry. Those resulting from keywords underwent a screening since the keyword may be used in a different context than the agrifood industry. For instance, the keyword "oil" highlighted both productions of vegetable oil and petrol industry's players. To perform this filtering the company's description provided by Crunchbase was analysed. In addition to non-agrifood enterprises, all the companies without a working website or social media pages were discarded, since it would not have been possible to gather sufficient information on them for the following parts of the analysis. Among the 5,467 startups examined, only 1,778 passed this phase, while the others have been deleted.

The chosen enterprises have been added to the 3,267 extracted through the category groups, to form a sample of 5,045 companies analysed in-depth. However, many firms from this set have been excluded as well, because after a careful analysis they were considered outside the agrifood industry, or it was not possible to find sufficient information. Eventually, 2,578

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agrifood startups not analysed before have been inserted in the database.

The information from secondary sources, such as the CrunchBase description, the companies' website and their social media pages, has been assessed to assign a NACE class representing the activity startups perform. The class is used to determine the supply chain stage in which the startup operates. In case a company performs more than one economic activity belonging to different classes of the NACE classification, the guideline provided by Eurostat (2008) is to compute the value added by each of the activities and select the class indicating the one accounting for the highest value-added. Unfortunately, it was impossible to access the data necessary to calculate this measure, so the code was assigned based on a qualitative evaluation of the available information.

The sustainability commitment has been evaluated based on the information available on the CrunchBase description, companies website and their social media pages. First, this information has been qualitatively assessed to decide whether the startup adopts a sustainable business model, by considering if it tackles one of the SDGs targets shown in Section 3.1.3. Then, the main Goal and Target have been assigned, together with a list of all the targets tackled, to a maximum of 4. Eventually, another classification has been adopted between startups explicitly disclosing that they are sustainable and startups which are not aware of their own sustainability (or do not communicate it). Startups mentioning the SDGs they tackle, or other sustainability frameworks have been considered as explicitly sustainable.

Eventually, to build the database exploited in this thesis, the 2,578 agrifood startups analysed have been integrated with those in the previous database version developed by Segatta and Tanara (2017) and Caliceti (2017). Their database contains 2,674 firms referring to the current research's time range, which includes companies founded from 01/01/2015 to 31/12/2019. However, it was necessary to eliminate those inactive, identified through a comparison between the researchers' database and the current extraction firms. Those not detected in the new sample have been considered inactive and excluded. After this operation, the number of startups inserted became 2,331, which, together with the 2,578 newly analysed, brought to a final number of 4,909 agrifood startups included in the database. Figure 3.3 summarises the process adopted to update the database. The next chapters will explain how startups are qualified in terms of supply chain stage, industries and SDGs targets (see variables in 3.2).
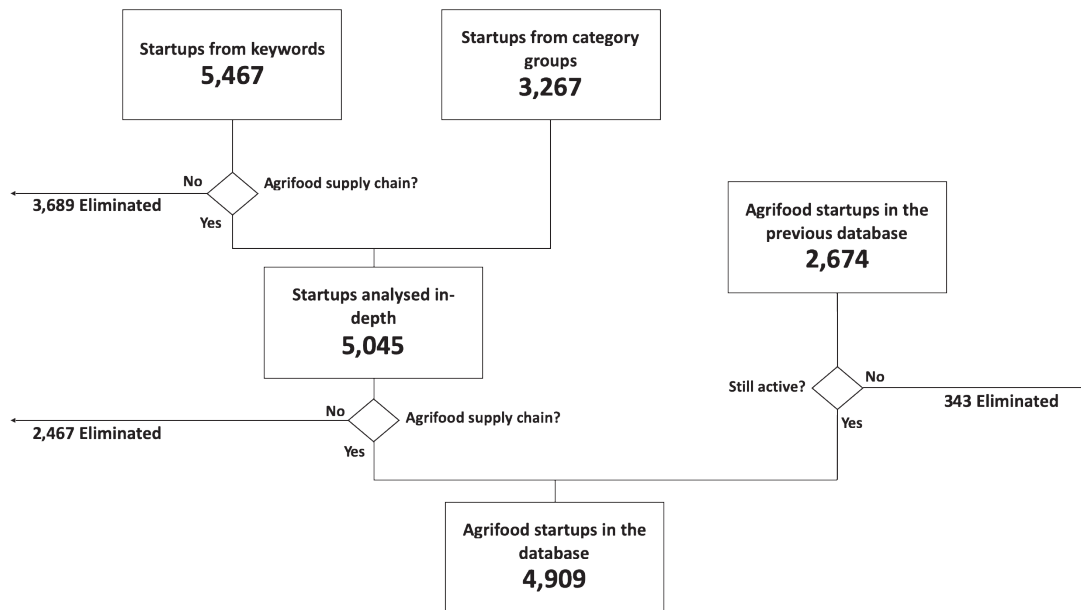
Figure 3.3 - The assessment process to select the startups in the database

3.1.6 Country-level information

The last activity performed to update the database has been to assign the geographical information to startups. CrunchBase provides the location of the headquarter to most of the companies registered, and for those for which this data was not available, it was searched through other secondary sources, such as the companies' website and their social media pages. The information has been detected for 4,856 startups. The firms' country of origin has been assigned as the country where the headquarter is placed. Then, each startup has been provided with additional qualifications depending on it.

- **The income of the country**, for which the possible values assigned are "Low", "Low Middle", "Upper Middle", and "High", depending on the GNI per capita of the country, assigned by the World Bank through the methodology explained in chapter 2.1.1.

- **The development level of the country**, for which the possible options are DCs, i.e., countries with a value of "Income" equal to "Low" or "Low Middle", and developed countries, i.e., countries with a value of income equal to "Upper Middle" or "High".

- **The geographical area the country belongs to**, assigned adopting the same grouping used by the World Bank (World Bank, s.d.), which distinguishes between: (i) East Asia and Pacific, (ii) Europe and Central Asia, (iii) Latin America and Caribbean, (iv) Middle East and North Africa, (v) North America, (vi) South Asia, and (vii) Sub Saharan Africa.

The possible categories attributed are the geographical areas aforementioned

The last geographical information assigned to startups is the region, obtained by crossing the development level and the geographical area of the country. Four possible categories emerged by linking these two dimensions.

1. "Developing SSA", attributed to startups with a country of origin located in Sub Saharan Africa and labelled as a DC.

2. "Developed SSA", attributed to startups with a country of origin located in Sub Saharan Africa and labelled as a developed country.

3. "Other developing", attributed to startups with a country of origin located outside Sub Saharan Africa and labelled as a DC.

4. "Other developed", representing startups with a country of origin located outside Sub Saharan Africa and labelled as a developed country.

The list of countries where at least one startup is located, showing their level of income, level of development, geographical area and state is provided in Annexe 8.5.

The methodology adopted and described in this chapter allows the consistent allocation of startups into the various categories within the database, ensuring a high level of objectivity and standardization. The subjective actions left to the researcher were to decide the supply chain stage and the sustainability commitment, but they were performed according to established and widely used frameworks. This procedure was unavoidable since for the supply chain stage there was not the possibility to access data for computing the value added by each activity (as it is suggested in the NACE), and regarding the SDGs, a method for attributing them apart from qualitative assessment does not exist.

3.1.7 Analysis of the distribution of startups over key dimensions

This chapter illustrates the methodology followed in carrying out the statistical analysis of the agrifood startup database to address RQ1: "What are the main differences and similarities in startups between developing and developed countries?". It presents the variables used to execute the analysis and the computations done.

Once the data has been collected from the selected sample of agrifood startups, a statistical analysis has been carried out to understand how entrepreneurship in the agrifood sector differs between developed and DCs regarding the supply chain's composition and sustainability orientation. Furthermore, an additional study regarding entrepreneurship in SSA has been performed on the same dimensions mentioned before. The analyses have been executed by crossing the data in the database.

First, the incidence of sustainable startups in the database has been computed. To do so, it has been introduced a variable representing whether the startup business model is considered sustainable or not. The variable Sustainable includes two values, i.e. *Sustainable* ∈

$$IRSS = \frac{n° \, of \, Sustainable \, Startups}{Total \, n° \, of \, Startups}$$

<div align="right">3.1</div>

$\{Sustainable; Non\ Sustainable\}$. Formula 3.1 displays the computation performed to obtain the incidence rate, where IRSS stands for "Incidence Rate of Sustainable Startups".

Then, to understand the time trend, companies have been grouped by the year of foundation, considering those created from 2015 to 2018. Firms founded in 2019 have been excluded since their numbers significantly smaller than in other years (302 of 4856 startups, equal to 6.24%). In fact, companies tend to not register to CrunchBase immediately after their creation, so those founded in 2015 had five years to subscribe to the platform, while those from 2019 had just one year. The resulting variable Year can assume four values, i.e. *Year* ∈ $\{2015, 2016, 2017, 2018\}$. The incidence rate of sustainable agrifood startups for a given year has been

$$IRSS_t = \frac{n° \, of \, Sustainable \, Startups \, founded \, in \, year \, t}{Total \, n° \, of \, Startups \, founded \, in \, year \, t}$$

<div align="right">3.2</div>

computed as the ratio between the number of sustainable agrifood startups and the number of startups founded in that year. The calculation is shown in formula 3.2, where IRSS stands for "Incidence Rate of Sustainable Startups at year t.

This computation has been executed by classifying the companies according to their country of origin's development level to have an insight into the differences between developed and DCs. The resulting Country1 variable can include two categories, i.e. *Country1* ∈ $\{Developing; Developed\}$. Moreover, in the study focused on SSA, this calculation has been repeated, grouping countries according to the region. The region is a value resulting from crossing the country of origin's geographical area and its development level, explained in Section 3.1.6. In this case, the resulting *Country2* variable can include four categories, i.e. *Country2* ∈ $\{Developing SSA; Developed SSA; Other developing; Other developed\}$.

The second dimension of analysis aims to understand the sustainability dimensions in which the startups in the database are concerned. Apart from establishing whether or not the sample firms adopt a sustainable business model, represented by the variable *Sustainable*, they have been assessed to determine which goals and targets from the group of SDGs selected they tackle. As described in Section 3.1.5, each startup has been provided with a main SDGs Target from the list shown in Section 3.1.3. For this investigation, a variable representing the targets has been created. The variable Target can include 23 categories, i.e. *Target* ∈ *{2.1; 2.2; 2.3; 2.4; 2.5; 4.4; 6.3; 6.4; 8.5; 8.; 8.9; 9.4; 11.4; 12.2; 12.3; 12.4; 12.6; 12.8; 14.4; 15.1; 15.6;*

15.8; 17.7}. This analysis has been carried out to highlight differences between developing and developed countries, crossing the variable Target with Country1, and crossing Target with Country2 to understand those between SSA and the other regions.

Eventually, the last analysis has concerned the distribution of startups along the supply chain stages, described in Section 3.1.1. For that purpose, a variable representing the stage occupied by the company has been created. The resulting variable Stage can include eight categories, i.e. Stage ∈ {*Input companies; Farmers, breeders, and fishers; Food processing; Wholesalers; Support Activities; Food Service; Service Providers; Retailers*}. The steps followed in this supply chain analysis has been the same performed for investigating the sustainability orientation. Initially, differences between developed and DCs has been highlighted, crossing the variable Stage with Country1. Then, the focus shifted towards SSA crossing Stage with Country2. In this way, it has been possible to understand how many startups from the sample operate in each of the stages comprised in the extended version of the agrifood supply chain, comparing differences between developed and DCs, and between Developing SSA and the other regions.

3.2 Case Studies

This chapter illustrates the case study methodology applied in this thesis to address RQ2: "What are the main barriers for startups in SSA, and how are these companies addressing them?" and RQ3: "How do the background and competences of the entrepreneurs influence the creation of startups in SSA countries?"

Section 3.2.1 explains why this method was selected and the typology of case study adopted, while Section 3.2.2 clarifies how the case studies have been designed and how data has been analysed to extract the key findings, presented in Chapter 4.

3.2.1 Case Study as a Methodological Approach

This thesis investigates entrepreneurship to understand its role in addressing sustainability and sustainable development in DCs. The first objective of the analysis is to understand the main differences between developed and developing countries (DCs) regarding agrifood entrepreneurship. This high-level question has been addressed by updating and enriching the agrifood startups database of the Food Sustainability Observatory and analysing the distribution of startups between the key variables.

The other dimensions of this thesis, expressed by RQ2 and RQ3, regard the barriers to entrepreneurship for startups in SSA, the solutions these firms adopted, and how entrepreneurs' competence and background operating in SSA influence the business. From the analysis of the existing literature, it was possible to draft two conceptual frameworks. The first one, presented in

Section 2.4, describes the possible barriers to business development in DCs, explaining how they impact entrepreneurship. The second one, displayed in Section 2.5, concerns the entrepreneur's most relevant characteristics and background factors that may encourage him/her to create a startup and links them to the firm's performance. These models have been elaborated referring to DCs, a heterogeneous group with relevant differences among its members. Therefore, they may not be valid for some areas, and they may not differentiate between companies adopting a sustainable business model and companies that do not.

This chapter presents the methodology adopted to understand how the two frameworks elaborated apply to sustainable firms in SSA and in which determinants they differ. SSA was chosen as the geographical area to be investigated for three reasons. First, it is mainly composed of developing countries (according to the World Bank data, among the 46 countries in SSA, 42 have a level of income equal to low or low-middle, 91% of the total). Second, because of the primary importance that sustainability-related issues occupies for the development of this area, as reported by Pawlak & Kołodziejczak (2020), and Roser & Ritchie (2018). Eventually, during the literature review, few results been found regarding this specific region, so this research aims to fill this gap. To investigate how the two frameworks apply in the context under analysis, it was necessary to directly collect data and insights from agrifood startups.

The study has been performed through the collection of qualitative data. In this phase of the research, the focus shifted from general analysis to gathering insights on single startups to understand the phenomenon. After deciding to perform qualitative research, the second step was to establish the method to apply. Many qualitative research methods exist, such as action research, collaborative research, ethnography, in-depth study, case study, qualitative survey, discourse analysis and content analysis. These approaches, according to Arnaboldi (2019), can be classified on the base of three main dimensions: (i) the number of organizations involved, (ii) the role of the researcher, and (iii) the primary source of data. Table 3.3 shows the most appropriate methodology to use according to the dimensions mentioned above.

Source of Data:
■ Mainly Human
■ Written Documents

Researcher Position	Number of Organisations Involved	
	One or Few	Many
Participating in Events	• Action Research • Collaborative Research	
Living the Field	Ethnography	
Interviewing	Case Study	
Interviewing and Observing	In-Depth Study	
Observing from Outside	• Discourse Analysis • Content Analysis	

Table 3.3 - The appropriate research method according to the three dimension of a qualitative research method

In our case, due to the difficulty of reaching out to SSA startups, the number of organisations involved has been forcingly few (three agrifood startups), the role of the researcher has been to interview, and the source of data has been primary human (interviews), so the research method that fits the most is the case study methodology.

3.2.2 The Design of Case Studies

3.2.2.1 Typology of Case Study

A case study is defined by Yin (2013) as "*an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*". After establishing this tool as the methodological approach to address RQ2 and RQ3, it was necessary to decide which typology to use. In fact, a case study is not a univocal concept, but depending on its purpose Yin (2013) identifies three categories of case study.

- Descriptive: descriptive case studies aim to accurately portray a particular phenomenon, exploiting the previous theories to identify the variables to be studied.

- Explanatory: an explanatory case study tries to understand the reflection of theories and hypothesis in the case observed. In this category of research method, the researcher tests a theory or hypothesis in the case context, contributing to the existing theory.

- Exploratory: in exploratory case studies, fieldwork and data collection are undertaken before the final definition of study questions and hypothesis. In this research method, the intervention under evaluation has no clear outcomes, and uncertainty covers the case's central feature. The general questions proposed are meant to introduce further examination of the phenomenon observed.

The case study developed in this part of the research aims to test the theory formulated in the two frameworks designed from the literature review in a specific context of interest: sustainable agrifood startups located in SSA. Thus, the explanatory case study has been considered the most appropriate type.

After setting the problem to be analysed, established the objectives to be achieved, and defined the dimensions through which collecting and analysing data, it was possible to proceed to the research design definition. This phase is crucial since it determines the logical sequence linking the empirical data to the research questions to be addressed and eventually to the conclusions that have been drawn. Yin (2009) defines the research design with these words: "*a research design is a logical plan for getting from here to there, where here may be defined as the initial set of questions to be answered, and there is some set of conclusions (answers) about these questions*". The case study design followed the guidelines provided by Yin (2009) to have a robust methodology. The steps identified in the process are illustrated below.

1. Identification of the unit of analysis.

2. Case's selection.

3. Data selection.

4. Data analysis.

5. Interpretation of the findings.

6. How these five steps have been attended in this thesis is illustrated in the following sections.

3.2.2.2 Identification of the unit of analysis

The identification of the unit of analysis consists of determining what the "case" studied is. The unit of analysis's importance consists of defining the research scope, drawing a line to establish what is relevant and what can be neglected. Moreover, it helps relating the study to any broader body of knowledge (Yin, 2009). Yin (2009) provided a general guideline for establishing the unit of analysis. According to him, the unit of analysis should easily come from the research questions addressed by the case study as a direct consequence of the investigated dimension.

The case selected in this research is represented by agrifood startups in SSA. Even though this decision might seem to exclude the topics related to RQ3, the competences and background of entrepreneurs of agrifood startups in SSA have been considered an embedded case. This choice has been made to group the two fields of analysis in the same case study. What an embedded case is and the motivations of this decision are explained in Section 3.2.2.3.

3.2.2.3 Selection of the cases

The second step of the research design has been the selection of cases. A primary distinction regards single- and multiple- case design, which means to decide whether to use one or several cases to address the research questions. The single-case study is an appropriate design under certain conditions. Five rationales for this option are presented below (Yin, 2009).

- Critical cases: the single case represents a critical case in testing a well-formulated theory, which specifies a clear set of propositions and the circumstances where they are true.

- Extreme or unique cases: often occurring in clinical psychology, where a specific disorder may be so rare that any single case needs to be documented.

- Representative or typical cases: a situation opposite to the previous one, where the

objective is to capture the circumstances and conditions of an everyday or commonplace situation.

- Revelatory cases: this situation takes place when a researcher has an opportunity to investigate a phenomenon previously inaccessible

- Longitudinal cases: the study of the same case in two or more different points in time.

These rationales are the main reasons for conducting a single-case study. In all the other situations, multiple cases provide more robust results and compelling arguments than single-case design (Yin, 2009). Moreover, multiple-case studies entail the opportunity to analyse a broader range of behaviours, enhancing the research with aspects that may have not previously considered. Since the cases of both research questions are not included in the five typologies mentioned above, multiple case study is a better approach for addressing both RQ2 and RQ3. Yin (2009) proposes a second step for the selection of cases, differentiating between two possibilities regarding the unit of analysis: (i) a holistic case, where there is a single unit of analysis, and (ii) an embedded case, where attention is given to subunits. These two variants both have their strengths and weaknesses (Yin, 2009).

- The holistic design is appropriate when no logical subunits can be identified, or when the relevant theory underlying the case study is itself of a holistic nature. However, a typical problem arises when the procedure brings to investigating the specific phenomenon with an insufficient level of detail.

- The embedded design requires identifying logical subunits but allows to keep the focus on an exhaustive level of detail. However, the main drawback is that it may concentrate exclusively on the subunits, failing to depict the larger unit of analysis.

In this study, it was decided to adopt an embedded case for addressing both RQ2 and RQ3 within the same case. This approach has been selected because the unit of analysis of RQ3, the experiences and background of entrepreneurs of agrifood startups located in SSA, can be included in the same investigation performed for the RQ2. So, while focusing on the barriers and enablers faced by agrifood startups in SSA, a part of the research shifted to the entrepreneurs of the same startups analysed, creating an embedded case.

A further decision to be made, once established to perform multiple cases, is the number of cases to include in the study. The logic supporting this choice is that of a replication design, similar to that used for multiple experiments (Yin, 2009). Each case should be selected to either predict similar results (a literal replication) or anticipate contrasting results, but for expected causes (a theoretical replication). In this replication process, it is essential to develop and enhance a theoretical framework explaining the conditions where a phenomenon is likely to happen and those where it does not. This model provides the knowledge necessary to extend

the hypothesis made to new cases (Yin, 2009). Nevertheless, the number chosen should reflect the needs of the researcher.

In this case, the choice for the subjects studied for the RQ2 fell on sustainable agrifood startup from SSA. Moreover, the case study has been complemented with the perspective of sector's experts, i.e. persons who worked for private or public organisations operating in SSA and focused on agrifood startups.

The companies have been selected to cover at least two different supply chain stages and three SSA countries. This choice aims at representing the breadth of the geographical area investigated and the variety of actors in the agrifood supply chain. The experts have been chosen to support the case study through a different point of view and triangulate the information reported by entrepreneurs. They provide insight into the enabling environment around startups, allowing the researcher to study the phenomenon of interest with the contribution of actors dealing with the ecosystem's barriers and working to mitigate them. Moreover, their informed opinions are helpful to understand whether the data presented by entrepreneurs are aligned with their knowledge of the sector. The embedded case to address the RQ3 focuses on the entrepreneurs of the same startups chosen for RQ2. This decision came naturally since they represent important entrepreneurs of startups in the agrifood sector in SSA. For this research question, experts have been included to support the knowledge developed in the case study. They worked tightly with many startups for a long time so that they can provide an interesting perspective.

The starting point to identify startups and entrepreneurs to include in the case studies has been the database created for the RQ1. A group of suitable companies have been identified among those that are sustainable, founded, and located in Developing SSA. The decision to investigate only funded companies aimed to identify startups that scaled their solution, assuming fundraising as a proxy of expansion. The results of this extraction were 7 firms. Then, the entrepreneurs of these companies were contacted via e-mail or LinkedIn to establish a connection. Whenever the previous means were ineffective to reach out, the corporate e-mail was used. This process permitted to involve 2 startups in the case studies, Farmshine and Moringa Wave.

To enlarge the sample, Fondazione ENI Enrico Mattei (FEEM) and the Food Sustainability Observatory of Politecnico di Milano provided support. FEEM is a policy-oriented research centre that produces quality, innovative, interdisciplinary and scientifically rigorous research in the field of sustainable development. The organisation was contacted and showed interest in the topics of this study. Thus, they provided a list of startups respecting the criteria set before, which were e-mailed to be interviewed. Eventually, the final number of actors included in the sample increased to 3 startups, adding Seekewa to the two identified before.

FEEM and the Food Sustainability Observatory supported this research also by

proposing the experts to interview. Thanks to the two organisations, three experts have been involved: Debisi Araba, Ritta Sabbas Shine and Dennis Treau. A description of these actors and the organisations they work with is provided below. This description has been created exploiting both secondary sources, such as the organisations' web site and social media pages, and primary sources, i.e. the interview they participated in.

- Debisi Araba has been the first expert interviewed. He is the Managing Director at the African Green Revolution Forum (AGRF), the world largest multilateral platform focused on Agricultural Transformation in Africa, working in all the countries of the continent. AGRF mission is to co-create a public-sector-enabled-private-sector-led process for agrifood transformation. The organisation advances its mission by working through ten thematic platforms, divisions of the organisations specialising in a particular area of the agrifood industry. They are composed of several members of AGRF, who set a long-term strategy and the annual work plan to achieve specific outcomes. Debisi's role is to lead the strategy, coordinating the secretariat's activities and the ten thematic platforms. AGRF organises a ministerial roundtable to ensure that public policies create the right enabling environment for the private sector to thrive, and a growing-agribusiness-deal room, where they convey financial providers and support entrepreneurs to grow from startups to scale up. SMEs are their primary target since they comprehend more than 80% of the agrifood sector.

- The second expert is Ritta Sabbas Shine, country support manager in SUN Business Network (SBN). Her role is to support country networks from a global perspective to ensure that advocacy activity at the national level is planted in global advocacy initiatives. Scaling Up Nutrition (SUN) is a global movement to fight malnutrition, which collaborates with the private sector and governments to identify policy constraints faced by firms to advocate for an improved enabling business environment.

- The last expert interviewed has been Dennis Treau, who worked with Seeds&Chips to create their African division. Seeds&Chips was an international summit for designing the future of feeding, born as a continuation of the initiatives undertaken during the Expo of Milan in 2016 "Feeding the Planet, Energy for the life". The movement stopped their activity in 2020 as a consequence of the crisis created by COVIS-19. In addition to this activity, Dennis Treau has been managing his non-profit organization Okapia focused on training projects in Rwanda since 2015.

Three startups have been selected as the subject of the cases, and for each of them, a founder has been chosen for the embedded case. The three firms are (i) Farmshine, a service provider which operates in Kenya, (ii) Moringa Wave, a food processing company headquartered in Madagascar, (iii) and Seekewa, located in Cote d'Ivoire and working as a service provider.

- Farmshine was founded in 2017 by Luca Alinovi, Andrea Alinovi, Chris Mimm,

and Alessio Colussi. It is headquartered in Thika, Kenya, and mainly operates in this country. It exploits digital technologies to create a program that allows skipping many intermediary steps in the agrifood supply chain, which typically result in higher costs of the product and less revenue for the farmer. The company provides a model through which it aggregates farmers' production and sells it in a structured way to large commodities traders, transferring a higher share of revenues to smallholder farmers.

- Moringa Wave, founded in 2016 by Franco Emilio Russo and a group of his friends, is a company headquartered in Antananarivo, Madagascar, operating primarly in these region. It is involved in the final transformation, logistics, marketing and sales of products derived from the Moringa Oleifera. This tree is grown in Madagascar by local farmers and purchased by the firm through a contract farming agreement. The startup commercialises its product within and outside the country and the African continent.

- Seekewa, founded by Fred Zamble and Serge Zamble, is a startup headquartered in Abidjan, Côte d'Ivoire. It has created a participative platform for smallholder in African countries to help them find all the resources they need to sustain their projects. It provides them directly with goods and services rather than loans through a model based on a vouchers' exchange between investors and the platform.

A broader description of these startups and their entrepreneurs is presented in Section 4.2 and 4.3.

3.2.2.4 Data collection

TThe data collection design for the case study included multiple sources of evidence to

double-check information, expand the knowledge, and enhance the theoretical framework (Yin, 2009).

The first source of evidence is the literature review performed at the beginning of the study, which provided the investigation's basis. During this process, a general framework has been created for the two research questions to be tested in the case studies' specific context. However, as previously stated, the information collected from this operation suffers from gaps that the case study aims at filling. In particular, this research looks at startups in SSA adopting a sustainable business model, where few information is available.

The second source is the secondary information gathered from the companies' website, their social media pages, and the data in CrunchBase. Specifically, information about the founded date and the number of employees has been retrieved from CrunchBase and the company websites, while that regarding the business model and impact has been explored in the companies' website and social media pages. Even if secondary information does not cover the case study topics sufficiently, it plays a crucial role for several reasons. First, it provides a general

vision of the startups under analysis to frame the interviews with greater precision, developing a more profound knowledge of background information. Then, secondary data is required to triangulate the interviewees' information, as they can return a subjective description of the startup, miss some facts, or describe them in an unclear way. Therefore, secondary information is needed to have a sounder, errorproof knowledge of the firms and the entrepreneurs.

The third source of evidence exploited are interviews from the experts. This source is particularly interesting since it provides insight into relevant actors working to create an enabling environment for agrifood startups in SSA. An important factor in their contribution is that they have collaborated with many startups over the years, accumulating extensive experience in the sector.

Eventually, the last source of evidence consists of the primary information obtained from interviewing the agrifood startups' entrepreneurs. The format adopted for the interview is that of semi-standardised interviews. This configuration involves designing some predefined questions from which interviewers and interviewees can step away if the dialogue shifts towards arguments that were not previously mentioned in the initial set of subjects (Yin, 2009). The rationale behind these guided conversations is to establish an exchange in which information can freely emerge to spot topics that the interviewer may neglect but perceived as necessary by the interviewees.

The interviews covered four areas of interest through a series of questions previously designed. These four parts aimed at addressing both RQ2 and RQ3 and refer to the following topics: (i) general information about the company, (ii) the business model, (iii) barriers, solutions, and enablers to the company's development, (iv) and background of the entrepreneur and network. Two interviews have been carried out in Italian, those for Farmshine and Moringa Wave, and one in English, for Seekewa. All the interviews have been performed remotely, including, apart from the interviewee, two interviewers: me and a researcher from the Food Sustainability of Politecnico di Milano. In this way, it has been possible to compare the notes and opinions to develop a precise analysis of the information. The interviews lasted about one hour and have been recorded to avoid missing parts of the information provided. The questionnaire was delivered in advance so participants could prepare for the topics to discuss during the interview.

Table 3.4 represents the interviewee table, illustrating the contextual information of the interviews realised. The table displays whether the interviewee was interrogated for the case study or as an expert, the interviewees' name, the organisation they work in and the job title, the interviewers and the language held during the interview, and the interview date.

Name	Role in the Research	Organisation and Job Title	Interviewers and language held	Date
Luca Alinovi	Case study	• Farmshine • Co-founder	• 1 student and 1 researcher • Italian	• 2 Dec 2020 • Italian
Franco Emilio Risso	Case study	• Moringa Wave • Co-Founder	• 1 student and 1 researcher • Italian	• 26 Nov. 2020 • Italian
Fred Zamble	Case study	• Seekewa • Co-founder	• 1 student and 1 researcher • Italian	• 14 Dec 2020 • Italian
Debisi Araba	Expert	• AGRF • Managing Director	• 1 student and 1 researcher • Italian	• 2 Dec. 2020 • Italian
Ritta Sabbas Shine	Expert	• SBN • Country Support Manager	• 1 student and 1 researcher • Italian	• 8 Dec. 2020 • Italian
Dennis Treau	Expert	• Okapia • Founder	• 1 student and 1 researcher • Italian	• 23 Dec. 2020

Table 3.4 – The contextual information of the interviews realised

3.2.2.5 Questionnaire for the founders of startups

The tool used to carry out the interviews in the case studies has been the questionnaire.

As previously mentioned, the interviews' topics regarded four different sections, and the questionnaire reflects this structure, being divided into four sections.

The first one focuses on the company's general features, such as the number of employees, the founded date, the geographical area where it operates, and a brief description of the business. This section was created to frame the company and check the secondary information gathered before.

The second section investigates the business model. Considering that the analysis has been focused on sustainable firms, the Social Business Model Canvas (SBMC) has been used as a tool to describe it. This framework is an adaptation of the well-known Business Model

Canvas (BMC) developed by Osterwalder and Pigneur in 2012. It has been used to effectively communicate a sustainable firm's objectives and its coherence with its resources and strategy. It is also helpful to assess the enterprise's activity in terms of output, outcomes and impact. Sparviero (2019) developed an SBMC providing the following definition of it: "The analysis of the rationale, infrastructure, capabilities and use of resources that enable stakeholders to create value for themselves and for the organization". His tool is composed of 13 building blocks, four of which inherited by the BMC (Sparviero, 2019).

- Key Resources: the most relevant assets required to make its business model work.

- Key Activities: the most relevant activities a company must perform to make its business model work.
- Channels: how the company communicates and reaches its customers and beneficiaries to deliver its value proposition

- Cost Structure: the main costs incurred when running the business.

- Value Proposition. divided into commercial and social:

- Commercial: like the traditional BMC, it describes the features of the products which creates value for the customers

- Social: It describes the value created for the beneficiaries in terms of social value, linked to the dimensions of sustainability.

- Non-targeted Stakeholders: this block replaces key partners in the BMC, including both partners and other stakeholders which affect or are affected by the activity of the firm.

- Customers and Beneficiaries: replace the Customer Segment of the BMC, it is used to define groups of people that the organization reaches, both through its commercial proposition (customers), and its social purpose (beneficiaries).

- Customers and Beneficiaries Engagement: this block substitutes the customer relationships, proposing a model in which the company can establish two-way relationships because customers and beneficiaries are involved in the value creation of the firm.

- Income: income replaces revenues since it includes all other forms of financial resources a social company can collect apart from revenues (e.g. government funding, donations).

- Mission Values: it defines the long-term goals of the enterprise.

- Objectives: it represents the short-term, more practical targets the company wants to achieve.

- Impact Measures: the indicators for the mission adopted by the company.

- Output Measures: the indicators for the objective adopted by the company.

The third section of the questionnaire regards the barriers, solutions, and enabling factors to entrepreneurship faced by agrifood startups in SSA. The part aims at collecting the data to understand the barriers faced by the three startups selected, the enabling elements of the environment, and the solutions they developed. The questions are voluntarily designed to be wide, not bias the interviewees' answers by forcing them to be related to the themes identified in the literature review and naturally bringing out new elements that may enrich the existing model through additional insights.

The last part of the questionnaire regards the background and network of the startup's entrepreneur. This section focuses on the interviewees' characteristics, such as education, previous job experience, and geographical origin. Then, the attention shifts to his/her network, investigating the team composition and the funding's channels.

Table 3.26 shows the questionnaire adopted for conducting the interviews with the entrepreneurs of the selected startup. The questions are grouped according to the corresponding sections.

Number	Section	Question
1	General Information	When was the company found?
2	General Information	How many employees are in the company?
3	General Information	In which geographical area does the company work?
4	Business Model	Does the company want to address any Social/Environmental problem? Which and how? Why do you think it is important?
5	Business Model	Who will benefit from its resolution?
6	Business Model	Who are the company's customers?
7	Business Model	What factors make the product/services offered different from competitors?
8	Business Model	What kind of impact are you generating?
9	Business Model	What are the most important external actors for the company?

10	Business Model	Through what channels is the company promoted? What are the main distribution channels? What are the main touchpoints between the customer and the company?
11	Business Model	What relationship does the company have with its customers?
12	Business Model	What relationship does the company have with its customers?
13	Business Model	What are the most important resources for the company?
14	Business Model	What are the most important activities the company has to do?
15	Business Model	What are the biggest costs for the company ?
16	Business Model	Does the company adopt any indicator to measure its social/environmental impact?
17	Barriers, Solutions, and Enablers to Entrepreneurship	What were the main barriers to the development of the company? What problems is it facing now?
18	Barriers, Solutions, and Enablers to Entrepreneurship	What solutions has the company implemented to address them?
19	Barriers, Solutions, and Enablers to Entrepreneurship	What factors helped the creation and development of the company?
19	Background and Network	What is your educational background? Where did you study?
20	Background and Network	What were your previous work experience? How did it help the development of the company?
21	Background and Network	How important has your geographical origin been for your career path?
22	Background and Network	Do the people in the company come from different geographical areas? Do they have a different background in terms of competences?
23	Background and Network	How did you reach the people in the company and through which channels?
24	Background and Network	Through which channels were you able to obtain funding?

Table 3.5 – The questionnaire used to conduct the interviews to the startup's founders.

3.2.2.6 Questionnaire for the Experts

Considering that three experts have been interviewed to complement the case study, another questionnaire was formulated to structure their interviews. They supported the analysis by providing a diverse perspective and by triangulating the entrepreneurs' data. Their contribution

differs from that of entrepreneurs since the latter have reported their personal experience, while experts answered the questions basing on their knowledge developed by working tightly with several agrifood startups in SSA. Thus, their responses are informed opinions rather than direct personal experiences. Since these interviews aim to provide information to integrate the case studies and triangulate the entrepreneurs' data, the experts' questionnaire follows the same structure adopted for startups. It is divided into the same four sections reported previously.

1. General Information: The first one focuses on understanding the characteristics and the objectives of the organisations they work in.

2. Business Model: The second section investigates their opinion on the most diffused and interesting business models of agrifood startups in SSA. A part of this section is dedicated to some of the blocks composing the Social Business Model Canvas, coherently with the firms' description included in the case study. In particular, the experts have been questioned about the firms' most important stakeholders and resources.

3. Barriers, Solutions, and Enablers to Entrepreneurship: The third section of the questionnaire regards the barriers, solutions, and enabling factors to entrepreneurship faced by agrifood startups in SSA.

4. Background and Network: The fourth part of the questionnaire discuss the founders' background and characteristics.

Number	Section	Question
1	General Information	What does the organisation you work with do?
2	Business Model	What are the most diffused sustainable business models in the agrifood sector in sub-Saharan Africa? What do you think are the most interesting ones for driving sustainable development?
3	Business Model	What sustainability issues do startups in sub-Saharan Africa more often address?
4	Business Model	What are the most important stakeholders for sustainable agrifood startups in sub-Saharan Africa?
5	Business Model	What are the most important resources for startups in sub-Saharan Africa?
6	Barriers, Solutions, and Enablers to Entrepreneurship	What are the main barriers these businesses encounter during their creation and development?
7	Barriers, Solutions, and Enablers to Entrepreneurship	What factors of the environment favour their development?

8	Founders' Background and Characteristics	What role the area of study plays for entrepreneurs in the agrifood industry in sub-Saharan Africa?
9	Founders' Background and Characteristics	How does the previous job experience influence the path of for entrepreneurs in the agrifood industry in sub-Saharan Africa?
10	Founders' Background and Characteristics	Do you think that the founder's geographical origin play a role in the creation and development of firms?

Table 3.6 – The questionnaire used to conduct the interviews to the experts.

3.2.2.7 Data Analysis and Interpretation of Findings

Once finished collecting data, the further step was to analyse it. For this process, the methodology was structured to ensure it adopted a systematic approach. So, the examination passed through a series of predetermined steps, following Venturi's guidelines (2020).

- First, the recorded interviews were written down, adapting the spoken conversation to a written text.
- Then, a group of categories was established to cluster the information. These groups refer to the category of elements highlighted in the case studies to address the research questions.
- Eventually, the interviews were analysed to identify the sentences referring to the categories.

The last two steps have been performed through iterations rather than linearly. The starting set of categories has been taken from the model created in the literature review, but new sections have been added as new relevant elements emerged from the interviews. Thus, the final set of categories resulted from the integration between the initial frameworks and the interviewees' novel insights. This process resulted in two tables, one for RQ2 and one for RQ3.

- For RQ2, it has been created a four-column table where there is the macro-category of the information in the leftmost column, which classifies whether the information regards a barrier or a solution. In the second column from the left, there is the group, considered the typology of barrier or solution reported, while the third column from the left contains the interviewee's quote. The last column from the left represents the code assigned to that information.

- For RQ3, it has been created a three-column table. The category has been inserted in the leftmost column, representing the group in which the reported entrepreneur's characteristic is included. In the second column from the left, the quote has been inserted, while the code has been inserted in the last one.

66

The code identifies the piece of information reported. In the table created to summarize RQ2's results, the code is composed of three letters and a digit, while in that used for RQ3, of two letters and a digit. This difference is because the first mentioned table operates a distinction on the macro-category, which can be either a barrier or a solution, while this classification does not occur in the latter. In the RQ2's table the code has this structure:

(interviewee) (macro-category) (category) (quote number)

In the RQ3's table it has the following one.

(interviewee) (category) (quote number)

The quote number is a digit that distinguishes the citation belonging to the same category and provided by the same person. The possible values of the code's component are illustrated below.

Interviewee:

A: Luca Alinovi (Farmshine)

F: Franco Emilio Risso (Moringa Wave)

Z: Fred Zamblé (Seekewa)

Macro-Category:

B: Barrier

S: Solution

Category (RQ2):

I: Infrastructure

M: Access to market

R: Regulatory framework

A: Access to finance

T: Trust

C: Conservative environment

F: Customers' access to finance

Category (RQ3):

E: Educational Background

J: Previous Job Experience

G: Geographical Origin

V: Volunteering

P: Psychological Traits

Quote Number: A progressive number that starts from 1 and increases for each citation within the same macro-category (for RQ2), category, and interviewee. Citations are ordered according to their chronological order within the interview.

Thus, for instance, the first citation taken from the interview of Luca Alinovi regarding a barrier in the category of trust would have the code number "ABT1".

Once this operation ended, the primary information collected in the table was compared with the theory elaborated in the frameworks. The resulting findings enrich the knowledge of the context under analysis, providing the thesis's answer to the research questions.

The followed methodology allowed to test the barriers identified in the literature to verify whether they affect sustainable agrifood startups in Developing SSA. Moreover, it highlighted new barriers not considered in the starting model and the solutions firms adopted to overcome them. Moreover, it provided an in-depth comprehension of the link between the entrepreneur's background and business decisions.

4. Key Findings

This chapter presents the main results deducted from the statistical analysis of the agrifood startups database and the case studies. These findings aim to answer the three research questions formulated in Chapter 2 by applying quantitative and qualitative methods.

Section 4.1 illustrates the results of the statistical analysis carried out to answer the RQ1: "What are the main differences and similarities between agrifood startups from developing and developed countries?". First, it presents the macro differences between agrifood startups operating in developed and developing countries (DCs, Chapter 1), comparing the two clusters on (i) the number of firms created over the years, (ii) the positioning of startups along the stages of the supply chain, and (iii) their sustainability orientation. Then, the focus narrows to a specific geographical area, Sub Saharan Africa (SSA, Chapter 1), repeating the analysis described before on new clusters obtained by dividing startups according to their headquarter location in (i) Developing SSA, (ii) Developed SSA, (iii) Other Developing, and (iv) Other Developed. Section 4.2 presents the key findings of the cross-case analysis concerning RQ2: "What are the main barriers for SSA startups, and how are these companies addressing them?". First, it describes the startups selected for the research, then it displays the barriers to entrepreneurship identified in the cases compared to those stemming from the literature review. Eventually, Section 4.3 shows the comparison between the entrepreneurs' most important characteristics listed by the interviewees with those highlighted in the literature review to address RQ3: How do the background and competences of the entrepreneurs influence the creation of startups in SSA countries?"

4.1 RQ1: Results of the Database Analysis

As previously stated, the literature analysis identified little data available to assess entrepreneurship in DCs. To fill this gap is one of the aims of this thesis and constitutes the core of the research performed to address RQ1: "What are the main differences and similarities between agrifood startups between developing and developed countries?". The data source investigated is the agrifood startups database described in Chapter 3.1 that includes 4,856 startups, among which 1,157 selected as sustainable (23.8% of the total).

4.1.1 The Comparison Between Developed and Developing Countries

This section displays the results of the statistical investigations carried out in the database by clustering startups according to their headquarter location, distinguishing between those located in developed and DCs.

First of all, the number of agrifood startups and the incidence rate of those sustainable in each group have been calculated. As shown in table 4.1, most firms in the database are from developed countries, vastly outnumbering those located in DCs. Moreover, the incidence rate of sustainable agrifood startups over agrifood startups from developed countries was significantly higher than that registered in DCs, with a value of 24.3% compared to 20.1% of DCs.

Developing Countries (Low and Lower Middle income)
577 Agrifood Startups
116 Sustainable Agrifood Startups
20.1% Incidence Rate

Developed Countries (Upper Middle and High income)
4,279 Agrifood Startups
1,041 Sustainable Agrifood Startups
24.3% Incidence Rate

Low Lower Middle Upper Middle High
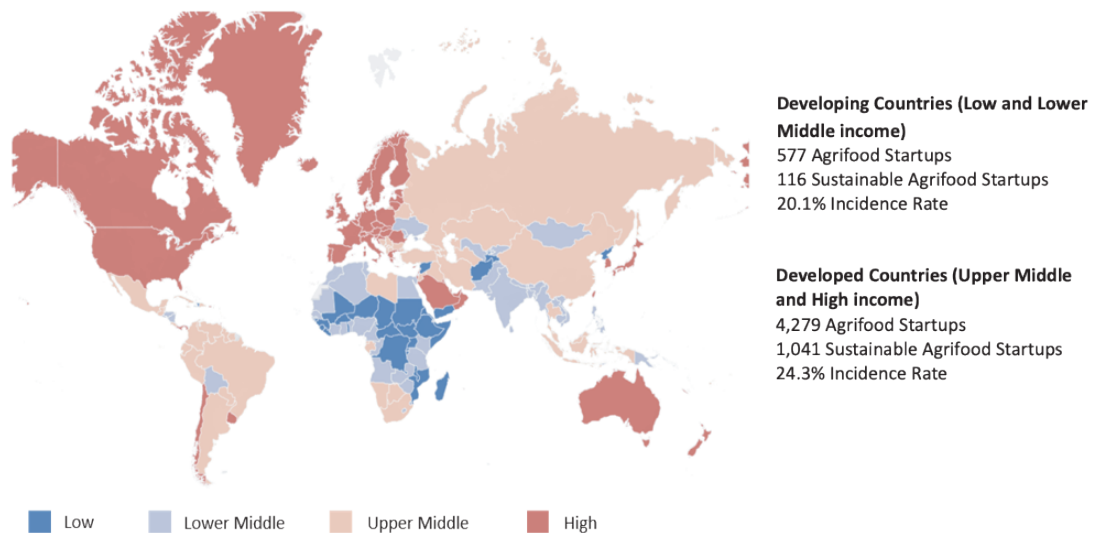
Figure 4.1 – Number of Agrifood Startups in Developed and DCs and Incidence Rate of those Sustainable

This analysis represents the situation without considering the evolution during time. Thus, to insert the temporal dimension in the study, the incidence rate from 2015 to 2018 has been examined grouping companies by their founded date. The data representing 2019 has not been included because the corresponding sample of companies is much smaller than those from the previous ones. This decision has been made considering that firms usually register to CrunchBase a few years after their creation. Figure 4.2 shows how the sustainable startups' incidence rate changed, highlighting a continuous increase in each of the years, passing from 21% in 2015 to 27% in 2018.

After computing this data for the whole database, information has been disaggregated, distinguishing between startups in developed and DCs. Figures 4.3 and 4.4 illustrate the results, suggesting a continuous growth in both areas. However, there is a substantial difference in the shape of the trend between the two clusters. In DCs, the incidence rate dramatically increases from 2015 to 2016, and then it flatters around a value of 23% over the following three years.
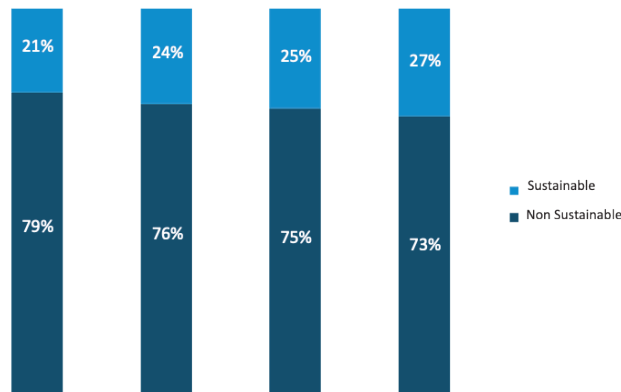
Figure 4.2 - Incidence rate of sustainable agrifood startups in the database from 2015 to 2018. The sample consists of 1,382 Sustainable Agrifood Startups for 2015, 1,283 for 2016, 1099 for 2017 and 789 for 2018
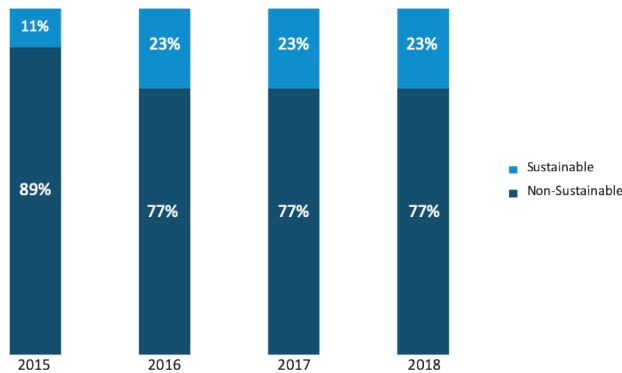
Figure 4.3 - Incidence rate of sustainable agrifood startups in developing countries from 2015 to 2018. The sample consists of 142 sustainable agrifood atartups for 2015, 142 for 2016, 120 for 2017 and 114 for 2018.
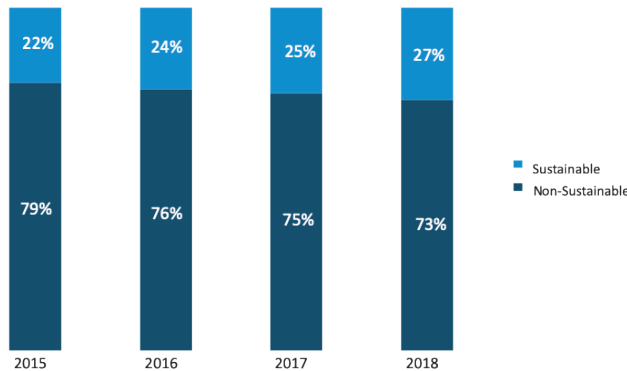
Figure 4.4 - Incidence rate of sustainable agrifood Startups: developed countries from 2015 to 2018. The sample consists of 1,240 sustainable agrifood startups for 2015, 1,141 for 2016, 979 for 2017 and 675 for 2018

In developed countries, the growth is stable, and sustainable agrifood startups account for 22% of firms in 2015, 24% in 2016, 25% in 2017 and 27% in 2018.

The second analysis presented is the distribution of sustainable agrifood startups along the agrifood supply chain stages. The two clusters compared are the same as before, distinguishing between firms headquartered in developed and DCs. The allocation of firms was done according to the NACE codes as described in Section 3.1.2. The three stages that account for the highest

number of companies in developed countries are (i) service providers, including 399 startups out of 1,041 in the sample (38%), (ii) food processing companies, including 222 startups (21%), and (iii) technology suppliers, including 166 startups (16%). The remaining firms are evenly distributed in the other stages, with none of them including more than 66 startups. In DCs, the three stages with the higher number of startups are (i) service providers, including 58 startups out of 116 (50%), (ii) retailers, including 16 startups (14%), and (iii) technology suppliers, including 12 startups (12%). Figure 4.5 and 4.6 illustrates how sustainable startups are distributed in the agrifood supply chain in developed and DCs, highlighting the three most common stages in boxes with a dashed border.
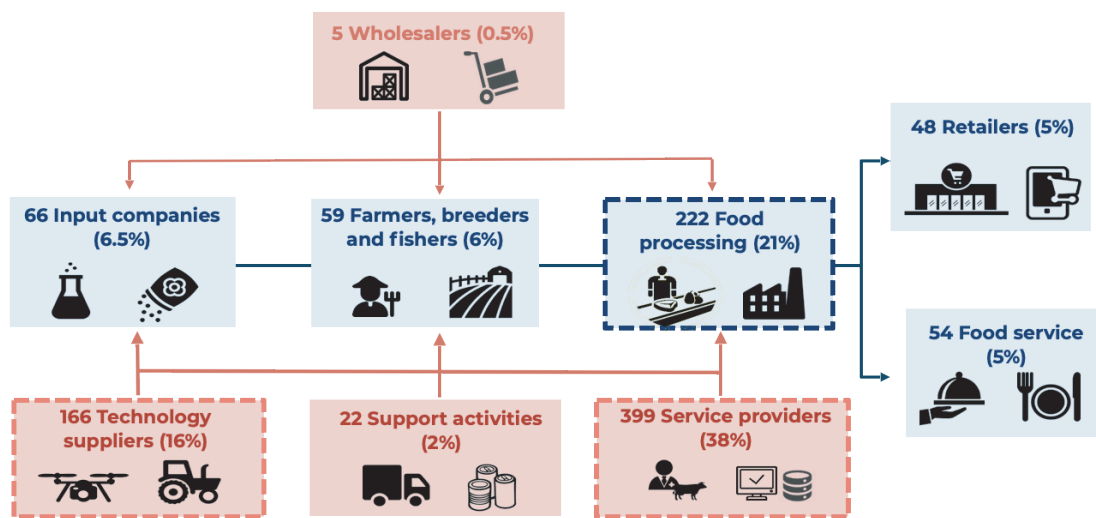
Figure 4.5 - The distribution of sustainable agrifood startups along the supply chain in DCs.
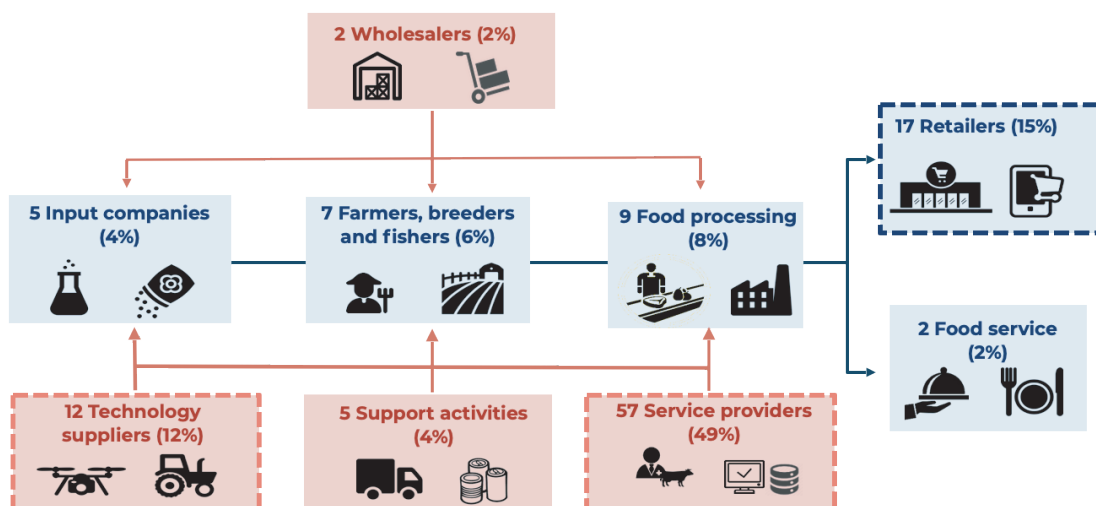
Figure 4.6 - The distribution of sustainable agrifood startups along the supply chain in developed countries

The third dimension analysed in this comparison between sustainable agrifood startups in developed and DCs is their orientation towards the SDGs targets. The incidence rate of sustainable agrifood startups in the database has been already shown in figures 4.2, 4.3 and 4.4, illustrating that this indicator is higher in developed countries, where it has continuously grown from 2015 to 2018, while in DCs, the growth was very high from 2015 to 2016 for then stopping around 23%. Once computed these numbers, the following step was to understand the targets where agrifood startups focus on, to spot the areas of sustainability where they concentrate. Each sustainable startup in the database has been assigned with the main SDGs target representing the issue the firm is addressing. Figure 4.6 illustrates the most frequently SDGs targets and goals tackled by agrifood startups in developed and DCs. All these targets belong to two main goals.

- **Goal 2**: *"End hunger, achieve food security and improved nutrition and promote sustainable agriculture"*. The two targets included in this goal more frequently addressed by agrifood startups are target 2.3 and target 2.4.

  ◊ **Target 2.3**: *"by 2030 double the agricultural productivity and the incomes of small-scale food producers, particularly women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment"*. This target is assigned to 185 of 1,041 sustainable startups in developed countries (18%) and 59 of 116 startups (51%) in DCs.

  ◊ **Target 2.4:** *"by 2030 ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and that progressively improve land and soil quality"*. This target is assigned to 164 of 1,041 sustainable startups in developed countries (16%) and 13 of 116 startups (11%) in DCs.

- **Goal 12**: *"Ensure sustainable consumption and production patterns"*. The three most addressed targets by startups in the database are 12.2, 12.3, and 12.4.

  ◊ **Target 12.2**: *"by 2030 achieve sustainable management and efficient use of natural resources"*. This target is assigned to 124 of 1,041 sustainable startups in developed countries (12%) and 4 startups out of 116 (3%) in DCs.

  ◊ **Target 12.3**: *"by 2030 halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains including post-harvest losses"*. This target is assigned to 130 of 1,041 sustainable startups in developed countries (12%) and 6 startups out of 116 (5%) in DCs.

◊ **Target 12.4:** *"By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment"*. This target is assigned as main to 90 of 1,041 sustainable startups in developed countries 1.041 (9%), and to 7 of 116 (6%) in DCs.
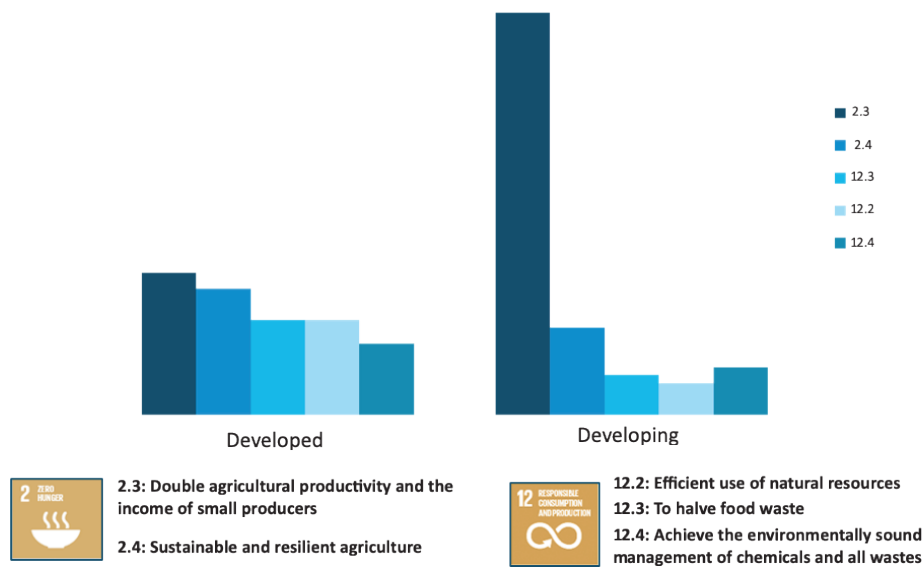
Figure 4.7 - Distribution of Sustainable Agrifood Startups over the 5 Top SDGs Target

This result can be justified providing that the focus of the research is on agrifood industry firms. It seems logical that the main SDGs addressed by companies in this sector are zero hunger and sustainable consumption and production, and the targets identified are those closer to the industry. An interesting finding regards the percentage of companies allocated to these five targets. In developed countries, the percentage is balanced among all of them, ranging from 9% to 18%, while in DCs, there is a predominance of target 2.3, accounting for 51% of the sustainable startups. The percentage of companies addressing the other four targets is higher in developed countries. The main differences can be found in target 12.3 (12% in developed and 5% in DCs) and target 12.2 (12% in developed and 3% in DCs).

4.1.2 The Focus on Sub Saharan Africa

The statistical analysis of the agrifood startups database has been carried out in two steps. The first one is to study the differences regarding the macro dimensions of entrepreneurship in developed and DCs, presented in Section 4.1.1. In the second one, the focus narrows to

a specific group of DCs, those in SSA. The investigation displayed in the previous chapter adopts a general and wide perspective, grouping all the countries included in the classification of DCs even if they are very different one to each other. Thus, to analyse firms that operate in a similar context, a smaller cluster was selected as the unit of analysis. The reduced scope implies that countries within this group are more similar and work in an environment with common characteristics.

SSA was selected for two main reasons. First, because of the lack of studies on entrepreneurship focused on this specific area. Second, because it is one of the world's poorest regions, and considering the importance entrepreneurship has to drive sustainable development (Dutz, Kessides, O'Connell, & Willig, 2011; infoDev, 2016, p. 10-14; Olafsen & Cook, 2016; Naudé, 2009), it is interesting to examine it in the context of SSA, where several social, environmental, and economic issues are the priority. This section displays the results of the statistical investigations on agrifood startups in the database dividing companies into four clusters: (i) Developing SSA, (ii) Developed SSA, (iii) Other Developed, and (iv) Other Developing. The analysis carried out shows the incidence rate of sustainable agrifood startups in Developing SSA, their distribution along the supply chain, and the SDGs targets they tackle. The database contains 89 startups headquartered in 18 different SSA countries, all of which are DCs but South Africa and Namibia, which account for 17 startups. Of the 72 startups from SSA developing, 29 are sustainable firms, while for SSA developed, the incidence is 24% (4 sustainable agrifood startups out of 17). These samples are much smaller than those of the other two groups, considering that Other Developed includes 505 startups and Other Developing 4,262, but can still provide significant insights.

Figure 4.8 shows the incidence rate of sustainable agrifood startups for the four groups.
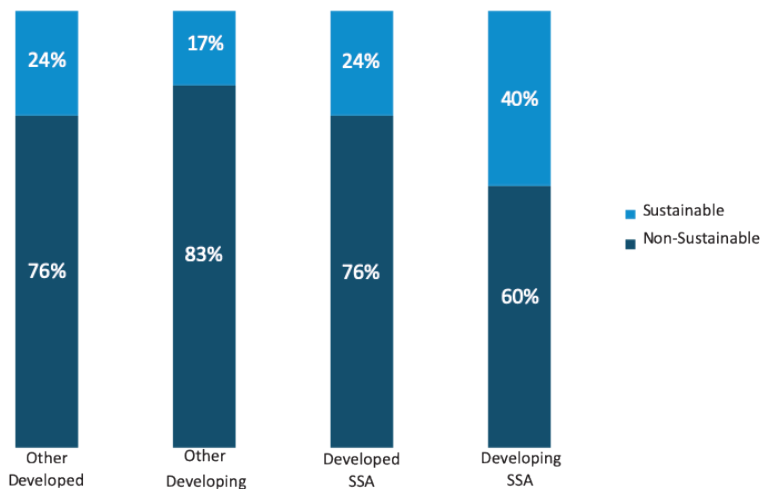
Figure 4.8 - Incidence rate of Sustainable Agrifood Startups in Developing SSA.

This indicator is significantly higher in Developing SSA, accounting for 40% of the firms compared to 24% in developed countries and 17% of other developing. This data supports the reason for carrying on an analysis of sustainable entrepreneurship in SSA since it demonstrates that in this region, firms' sustainability orientation is very pronounced.

The SDGs target sustainable agrifood startups in Developing SSA address the most is target 2.3, accounting for 21 of 29 startups (72%). This value is significantly higher than in other DCs, where it accounts for 44% of the firms in the sample, and Other Developed countries (17%). The prevalence of firms tackling this issue highlights the companies' orientation towards supporting smallholder farmers, aiming at raising their income. This trend may be explained considering that in SSA, agriculture is the first employer providing work for most of the population (FAO and OECD, 2019, p. 1), especially in rural areas. However, these actors typically live in poverty and are particularly fragile (FAO and OECD, 2019, p. 1). In fact, they gain low money and suffer the effects of climate change the most. Thus, startups are particularly sensitive to this issue since it is a priority faced by many people in their countries, which, if resolved, may generate a big impact on their livelihoods.

For what concerns the allocation of sustainable agrifood startups along the supply chain, service providers represent the stage where most companies operate, accounting for 18 of 29 companies (62%). The incidence of this stage for Developing SSA is significantly higher than in Developed SSA (25%), Other Developed (46%), and Other Developing (34%). The second-highest incidence stage is retailers, with an incidence rate of 13.5%, the same as other developing, occupying the second stage too. Eventually, technology providers and primary activities (farmers, breeders and fishers) both include two companies. An important difference between Developing SSA and Other Developed regards companies' incidence in the food processing stage: the value for the first-mentioned group is 3.5% compared to 21% of the latter. Figure 4.8 illustrates how the companies in the sample are divided among the different stages.
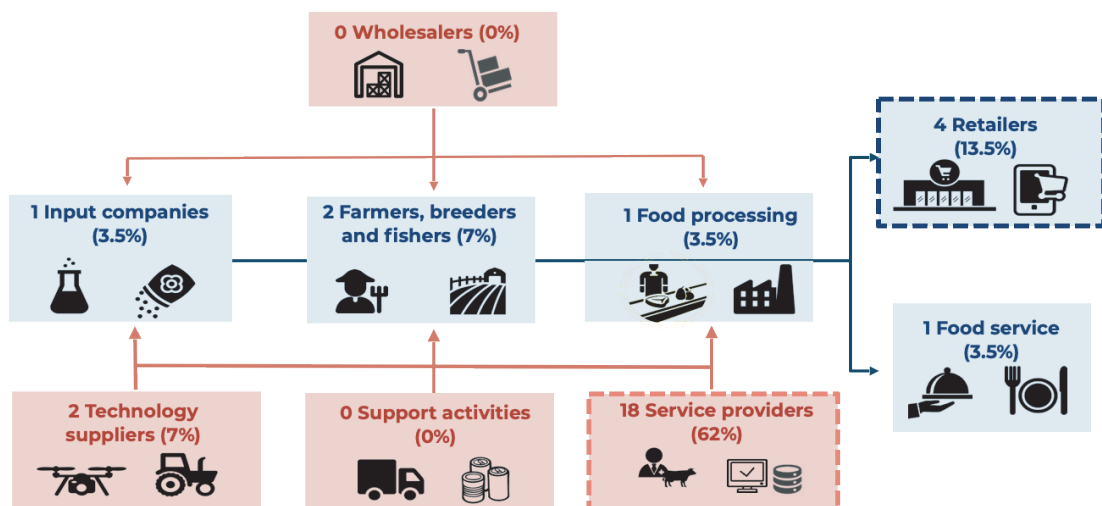
Figure 4.9 - Allocation of sustainable agrifood startups along the supply chain

4.1.3 RQ1: Interpretation of the Findings

4.1.3.1 Differences Between Developed and Developing Countries

The database's statistical inquiry showed a higher incidence of sustainable firms among agrifood startups in developed than DCs. However, the percentage of sustainable startups in DCs is significant, accounting for 23% of the firms from 2016 to 2018, demonstrating that sustainable entrepreneurship is no longer a niche in the agrifood sector. Regarding the sustainability orientation, Goal 2: "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" (Target 2.3 and 2.4) and Goal 12: "Ensure sustainable consumption and production patterns" (Target 12.2, 12.3, and 12.4) are the most addressed regardless of the company's location. What differs between the two clusters is the incidence of startups assigned to each of them.

In developed countries, the distribution is almost even, with the most addressed target, 2.3, tackled by 18% of sustainable companies and the least one (among the five mentioned before) addressed by 9%. In DCs, the distribution is much more skewed, with target 2.3 addressed by 51% of sustainable startups and target 12.2 by just 4%. A justification of why in both developed and DCs the targets addressed are the same is that all the firms belong to the agrifood industry. The five targets are the closest to the sector since they focus on increasing the agricultural productivity and small producers' income (Target 2.3), creating sustainable and resilient agriculture (Target 2.4), reducing food waste (Target 12.3), efficiently using natural resources (Target 12.2), and the environmentally sound management of chemical and water (Target 12.4). Nevertheless, these targets are addressed with a different priority between developed and DCs, which reflects in a relevant discrepancy between the two regions regarding the incidence of firms addressing each of the targets. This difference may be caused by the different contexts where startups operate. In DCs, the agrifood industry is the sector that employs most people and provides the primary source of income to the population (FAO and OECD, 2019, p. 1). However, it mainly exists as informal entrepreneurship, where actors, concentrated in the first stages of the supply chain (FAO and OECD, 2019, p. 1), live in poverty with shallow stability and protection. Thus, target 2.3 is more a priority than in developed countries where companies that address it focus more on doubling agricultural productivity using innovative solutions than raising producers' income. This result is also encouraging since the agrifood industry is the principal sector considered capable of providing enough jobs for young people in DCs in the near future, on the condition that it will become more attractive, productive, and profitable. (FAO and OECD, 2019, p. 53). This change requires creating a supporting business ecosystem composed of service providers, suppliers and a market. Companies in this stage are also required to drive the structural transformation of these countries' economy from being predominantly rural and agriculturally based to being urban, manufacturing and service-based (Olafsen & Cook, 2016; Naudé, 2009; Naudé, 2010; Vivarelli, 2016; Dutz, Kessides, O'Connell, & Willig, 2011; infoDev, 2016, p. 10). Target 12.3, responsible consumption of resources, and target 12.2,

reducing food consumption, are the two targets, apart from 2.3, where there is a significant difference between developed and DCs, with an incidence rate of 12% in developed compared to a value of 4% for 12.2 and 5% for 12.3 in DCs.

The last area of analysis is the distribution of sustainable agrifood startups within the clusters along the supply chain. In developed countries, companies are predominantly service providers, accounting for 38% of the total. The second and third stage are food processing companies and technology suppliers, encompassing 21% and 16% of the startups. The service provider stage is where most sustainable startups from DCs concentrate, representing 51% of the sample's startups. The second and third stages are retailers and technology suppliers, with an incidence rate of 14% and 12%. Even if service providers account for the highest number of firms in both developed and DCs, the incidence of firms in this stage is significantly different between developed and DCs. In the latter, the percentage of service providers is much higher than in the first one. Moreover, another difference regarding this stage in the two clusters is the sustainability orientation of the companies they include. In developed countries, 28% of startups operating in this stage tackle target 2.3, while in DCs, it accounts for 67% of firms. Moving the attention towards the sustainability orientation of technology suppliers, in developed countries, 28% of them address target 2.4 and 14% target 2.3. In DCs, this data overturns, and 33% of technology suppliers focus on target 2.3 while 17% on Target 2.4.

To conclude, based on the results identified through the statistical analysis of the database, it is possible to answer the RQ1: "What are the main differences and similarities between agrifood startups from developing and developed countries?" summarizing the aforementioned findings..

To conclude, based on the results identified through the statistical analysis of the database, it is possible to answer the RQ1: *"What are the main differences and similarities between agrifood startups from developing and developed countries?"* summarizing the aforementioned findings.

- Regarding the sustainability orientation, in both developing and developed countries, the five most addressed SDGs targets are 2.3, 2.4, 12.2, 12.3, and 12.4. However, the distribution of startups into these targets is more skewed in DCs than in developed countries, where target 2.3 is addressed by 51% of startups compared to 18% of the latter group. Targets 2.4 and 12.4 show a similar incidence: in developed countries they account for 16% and 9% of the firm, in DCs for 11% and 6%. Targets 12.2 and 12.3 display a more marked difference, including 12% of companies in developed countries while respectively 4% and 5% in DCs.

- Service providers are the agrifood supply chain stage where most of the firms in the database work. Once again, there is a relevant difference between developed and DCs regarding the incidence of startups in this stage. In the first-mentioned cluster, this category accounts for 38% of startups. In the second one, this value increases

to 50%. Technology providers is a stage where many companies from both categories concentrate. In DCs, it represents 12% of the firms, and in those developed, 11%. A significant difference emerges in the food processing and retailers stages. Food processing companies are quite diffused in developed countries, encompassing 21% of startups, while in DCs, they have a more marginal role, including just 8% of firms. The retailer stage has an opposite trend, being an essential sector in DCs and almost irrelevant in developed. In the first-mentioned group, 14% of startups belong to this stage, while in developed countries, the incidence is just 5%.

4.1.3.2 Entrepreneurship in Sub Saharan Africa

When focusing on Developing SSA, many interesting findings emerge. First, the incidence rate of sustainable agrifood startups is significantly higher in this region than in the other three. In this area, 40% of the startups in the sample are sustainability-oriented, compared to 24% in developed countries and 17% in Other Developing outside SSA. This data demonstrates the importance of sustainability for this region and shows how it is deeply connected with the agrifood industry, as presented in Section 2.1.5. Moreover, it supports the motivation of analysing sustainable entrepreneurship in SSA as a relevant solution to spur sustainable development in the region.

The most addressed target by sustainable agrifood startups in Developing SSA is target 2.3, accounting for 21 startups out of 29 (72%). This value is significantly higher than in other DCs, where it settles at 44%, and Other Developed (17%). This result can be interpreted considering what has been said about the differences between developed and DCs. In fact, the agrifood industry employs a higher share of people in Developing SSA than in other developing countries, and the largest contributor to the industry is informal agriculture (OECD, 2016). Agriculture employs more than half of the total labour force, a large part of which is constituted by many small-scale producers from the rural population. Smallholder farms constitute approximately 80% of all SSA farms and directly employ about 175 million people, mainly in the informal sector (OECD, 2016). Thus, Target 2.3 assumes higher importance compared to the other regions of the world since increasing the agricultural productivity is required to satisfy the growing demand of the increasing population, and to ensure a decent livelihood for producers by increasing their income is fundamental (United Nations, 2019).

For what concerns the supply chain stage distribution, most of the agrifood startups from Developing SSA are service providers, accounting for 62% of the companies. The second most common stage is retailers, with an incidence of 13.5%. The same evidence highlighted for sustainability orientation applies to this dimension of analysis. While the service provider

stage is where most of the startups operate in each of the four clusters, in Developing SSA the startups distribution is more focused on them. In Other DCs, 46% of the sample firms are service providers, while in Other Developing this figure is equal to 38%. For what concerns the other stages, in Developing SSA and Other Developing the second one is retailers with an incidence rate of 13.5%. Eventually, it is illustrated that food processing is a crucial stage in other developing, accounting for 21% of startups in that sample. However, it is not as relevant in other developing, with an incidence of 9%, and even less in Developing SSA, where just 3.45% of startups are included in it.

4.2 The Findings of the Case Study to Address RQ2

This chapter presents the results of the case study performed to address RQ2: "What are the main barriers for SSA startups, and how are these companies addressing them?". The methodological approach followed is a multiple case study, and the subjects of the investigation are agrifood startups headquartered in Developing SSA. Their contribution has been complemented with the sector's experts to enrich the research with the knowledge of institutions working for sustainability in the agrifood industry. Three companies and three experts participated to the research through interviews. Sections 4.2.1, 4.2.2, and 4.2.3 describe the findings collected from the three startups and interpret the content provided by the experts related to them. Section 4.2.4 summarizes the results and presents (i) the model of barriers to entrepreneurship faced by agrifood startups in Developing SSA and (ii) the solutions they adopted to overcome them.

The information in the first three subchapters is structured as it follows.

- First, it is described the company under analysis, exploiting the data collected from both primary and secondary sources. Primary information stems from the transcription of the interviews guided through the questionnaire illustrated in Section 3.2.2.5. Secondary information was collected from companies' websites, social media pages, CrunchBase and other online resources. The social business model canvas was selected as a tool to display how they operate to present information through a well-known scientific framework.

- After describing the companies, the coding table related to the interviews is displayed, encompassing the information upon which the findings are drafted. This data has been collected according to the method described in Section 3.2.2.6: in the rightmost column of the coding table, there is the macro-category of the information, that in this chapter can be a barrier or a solution; in the second column from the right there is the group, considered as the typology of barrier faced by the company or for which a solution is provided; the third column from the right contains the quote of the interviewee; the last column from the right represents the code assigned to that information.

- Followingly, the data is interpreted to determine which barriers among those identified in the case studies are included in the group selected from the literature review and which do not. Moreover, the information analysed are compared with those provided by the experts to see whether the two actors are aligned.

- Eventually, the last section of these sub-chapters presents the solutions proposed by the startups to address the barriers they reported and compares them to possible solutions reported by the experts.

4.2.1 Farmshine

The first startup analysed is Farmshine. The company was created in 2017 by four founding partners: Luca Alinovi, Andrea Alinovi, Alessio Colussi, and Chris Mimm. It mainly operates in Kenya and has thirty employees. Farmshine is a service provider proposing a program to allow small farmers to sell their products in a structured way to large commodity traders, skipping intermediary steps to deliver and capture a higher share of value. It is a global agriculture platform where farmers, buyers and service providers can trade on mutually beneficial terms. The person interviewed to perform the case study was Luca Alinovi, one of the four co-founders. The interview was held on 2 December 2020 by remote, and it was realised in Italian to have a more fluent dialogue. Two interviewers from Politecnico di Milano took part in the call.

The firm identified an inefficient agrifood supply chain composed of many intermediary steps that do not add value to the final customer but significantly decrease the share of producers' value. This issue is explicated on the company's website as it follows: "There are over 8,000,000 smallholder farmers in Kenya, 40,000,000 in East Africa and nearly one billion around the world. Many of these farmers are unable to access fair prices on the global market. Although smallholder farmers often are the low-cost producers of a given crop, agricultural buyers prefer to trade with one seller rather than many individuals". Farmshine addresses this issue through a solution that blends digital technologies, people, and market knowledge.

When a farmer registers to Farmshine, a field agent records his/her data to create an initial structure of the profile, refined across time. The typology of information collected regards the quantity and quality of the land used, which crops he/she grows and through which techniques, the M-Pesa account (the most used mobile phone-based money transfer service in Kenya), and the GPS location, if possible. Then, the farmer proposes a soft offer, i.e., how much he/she thinks to produce for each crop and how much is willing to sell in the market, and registers it on the App. From this moment, the firm offers access to input providers, training, and agronomy consulting to enable its customers to grow high-quality harvests. This activity is crucial since to deliver high-quality crops to large commodity traders consistently, it is necessary that farmers located far from each other use good seeds and cultivation techniques. The techniques and

activities taught are selected from the buyers' needs to ensure that their products match them. During the growing period, the field agents survey farmers to collect information on which projections on when and where the harvests will be ready and how much production they will supply are made. These forecasts are exploited to program activities and establish how much to expect from farmers' production in different areas when the aggregating is done.

Meanwhile, buyers register to the platform and communicate the type and quantity of crops they want to purchase. Thus, the App becomes filled with information on both parties: on the supply side, the quantities provided by farmers, and on the other, the requested volumes, prices and quality specifications of large commodity traders. This data is accessible from both actors so farmers can see the offers buyers make and buyers a dashboard containing the production data that informs them about when and how much of each product will be ready. Once a farmer accepts a buyer's offer, the two parties sign a legally valid contract through the App, which both must respect. The agreement typology depends on the conditions established by the buyer (e.g., a contract farming agreement between a buyer and farmers which work exclusively for him/her for a fixed price set at the beginning, or a contract allowing farmers to work for many buyers at the same time paid by the quantities provided). The buyer can see how each farmer production is going through drill-in in the dashboard. In the case of productivity change, he/she can investigate the reason through the App. Therefore, the platform creates a trading ecosystem advantageous for both parties. Farmers can increase their income, develop a credit history (the App records the transitions), and ultimately become independent actors. Buyers can access a high-quality supply of crops at a lower price than from other channels, where the supply chain is extensively inefficient.

As mentioned before, the SBMC framework was used to investigate the company's business model in depth

Mission Values

The company's long-term goal is to create an efficient market environment where farmers can earn the highest possible income-producing crops sustainably.

Objectives

Farmshine has several medium-term goals, listed below.

- To increase the income of farmers.

- To transform farmers into independent economic actors.

- To transfer practical knowledge about farming and conservation agriculture.

To reduce the gender gap: 70% of Farmshine farmers are women and given that the M-Pesa account must be associated with the farmer signing the contract, the revenues from the sale of crops goes to them. In the middle term, women will be the ones with a credit score, becoming powerful economic actors.

Value Proposition

In Farmshine, the social purpose is strictly connected with their business activities, so the social and commercial value propositions are linked. However, we can still make this differentiation for specific objectives that the business pursues.

Commercial Value Proposition:

- Market Efficiency: eliminate several layers of intermediaries to connect low-cost producers directly with end buyers.

- Pooled Purchasing: aggregate farmers for favourable rates on seeds and other inputs, small loans, and crop insurance.

- Traceability: ensure traceability of farmers' production, improving both value chain transparency and farmers' access to markets and credit.

- Higher Value Crops: give large commodity buyers the possibility to access the supply of higher-quality crops at a lower price than that they would purchase from other channels.

Social Value Proposition:

- To safeguard the environment through the diffusion and application of climate-smart agriculture (CSA) techniques.

- Improving the livelihood of rural communities: a portion of the profits are invested in improving rural communities. These initiatives try to solve the financial and social constraints experienced by marginalised people earning two to five dollars per day.

Key Resources

The most critical resources for Farmshine are those listed followingly.

- The digital platform and the App.

- Their market and context knowledge.

- The network of farmers and buyers they created over time.

- The human capital.

- The trust they obtained in their sector.

Key Activities

The most crucial activities the company performs to deliver value to customers are listed below.

- Business registering: the collection of farmers' data by technical field agents is a crucial and delicate activity since it creates the initial structure of data upon which the predictions are made.

- Training: to teach the techniques and procedures is required to deliver a quality product sustainably.

- Quality Control: this step is performed both on-field and during productions' aggregation and ensures to deliver crops compliant with the standards established with large commodity traders.

- Aggregation and Logistics: to aggregate farmers' production, organise logistics and transportation is one of the core activities of Farmshine since it allows to disintermediate the supply chain and trade with large buyers through a structured approach.

- Commercial Activities: this cluster of activities include managing relationships with clients and marketing.

- Management of IT resources: technology is a principal feature of the solution provided by Farmshine, so managing and improving IT resources is crucial for running the business and scaling.

Channels

The main touchpoints through which Farmshine reaches its customers and beneficiaries are the App, and the technical field agents. The promotion channels are word of mouth between farmers in Kenya (WoM), local radio, and social media.

Cost Structure

The company's most relevant costs are the cost of personnel and the cost to manage the platform.

Non-Targeted Stakeholders

The most important external stakeholders for the company are impact investors, which provide the necessary capital to scale without imposing binding constraints on the business strategy, and local administrations that influence the company's environment

Customers and Beneficiaries

- <u>Customers</u>: the commercial customers of Farmshine are the farmers and large commodities traders.

- <u>Beneficiaries</u>: the beneficiaries of Farmshine can be distinguished in three categories.

    - Farmers, in particular women, that represent a large part of their crop producers.

    - The environment, that gains from the diffusion of CSA techniques.

    - Rural communities, benefiting from the investment Farmshine does for them.

Customers and Beneficiaries Engagement

Farmshine establishes direct relationships and personal assistance through the App with both farmers (direct relationships through the technical agents) and buyers.

Income

The revenue model of Farmshine is based on different sources of income:

- A fee from the crops sold over its platform.

- A licensing model for organisations that would like to use the Farmshine agriculture operating system to manage their field operations.

- Consultancy on business development.

- Use of the app for uses different from the agricultural industry. For instance, it is used by some customers for a micro-warehousing system.

Impact and Output Measures

The only impact/output measure used by Farmshine is the number of farmers using the service.

Figure 4.10 illustrates the SBMC of Farmshine

Mission Values		Objectives		
• To create an efficient market environment in which farmers can earn the highest possible income		• To increase farmers Income • To transform the farmer in an independent economical actor • To transfer practical knowledge about farming and conservation agriculture • To reduce gender gap		

Non-Targeted Stakeholders	Key Activities	Value Proposition	Customers and Beneficiaries Engagement	Customers and Beneficiaries
• Impact investors • Local administration	• Business registering • Training • Quality control (both on field and during aggregation) • Aggregation and logistics • Commercial activities (client relationship and marketing) • Management of IT resources	*Commercial* • To Increase the market efficiency by directly connecting low-cost producers with end buyers • To aggregate farmers production to obtain advantageous rates, small loans and crop insurance • To ensure products traceability, value chain transparency, and farmers' access to markets and credit	• Direct relationship through the field agents • Personalized assistance and tailored agribusiness advices through the App	*Customers:* • Farmers • Large commodities companies • Service providers *Beneficiaries:* • Farmers (particularly women) • The environment • Rural communities
	Key Resources • App/Platform • Network • Data • Technical field agents • Trust	*Social* • To safeguard the environment through the diffusion of CSA techniques • To improve rural communities' livelihood	**Channels** • App • Field Agents • Word of mouth • Radio • Social (young people)	

Cost Structure	Income	
• Personnel • Cost to manage and develop the platform	• Fee on the crops sold over its platform • Licensing of the app for external organisations • Consultancy	

Impact and Output Measurements
• Farmers using the service

Figure 4.10 - illustrates the SBMC drawn for Farmshine

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The second part of the questionnaire, following the analysis of the company's business model, is focused on identifying the barriers faced by agrifood startups in Developing SSA. Table 4.1 illustrates the coding table created after the interview with Luca Alinovi containing the information used to address the RQ2.

Macro Category	Group	Citation	Code number
Barrier	Trust	*"In these three years we have encountered a lot of difficulties in the face of reality, because both farmers and field agents try to cheat on you all the time. Here, everyone in the agricultural sector cheats on you, but if everyone behaved correctly, they would make a lot more money than they do. The situation is like the prisoner's dilemma: until you rebuild trust everyone tries to cheat by following self-interest. Thus, everyone tries to win in the short term, but everyone loses in the long-term"*	ABT1
Solution	Trust	*"What Farmshine does is to force the actors to play fairly since if you want to sign to the platform, you must make your activity transparent. Everyone knows everything about the others' activities, how much and from where they gain, from the farmers to the consumers"*	AST1
Solution	Farmers' lack of capital to invest	*"The other big change we want to promote is to transform a totally informal economy into a totally formal economy. Formalizing business benefits the poorest, since in the informal world he/she is a mister nobody, with no name or data, while in the formal sector he/she becomes a true economic actor, with an identity and a voice"*	ASF1
Solution	Farmers' lack of capital to invest	*"By formalising the business, you give farmers the ability to create a credit score, and access services and benefits which they did not have before"*	ASF2
Barrier	Farmers' lack of capital to invest	*"To build a credit history it is previously required to make farmers earn because if you cannot prove their ability to generate income, banks are not interested"*	ABF1
Barrier	Farmers' lack of capital to invest	*"We understood the ecosystem and we could theoretically offer all the services to farmers, but it makes no sense because if they do not have any money to invest, they will not be able to afford them, regardless of how low the cost is. Just 8% of the farmers can save money to invest"*	ABF2

Barrier	Trust	*"Our initial idea was that, thanks to our vast knowledge and experience, we could solve all the problems around the agricultural ecosystem. We wanted our App to be the backbone of change, but this turned out to be naive, as the system works well if you solve a single problem, while to generate an impact in all these areas you have to hope it triggers many other phenomena"*	ABT2
Barrier	Trust	*"The problem is that we have decided to solve the financial part, the problem of loans, access to inputs. It does not work because the main problem is a lack of trust"*	ABT3
Barrier	Access to market	*"We decided to stay small for the first two years and a half because we often realised that there was something we misunderstood. In fact, operating with actors from the informal sector, there are no data or a recorded history that explains how the market works"*	ABM1
Solution	Farmers' lack of capital to invest	*"We increase the efficiency of the supply chain guaranteeing the maximum gain to farmers and a low commercial price to buyers"*	ASF3
Barrier	Conservative environment	*"The biggest barrier was that there is no more conservative environment than that of agriculture. Thus, the biggest barrier was the culture"*	ABC1
Barrier	Farmers' lack of capital to invest	*"Before offering any service to farmers you must increase their profit because if a farmer has no money and lives in constant debt, it is impossible for him to take the following steps and become an economic actor capable of investing"*	ABF3
Solution	Farmers' lack of capital to invest	*"Our first priority is to make farmers earn so they will be able to purchase the inputs and services we want to propose them, once a relationship of trust is established"*	ASF4
Barrier	Trust	*"There is a general belief in our industry that if you screw others, you will earn more than doing the right thing. This belief is in both farmers and field agents, and it has been a big problem for the company to tackle, which has led to a large initial turnover"*	ABT4

Table 4.1 – The coding table of Farmshine

The primary information collected from the interview highlights that one of the barriers reported by the startup matches the initial framework. This finding suggests that the model created in the first phase of the research partially applies to the case, and other elements it does not include are significant for Farmshine. According to the interviewee, the most relevant hampering factors the company has faced are the lack of trust between actors in the agrifood supply chain, the industry's conservative environment, the lack of farmers' capital to invest, and the difficulties in accessing the market. Only the latter is in the group stemming from the

literature analysis, suggesting that the model may be incomplete. The **barriers** reported by Farmshine are analysed in the following part of the section, interpreting the quotes from the interview regarding each specific area.

Lack of trust between actors in the agrifood supply chain (ABT1, ABT2, ABT3, ABT4)

The interviewee stated that one of the most challenging barriers Farmshine has faced is the lack of trust between actors in the agrifood supply chain. Since the industry is mainly informal, there are no established norms regulating the relationships between actors, which made it possible for them to cheat on each other. This condition has meant that trust was not created among them over the years, and everyone acted in their interest to increase their earnings. Therefore, a general belief has been developed in the industry that by cheating others, one can gain a greater advantage than behaving correctly. The interviewee compared the situation to the prisoner's dilemma: the lack of trust pushes the players to pursue a win in the short term, but in this way, everyone loses in the long-term.

Farmshine encountered many difficulties dealing with this phenomenon that made the company reconsider its scope. The barrier manifested from the early stage of the firm's activity when the intent was to be the backbone of the change by simultaneously tackling the issues of providing access to finance and quality inputs to farmers. The founders thought that their vast knowledge and experience could solve all the problems surrounding the agricultural ecosystem. However, they realised that to rebuild trust is a priority that comes before starting to intervene in all these areas. Moreover, since this attitude is present in both farmers and field agents, another consequence was to drive a large employees' turnover in the first period, until the company created a trusted staff and customer base, after being cheated on several times by both the actors.

The conservative environment (ABC1)

According to the interviewee, the sector's conservative environment is the most significant barrier Farmshine encountered. This factor adds to the general lack of trust between actors in the value chain to increase the startup's difficulties in accessing the industry. Considering that the company exploits a digital platform business model, where to onboard the actors on both sides is one of the biggest challenges, to overcome this barrier assumes greater importance. In fact, when Farmshine started its activity, farmers did not want to join the project since they did not trust the innovation.

However, this determinant can be understood considering that subsistence farmers with no savings and no public protection are risk averse, as reported by infoDev (2014), and tend to cling to their traditional processes.

Farmers' lack of capital to invest (ABF1, ABF2, ABF3)

Farmers' lack of capital to invest represents a significant obstacle for agrifood

startups looking to them as customers. As Luca Alinovi stated, once Farmshine understood the environment, it could have offered any service to farmers, from business services to supplying inputs, but it would not have been successful. No matter how low the cost of a specific good or service is, if farmers cannot save part of their revenues, they could not afford it. As long as they have no money on hand and live in constant debt, they cannot take the next steps to become economic actors able to buy the products that startups want to offer. According to the interviewee, only 8% of farmers in their area can save money to invest, so increasing the profit by the remaining 92% becomes a priority action that must be done before offering any additional services.

Moreover, the difficulty in solving this problem also lies in the fact that it feeds itself. Considering that a large part of the agricultural sector is informal, most of those who work in it do not have a substantial income or cannot prove it. This condition precludes access to finance and other financial services for actors in the supply chain, not allowing them to make the necessary investments to increase productivity and income. Therefore, the very fact that their income is meagre and untraceable means that they cannot access those services to increase revenues and make their business formal.

Access to the market (ABI1)

Another obstacle that the respondent reported during the interview is the lack of information on the agricultural market. Since the sector is predominantly informal, little data explains how it works, and no history traces the actors' characteristics. This vacancy had a significant impact on Farmshine's access to the market and hampered its development. Not having the required information available led the company to redo its solution many times since after creating a version of the product, it later discovered that it was not suitable for its customers. Easy access to the data that describes the market characteristics facilitates companies to be aligned with it, allowing them to seize opportunities quickly while efficiently developing consistent solutions. Therefore, in the absence of this information, enterprises find it more difficult to access markets during their development, especially in the early stage.

The issue faced by startups of lacking the information to access the market is also reported by Ritta Sabbas Shine, Country Support manager in SUN Business Network and one of the expert interviewed that stated: *"To increase SMEs access to market research or intel around a specific product or market would make it easier for them to make business decisions […] To make market intel available would allow SMEs to understand where profitable business opportunities lie"*. This is precisely the case of Farmshine. Due to the non-availability of market information, the company was forced to rebuild from scratch its solution many times. In fact, as it developed a better knowledge of the environment, new information on farmers emerged, which forced the firm to modify its model in order to adapt to them.

The last aspect investigated by analysing the information collected from the primary sources concerns the **solutions** that Farmshine has adopted to address some of the barriers identified. During the interview, the respondent reported solutions that Farmshine has implemented to solve the lack of trust between the agricultural supply chain actors and the lack of funds to invest by farmers. No specific solution has been provided for the conservative environment and the lack of access to market information. In any case, for these two barriers, the interviewee explained how the company addressed them. Regarding the first, to overcome the conservative environment, it was necessary to demonstrate over time that the service offered by the company brought value to farmers, who once conquered became the first promoters of the company, speeding up Farmshine's insertion. To manage the lack of information on the market, the startup adopted the strategy of keeping a small size and staying off the radar until it could create and validate a solution appropriate to the context. From that point, it decided to scale to minimise the impacts of previous failures.

Lack of trust between actors in the supply chain (AST1)

The lack of trust among the agrifood sector players was an initial stumbling block for the company, which realised how it had to recreate it before developing a system that would solve the problems inherent in the sector. What Farmshine does in order to build it is to force the actors to play legally: if a farmer or a buyer wants to sign to the platform, it must accept to make its activity transparent. In fact, all the information regarding productivity and sales prices are visible to the subscribers to the platform through the App. Everyone knows everything about others' activities, how much and where they earn, from farmers to consumers. Furthermore, the contracts signed between the two parties through the App have legal validity, so there is no possibility of defrauding others. The actors accept this condition as Farshine acts as a trusted third party who ensures that the conditions are maintained, and they see their earnings increase compared to when they were out of the system. Thus, Farmshine demonstrates that by behaving correctly within an efficient system, everyone can get more than they would otherwise and drives a cultural change within its supply chain.

Farmers' lack of capital to invest (ASF1, ASF2, ASF3, ASF4)

The other significant barrier to business development for which Farmshine provides a solution is the lack of capital to invest by farmers. As most of them cannot save money from their activities, the inputs and services that Farmshine can offer are limited. To solve this problem the startup acts in two directions:

- Improving the supply chain's efficiency: This solution is at the core of Farmshine value proposition and how it has been implemented is described in detail earlier in the chapter. The company has identified that the agrifood supply chain comprises many intermediary steps that do not add value to the final customer but significantly reduce the share of revenues obtained by producers. To solve this issue, the firm developed a distribution program that skips all these steps by aggregating the small farmers'

production and then selling it directly to large commodity traders. In this way, it is possible to transfer a more significant part of the revenues to producers. Once they improve their condition and save some money to invest, Farmshine can offer them complimentary services. Thus, the platform's customers can become independent economic actors while Farmshine manages to find a way to successfully offer other services that they could not afford before, pursuing mutual growth.

- <u>Formalisation of an informal market</u>: the other significant change that Farshine wants to spread is transforming an almost informal sector into a formal one. Formalisation would benefit the poorest actors, giving them an identity and data about their business that they did not have before. By formalising the business, farmers can create a credit score to access services and benefits they did not have before.

The importance of addressing this lack of farmer's fund to invest is recognized by Debisi Araba too, the managing director of the African Green Revolution Forum and one of the experts included in the research. During his interview he stated that: *"In the context of SSA a very important concept is that of Market-Creating Innovation: innovation addressing the problem of non-consumption, where you know that the services are required but they're either unaffordable or too expensive"*. In the case of Farmshine, the company noticed that farmers need to have access to services and quality inputs, but they have no funds to invest. Therefore, it tries to solve this issue by increasing farmer's revenues so that they will be able to purchase additional products and services through the platform.

In his interview, Debisi also emphasised the importance of creating a digital ecosystem for formalising the agricultural market: *"Creating a digital ecosystem means creating a digital history of transactions. In the near future, farmers in the informal sector will be able to access credit because they will have a credit profile, and a history of transactions"*.

4.2.2 Moringa Wave

The second sustainable agri-food startup included in the case study is Moringa Wave, a food processing company founded in 2016 by Franco Emilio Risso and Vonymshaingo R. Ramaroson. The company's primary market is that of Madagascar, but it also exports to other countries such as Reunion, Mauritius, Rodrigues, South Africa, Europe (mainly France) and the United States. The company has six full-time employees plus other seasonal employees, which varies from four to eight, depending on the amount of work.

Moringa Wave is a social enterprise specialized in the processing, distributing, and selling of products derived from Moringa, a tree that provides a highly nutritious food source. The entire production process is settled in Madagascar, mainly hiring young and female operators. The company has chosen not to grow the raw material directly but has selected a small cooperative of producers from which they source it through a contract farming model. The person interviewed to carry out the case study was Franco Emilio Risso, one of Moringa Wave

founders. The interview was held on 26 November 2020 by remote, and it was made in Italian to ease the discussion. Two interviewers from Politecnico di Milano took part in the call.

The problem the company is facing is malnutrition, a terrible plague in Madagascar. According to the most recent data provided by the FAO, the country is among the poorest in the world, and the percentage of people suffering from malnutrition is around 42%. The company declares its mission on its website, which states: "*Madagascar is the sixth country on earth with the worse child malnutrition rate. One out of every two children suffer from chronic malnutrition. Nowadays, nine out of ten Madagascan people live in poor conditions. It is for this reason that we launched our project. Starting with the packaging, all our products are made on-site*".

Moringa Wave does not own land or plantations but purchases the raw materials required directly from a small cooperative of producers, selected with NGOs' support. Therefore, the company can improve the local economy and stimulate an economic multiplier effect by providing income-generating activities within rural communities. The firm has made a great effort to build and develop a business ecosystem around Moringa and created an industry that did not previously exist in Madagascar before its arrival. The whole process is geared towards respecting the environment. For this purpose, a training program for Moringa producers has been launched focusing on natural cultivation methods without the use of chemicals. Moringa Wave provides all the necessary equipment to ensure that each producer can work in the best possible conditions. The quality control system is tight and extends from before harvesting to the finished product packaging through all stages of transformation.

In addition to supporting the local economy, Moringa Wave promotes a series of educational activities on both producers and consumers in Madagascar, collaborating with the National Department of Nutrition (ONN), the national agency that manages all nutrition programs. Moreover, in line with its commitment to fight malnutrition, the company provides moringa-based meals in schools. As for the company's SBMC, the elements that make up this framework are listed below.

Mission Values

The mission of the company is to contribute to ending the problems of malnutrition and poverty in Madagascar.

Objectives

The middle term goals of Moringa Wave are (i) to promote the production, distribution and use of the moringa oleifera and its derivatives according to the social economy and fairtrade criteria, and (ii) to create an industrial ecosystem advantageous for the local population.

Value Proposition

The value proposition of the company can be divided into a commercial and social value proposition.

Commercial

- Provide a superfood that can be a significant source of low-cost nutrients. Moringa Wave proposes itself as the founder of a Moringa market in Madagascar, able to provide a trusted product with a higher quality level than its competitors.

Social

- To support the local economy through a production process entirely settled in Madagascar, it employs mainly young and women and distributes the product according to the social economy and the Fairtrade criteria.

Key Resources

The most critical resources for Moringa Wave are those listed below.

- The human capital and competences of its employees

- The network of partner farmers that the company has been able to create over time

- The public-private sector partnership it has established, a fundamental asset that has allowed the company to know in depth the environment in which it operates

- The brand, a crucial resource for the Madagascar market, where Moringa Wave was the first producer of Moringa-based foods in the region.

Key Activities

The key activities of the company can be divided into upstream and downstream activities. The essential upstream activities, focused on the farm's farmer network, are production and quality control, training and traceability. On the other hand, the downstream activities include the firm's commercial and marketing side and the logistics processes.

Channels

The company sells its products in Madagascar in local stores, while international distribution occurs through the Fair-Trade Movement. The Fair-Trade Movement is a sustainability-oriented trade agreement, defined in 2018 by the International Fair-Trade Charter: *"Fair Trade is a business partnership, based on dialogue, transparency and respect, which seeks greater equity in international trade to sustainable development by offering better trade conditions and guaranteeing the rights of marginalized producers and workers, especially in the South. Fairtrade organizations actively engage with consumers, support producers, raise awareness and in the campaign to change the rules and practices of conventional international trade"*.

The main promotion channels are Word of Mouth, fares, Social Network, and PR ambassador, a channel used mainly for the promotion in Europe.

Cost Structure

The company's main cost elements are the purchase of the raw materials from its network of farmers and the labour cost.

Non-Targeted Stakeholders

The most important stakeholders of Moringa Wave are those below.

- NGOs that collaborate with the company to identify and scale the network of producers

- The cooperatives of producers that supply Moringa, which is subsequently transformed into derivative products for sale

- The National Department of Nutrition (ONN), a Moringa Wave partner in the food-oriented educational activities it carries out.

Customers and Beneficiaries

Commercial: Moringa Wave's commercial customers are (i) retailers, (ii) school canteens, (iii) companies offering Moringa-based products in their canteens and (iv) NGOs.

Beneficiaries: it is possible to distinguish between direct and indirect beneficiaries of Moringa Wave.

- The direct beneficiaries are the producers of Moringa and the people who use the product.

  - Moringa Tree Farmers: Before the arrival of Moringa Wave, there was no Moringa industry in the area, so the company created jobs and provided a new income source for farmers.

  - Consumers with poor access to food: Consumers of the product are also beneficiaries as they had access to a low-cost, nutritious food source they previously did not have.

- The indirect beneficiaries are the women of the rural community and the environment.

  - Rural community women benefited from training and work. This impact generated by the company was born out of necessity: before Moringa Wave, no one in Madagascar considered the Moringa tree a source of value, and the men of the community did not trust the company. The only ones interested in the project were women, who received a training process and a job in exchange.

- Environment: Moringa Wave adopts a zero-waste circular economy policy and does not use chemicals or pesticides, as evidenced by the company certification as a producer of organic products that it has obtained. Furthermore, in Madagascar, there is a problem of deforestation to produce coal. Moringa Wave has decided to protect the forests by placing Moringa trees near them. In fact, the Moringa tree is grown through agroforestry, and people stop cutting trees near the areas where it is grown because they recognize its value.

Customers and Beneficiaries Engagement

Moringa Wave establishes direct relationships with its customers and the farmers producing the Moringa.

Income

Moringa Wave only source of income is the sale of Moringa derivatives. It adopts a two-prices policy: full price to retailers and subsidized price for NGOs.

Impact and Output Measures

The indicators used by Moringa Wave to measure its impact are related to the output produced. They are the number of producers in the network and the quantity of material acquired.

Figure 4.11 shows the SBMC drawn for Moringa Wave

Mission Values			Objectives		
• To contribute ending malnutrition and poverty in Madagascar			• To promote the production, distribution and use of the moringa oleifera and its derivatives according to the social economy and fair-trade criteria • Create an industrial ecosystem advantageous for the local population		

Non-Targeted Stakeholders	Key Activities	Value Proposition	Customers and Beneficiaries Engagement	Customers and Beneficiaries
• ONGs • Small cooperative of producers • National Department of Nutrition (ONN)	• Production and quality control • Training • Traceability • Marketing • Logistics	*Commercial:* • To sell a quality superfood at low cost. Moringa Wave was the first company commercialising the Moringa Oleifera and to create a community around this product *Social:* • To support the cultural growth in the training and employment process, particularly for young people and women. • Support to the local economy: the entire production process is settled in Madagascar by mainly hiring young and female operators. • The distribution all over the world is driven by the fair-trade movement	• Direct relationships **Channels** • Fair Trade Movement • Word of Mouth • Social network • Exhibitions • PR ambassador	*Customers:* • Retailers • School cafeterias • Company canteens • NGOs *Beneficiaries:* • Producers • People in Madagascar who suffer from malnutrition • Women of the rural • Environment
	Key Resources • Human Capital • Producers' network • Private-public sector partnerships • Brand			

Cost Structure		Income	
• Raw materials • Labour cost		• Sale of their products	

Impact and Output Measurements
• Number of producers in the network • Quantity of raw material acquired

Figure 4.11 - The SBMC of Moringa Wave.

To enter the details of the results obtained from the research on Moringa Wave, table 4.2 is shown below, which illustrates the coding table developed from the interview performed. The information presented is then analysed to provide an interpretation of the results of this case.

Macro Category	Group	Citation	Code number
Barrier	Conservative environment	"When the society was created nobody knew about the plant, and when we went to talk with the men they were not interested, because they had other activities to do, and they did not trust us".	FBC1
Solution	Conservative environment	"We were able to involve young women who had more time available, more confidence in the project and saw it as a not full-time activity but as something that could integrate other things to increase the family's salary".	FSC1
Barrier	Access to Finance	"One of the biggest issues was the economical aspect. Not having the necessary funds to make useful investments for the company has slowed down our development".	FBA1
Barrier	Access to market	"It is not easy to ship from Madagascar to Europe due to customs duties, tariffs, VAT, and other regulations".	FBM1
Barrier	Access to market	"Madagascar is off the main trade routes. Whenever it is necessary to export by sea, the route goes from Madagascar to Mauritius, from Mauritius to Cyprus and from Cyprus to France. All these steps increase the price. The same goes for air traffic. In Madagascar there are only 3 airlines that do cargo".	FBM2
Barrier	Access to market	"Logistics is a problem from both a legislative and an infrastructure point of view: the legislative part, however, is an obstacle that, once overcome, never reappears, infrastructures, on the other hand, are used for every order".	FBM3
Solution	Access to market	"Our collaboration with the no-profit sector allowed us to identify the right area where to expand and the people to contact. This collaboration has been crucial for us and enabled a consistent and constant growth".	FSM1

Table 4.2 – The coding table of Moringa Wave

By analysing this coding table, it is possible to notice that two of the respondents' three barriers are included in the initial framework. Indeed, access to finance and access to market are encompassed in the set of barriers identified in the literature. Therefore, the model developed at the beginning of the research is partially applicable to the case under analysis, as it contains all the barriers reported by the interviewee except for one. The conservative environment represents this unforeseen barrier, a factor found in the previous case concerning Farmshine too. To better clarify the link between the interviewee's answers and the results regarding RQ2, an interpretation of the content of his interview concerning the **barriers** to entrepreneurship is provided

The conservative environment (FBC1)

The conservative environment hindered the firm's entry into the market in the context where the company operates. As previously described, before the foundation of Moringa Wave, no industry revolved around Moringa in Madagascar, and a significant challenge it had to overcome was to create this ecosystem from scratch. An obstacle for this task has been the lack of trust people had in the project. Initially, they did not know nor trust the company, or they have other activities to do. This condition has increased the difficulty to find partners and employees available to work with Moringa Wave, and it has been a relevant stumbling rock to deal with.

Access to finance (FBA1)

Difficult access to finance is a factor that has slowed the development of Moringa Wave. At various times in its life, the company found itself deprived of the necessary capital to make the investments required to grow. Having to rely solely on its revenues to scale, Moringa Wave has repeatedly had to postpone investments that could have increased productivity and development, which has led to a slowdown in business growth.

Access to market (FBM1, FBM2, FBM3)

Access to the market represents an important barrier for Moringa Wave, hindering its expansion to foreign countries. The interviewee pointed out two aspects influencing this phenomenon: export regulations and the distance from major trade routes.

Export regulations make the company lose competitiveness by significantly increasing the difficulties and price of trading goods outside the country. When shipping from Madagascar to Europe, the company has to deal with a maze of norms, and besides, products' cost rises due to customs duties, tariffs, VAT and other regulations. Due to these norms, expanding the business beyond regional borders becomes particularly onerous, hampering Moringa Wave's development.

Moreover, the enterprise suffers from being cut off from the major trade routes, which significantly impacts logistics. As reported by the interviewee, to export products from Madagascar to France by sea, where the company has the largest market in Europe, the path goes from Madagascar to Mauritius, Mauritius to Cyprus and finally from Cyprus to France. These

steps increase the consumer's price and the delivery time to send the goods, decreasing the firm's competitiveness. The same goes for air traffic: there are only three airlines in Madagascar that make cargo, widening the time and cost to send products. To conclude Moringa Wave's analysis of RQ2, we looked at how the company has addressed these barriers. about access to finance, infrastructure and the regulatory framework, the company has not developed general solutions, but has tried to adapt to continue growing despite these. The lack of access to finance has led Moringa Wave to self-finance and to seek additional funds by participating in tenders and competitions for startups. To offset the export price increase due to various regulations, the company has created a registered office in France. Finally, given that the problem related to infrastructures is difficult to solve by a startup, but concerns the country's development, it has not been able to contribute to breaking down this barrier, which continues to be a pressing problem, especially for exports.

Ritta Sabbas Shine and Denis Treau also report the regulatory problem when moving products out of the national borders. Dennis Treau worked with Seeds&Chips to organise their African division and founded and manages his non-profit organization, Okapia. The experts highlight how export regulations increase costs of trading with foreign countries and represent a stumbling block for companies that want to interface outside their nation. During their interview, Sabbas Shine explained that: *"If a company wants to produce in a country and then moving the product to another country there is a tax to pay which makes the price grow until becoming uncompetitive",* while Dennis states: *"A significant barrier that companies face regards the absence of agreement about the free movement of goods. In many SSA countries if you want to move or sell a product outside the national borders you have to deal with a maze of regulations and pay fees that make your cost levitate".*

To conclude, the **solutions** proposed by the company to overcome the conservative environment and access the market are shown below.

The conservative environment (FSC1)

At the beginning of Moringa Wave activity, men in the community were not interested nor trusted the project. Thus, the company decided to turn its attention to young people and women. Indeed, they had more time available, more confidence in the project and the prospect of working not full time but integrating other activities to increase the family's salary. This approach made it possible to create the company's first base of collaborators, leading to developing a winning project. Therefore, this solution proved to have a double value, improving both the commercial side of the business and its social impact. While it has allowed the company to enter the sector and develop, it has also positively affected the community, empowering women and creating development opportunities for the rural communities.

Access to the market (FSM1)

A problem highlighted in the initial set of barriers to which Moringa Wave offers a

potential solution is to access the market. Even if the company encounters several problems for exporting to foreign countries, accessing the domestic market has been relatively smooth thanks to its partnerships with the non-profit sector. The interviewee stated that thanks to the collaboration with these players, he managed to select the most suitable areas to locate the business, and he got in touch with potential partners. Therefore, this market knowledge has allowed the company to grow steadily in the internal market.

The importance of these actors is recognized by Debisi Araba: *"The burden does not just lie with the government and private sector, but you also need to involve civil society organisation, which can provide data and information. They are very critical in this entire ecosystem"*. As the expert says, civil society organisations play a primary role in entrepreneurship in sub-Saharan African countries, as they can be critical partners for the private sector. The knowledge they have of the context's condition and the social environment can compensate for the informal sector's lack of official information. Therefore, to collaborate with non-profit organisation can favour the insertion and development of new companies.

4.2.3 Seekewa

The latest sustainable agri-food startup included in the case study analysis is Seekewa. The company is a service provider founded in 2018 by Fred Zamble and his brother Serge. It has five employees and works exclusively in Côte d'Ivoire, focusing on the country's central and western part. Seekewa is a digital platform that adopts a hybrid business model that combines the crowdfunding scheme with a marketplace for fresh products. The firm aspires to create a participatory platform that helps small farmers in Africa access all the resources they need to carry out their projects and sell their products within e-commerce. The interviewee for this case study was Fred Zamble, one of the two founders of the company. The interview took place remotely on December 14, 2020 and was carried out in English. Two interviewers from the Politecnico di Milano participated in the call.

The company wants to address the lack of access to finance that prevents small farmers from developing their projects, especially in rural areas. The approach it follows differs from loans provision, as it aims at directly supply farmers with the goods and services they need. On the company's website, this objective is explained: *"At Seekewa, we believe that donations or loans of money to very low-income farmers are not effective solutions to help them develop their projects"*. Rather, it is by providing them directly with goods and services obtained at the best market price, payable on appropriate terms and conditions, that it will be possible to maximise the value they derive from their activities"*.

Seekewa has identified crowdfunding as an opportunity for small farmers, as this financial revolution that is spreading around the world is not currently being exploited by them. The initial idea of the founders was to create a crowdfunding platform for small farmers. Still, in Côte d'Ivoire the regulation prohibits money lending by any economic actor without a banking

or financial license. This ban makes it nearly impossible for a startup to create a crowdfunding platform, so they had to reinvent their model to go beyond traditional crowdfunding. To do so, Fred and his brother Serge have developed a point-valued electronic voucher system to directly provide farmers with the resources they need (goods and services) instead of lending them the money to acquire them.

Additionally, noting that consumers have become more aware of what they eat, they have decided to incorporate the farm-to-fork model through a fresh food marketplace into the platform. Seekewa acts as a trusted third party connecting three different members of the platform:

- Supporters who want to maximise their funds' impact (they can be individuals or organisations around the world).
- Farmers who gain access to the resources needed to develop projects.
- Consumers who can buy quality local products at a fair price.

The voucher system works as follows:

1. The supporters can purchase electronic vouchers valued in points.
2. Through these vouchers, they can purchase the goods and services required in the project they want to finance. Resources purchased through supporter points are not donated to farmers but sold at a cost price. Investors are paid on terms ranging from one to 12 months.
3. The supporter can select the project to invest in by distributing points. This division allows Seekewa to attribute the money received from the vouchers between projects. Each of these projects has been previously evaluated by Seekewa before being exhibited on the platform.
4. When a project reaches the set amount, Seekewa acquires all the resources to develop it, and the project begins.
5. As the project progresses, the supporter can monitor it through Seekewa's dashboards and the company's notifications.
6. As soon as the harvest is ready, Seekewa buys all the produce, pays the agreed amount to the farmer and reimburses the supporter.

7. At the end of the project, the supporter can decide to collect the equivalent of the points or assign them to other projects.

In this way, it is possible to satisfy both the needs of farmers and those of supporters by exploiting the points-distribution system. The platform, therefore, leverages the farm-to-table model to incentivise supporters by giving them priority access to products and special discounts. The greater the amount invested, the greater the discount received. The discount system works differently for the business-to-business (b2b) channel, where organisations purchase e-vouchers. They are unable to activate the discounts themselves, but they can select

what are called affiliates. Depending on the number of vouchers they buy, companies acquire a certain number of affiliates, which they can select among their employees, school canteens, hospitals, restaurants etc. Then, the organisation communicates to Seekewa its affiliates, and the platform has to sell them food at their discount. This distribution system constitutes an essential network. One plan for Seekewa's future is to strike a deal with the large retailers to sell the remainder of the harvest through them.

Regarding the SBMC made for Seekewa, the next part of this sub-chapter shows the blocks that constitute the tool.

Key Resources

The most important resources for the company are its human capital and the platform.

Key Activities

The most crucial activities for Seekewa to deliver value to its customers are the following.

- The evaluation of the projects that are selected for funding: this activity is essential to maximise the impact generated, allowing the most promising farmers to grow

- Project execution and monitoring: this activity is at the core of Seekewa as it ensures the completion of projects and the reimbursement of supporters.

- Marketing of the initiative: since Seekewa adopts a platform business model, the network gives a significant portion of the value, and it is important to attract customers on both sides to scale.

Channels

Seekewa reaches and connects its customers through the platform. Coaches support small farmers, young people in rural areas who help Seekewa implement and monitor projects. As for the distribution channels, the company mainly uses Social Networks and WhatsApp to directly sell fresh food. Affiliates are another important channel used by the company as an actor involved in distributing its products. When an organisation buys e-vouchers, it cannot activate the discounts by itself, so it has what are called affiliates: instead of directly exploiting the discounts, they can select other actors (such as employees, school canteens, hospitals, restaurants, etc.) to whom Seekewa has to sell food with their discounts.

Cost Structure

The highest costs for the firm are labour costs and the management and scaling of the platform. Operational costs occur when assessing projects and marketing crops.

Value Proposition

Commercial: The value proposition that Seekewa presents to its consumers is to provide the best experience in terms of farm-to-table products and quality products available in urban areas. Simultaneously, it helps farmers increase their income and provides them with access to the best services and goods they need. Plus, he offers them a little insurance and a phone to make sure they are financially included.

Social: Seekewa's social value proposition can be summarised in the following points.

- To contribute to youth employment in rural areas: 50% of the Seekewa platform projects are reserved for people between eighteen and forty. In this way, they have the opportunity to become modern and successful agricultural entrepreneurs.

- Help women in rural areas lacking access to land and credit by providing them with the opportunity to carry out agricultural projects independently and responsibly. To this end, Seekewa has established that women must lead 70% of published projects.

- Micro-investments to improve the living conditions of the rural population: Seekewa has a close relationship with rural communities and collects their needs to look for a financing partner among its sponsors and strategic partners to help them solve them.

Non-Targeted Stakeholders

The most important stakeholders for the company are:

- Service providers that perform transportation and other mechanical activities (mechanisation stakeholders).

- Coaches.

- Educational and health startups.

Customers and Beneficiaries Engagement

- The commercial customers representing the supporters of Seekewa are individual consumers and organisations. On the other side of the platform, the supply side, there are farmers.

- The beneficiaries are poor small farmers making 1.25 dollars per day and owning less than 1 hectare of land, vulnerable people in urban areas, women in rural communities and the environment.

Income

The primary source of income for Seekewa is the revenues from the platform.

Mission Values

Seekewa has multiple mission values that are listed below:

- To contribute to achieving food security for the most vulnerable part of the population.

- To improve the livelihood of poor farmers.

- To achieve gender equality.

Objectives

The middle term objective of Seekewa is to allow farmers to develop their projects by providing them with access to credit, services and inputs.

Impact and Output Measures

No indicators emerged during the interview

Mission Values			Objectives	
• To achieve food security for the most vulnerable part of the population • Improve the livelihood of poor farmers • Gender Equality			• Allow farmers to develop their projects by providing them with access to credit, services and input • Increase youth employment and support women's projects in rural areas	
Non-Targeted Stakeholders • Mechanization Stakeholders • Educational and health startups	**Key Activities** • Assessment of the project • Found raising • Execution and Monitoring with the farmer • Marketing all of this **Key Resources** • Human Capital • Platform	**Value Proposition** *Commercial:* • To provide the best products and farm-to-table experience to consumers in urban areas • To increase farmers' income and provide them with access to the best services • To increase farmers financial inclusion *Social:* • Support the projects of women in rural areas • Contribute to youth employment in rural areas • Improve rural communities' livelihoods through micro investments	**Customers and Beneficiaries Engagement** • Direct Relationships with farmers included in the platform • Tailored but automatized interactions with customers through the App **Channels** • Platform • Coaches • Social networks • WhatsApp • Affiliates	**Customers and Beneficiaries** *Customers* • Individual consumers • Organisations • Farmers *Beneficiaries* • Poor small farmers • Women in rural communities • Vulnerable population in cities • Environment
Cost Structure • Operational costs for assessing the project and marketing the crops • Labor costs • Management and development of the platform			**Income** • Revenues form the platform	
Impact and Output Measurements				

Figure 4.12 illustrates the SBMC of Seekewa containing the elements described in the previous paragraphs.

After analysing the SBMC of Seekewa, this section illustrates the findings obtained from the interview with Fred Zamblè concerning the barriers to entrepreneurship and the solution adopted to overcome them. Table 4.3 presents the coding table for Seekewa, and the results illustrated are analysed followingly in relation with the elements of the RQ2.

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Macro Category	Group	Citation	Code number
Solution	Regulatory Framework	"We created a hybrid model: not just a crowdfunding platform but also a marketplace for fresh food. Seekewa is a digital platform that keeps the crowdfunding model, but it does not make direct crowdfunding, it uses a system of voucher"	ZSR1
Barrier	Regulatory Framework	"We wanted to create a crowdfunding platform for small farmers, but in West Africa startups are not allowed by the law to work in the crowdfunding area (you must be a bank or financial institution)"	ZBR1
Barrier	Infrastructures/ Regulatory Framework	"In our environment there are not important and developed infrastructures or supporting policies "	ZBI1
Barrier	Infrastructures	"Infrastructures represent a significant obstacle since the regions where we operate are far and off the grid, that means no access to internet "	ZBI2
Solution	Infrastructures	"Given our environment, we must adopt offline applications"	ZSI1
Solution	Access to Finance	"We are included in an accelerator program that constitutes our main channels for obtaining funding"	ZSA1

Table 4.3 – The coding table of Farmshine

Examining the data in the coding table shows that both the barriers that emerged from Seekewa fall within the initial framework. Since the regulatory framework and the infrastructures are part of the model deriving from the literature, in this case it can be considered valid. Interestingly, the two **barriers** identified have been found in the previous case too, during the Moringa Wave analysis, further confirming the importance these factors have for entrepreneurship in Developing SSA. In this interview no new determinants emerged, and the two reported are investigated by interpreting the contents of the interview in the following paragraphs.

Regulatory Framework (ZBR1)

The regulatory framework represented a significant obstacle for Seekewa, which prompted the company to create its particular business model. As previously explained in the SBMC description, Seekewa aims at improving access to finance for small farmers through crowdfunding. Since Côte d'Ivoire is not possible to lend money without a banking or financial license, startups outside the financial sector are precluded from developing this business model.

The need of the regulatory framework to be aligned with new innovations brought by companies is highlighted by Debisi Araba. In his interview, he stated that *"The area where we (AGRF) should focus the most is innovation in public policy. In the private sector ideas are flourishing, while the public policy sector has yet to catch up, there is not much innovation in it, as far as the agri-food sector is concerned"*. Seekewa's case is undoubtedly an example of this, as the company has faced several obstacles due to the country's regulation regarding crowdfunding. The firm developed an innovation, but public policy has not catch up to support it yet.

The regulatory framework constitutes an important barrier for Ritta Sabbas Shine too. The expert's perspective is more concerned with how policies affect a business's creation than their match with the innovation in the private sector. According to her, the regulations an enterprise in the agrifood sector must adhere to are complex and burdensome. Moreover, founders are often unaware of them, making entrepreneurship problematic. In the interview, she stated: *"A policy constraint for agrifood SMEs is the regulatory framework: for many agrifood products, there is a maze of legislation that you need to adhere to. It is very costly to adhere to them, and SMEs do not often know where these policies are"*.

Infrastructures (ZBI1, ZBI2)

Another barrier Seekewa has had to contend with is infrastructure. In particular, the company refers to the lack of access to reliable and diffused IT infrastructures. Since the farmers included in the firm's projects operate in rural areas, far from those more developed, they are cut off from the grid. This issue is particularly relevant, considering that Seekewa operates a digital platform business model, and having actors that participate in the platform cut off from the networks is particularly problematic.

Poor infrastructures represent a problem for companies in SSA also according to Dennis Treau. The expert underlined the importance of logistics infrastructures, stating that their low diffusion represents a limit for SSA companies, increasing distances and hindering relationships between them. In particular, he referred to this topic during the interview as it follows: *"In SSA, the lack of adequate logistics infrastructures increases the distances between countries and creates a proximity gap. Thus, the transportation of goods across countries is risky and time consuming, limiting the trades"*.

After listing the barriers that Seekewa encountered during its development, it is interesting to analyse its **solutions** to overcome them. As for Moringa Wave, the company has not been able to change the infrastructure at its disposal but adapted to live with those available. What has done is to create a part of the App (used by farmers) that worked offline, as in the areas where they are located, there is no Internet connection. Even if access to finance has not been highlighted as a barrier that Seekewa faced, the interviewee reported a possible solution regarding this problem. Since this barrier belongs to the initial set identified in the literature and has been detected in Moringa Wave too, it was decided to include it in the review

of the solution disclosed by Seekewa.

Regulatory Framework (ZSR1)

The solution that Seekewa has implemented to overcome the barrier represented by the regulatory framework constitutes the company's business model itself. As described during the presentation of the SBMC, the regulations in Cote d'Ivoire prevented the firm from carrying out the traditional crowdfunding model. Thus, instead of providing the money to buy the necessary resources for realizing farmers' projects, the enterprise developed a different business. Seekewa devised a system of vouchers with which to supply goods and services directly. Anyone wishing to support the small farmers' projects listed on the platform can purchase these vouchers to distribute points to projects, based on which Seekewa establishes where to invest in.

Access to Finance (ZSA1)

Accelerator programs represent an interesting solution that the interviewee indicated as a channel to obtain funding. These programs can be of great value for startups, considering their difficulties in directly accessing finance in Developing SSA. Thus, they can take advantage of this solution to grow both in terms of capital and skills.

4.2.4 Cross Case Analysis: The Barriers and Solutions Identified

To conclude the case study analysis concerning RQ2: "What are the main barriers for SSA startups, and how are these companies addressing them?", this chapter builds on the barriers presented in the previous sections to compare them with the model developed from the literature. The investigation aims to understand if the initial framework applies to the SSA context by highlighting which elements reported in the case study are included in it and which are unforeseen. The final result consists in identifying a group of barriers to entrepreneurship particularly relevant to Developing SSA. Finally, interviewees' solutions that may help SSA startups to overcome some of the identified stumbling stones are presented.

All the barriers indicated by the initial model have been faced by one or more startups and reported by the experts, suggesting the framework's validity for companies operating in Developing SSA. The framework developed in chapter 2 includes four elements: access to market, access to finance, infrastructure and the regulatory framework. All these factors have been reported by the interviewees representing the three companies.

- Infrastructure has been reported by Seekewa in quotes ZBI1 and ZBI2, and by Dennis Treau.

- Market access was reported by Farmshine and Moringa Wave in quotes ABM1, FBM1, FBM2, and FBM3, and by Ritta Sabbas Shine.

- The regulatory framework was reported by Seekewa in the quote ZBR1, and by Ritta Sabbas Shine.

- Access to finance was reported by Moringa Wave in the quote FBA1.

However, in light of the results obtained, even if the three startups validate the barriers included in the initial framework, other elements have been identified, suggesting that the model may be incomplete. The interviewees underlined several obstacles to entrepreneurship that have not been considered in the group stemming from the literature review, some of which are recurrent in more than one case. These factors are listed below.

- The lack of trust among the supply chain players, reported by Farmshine in quote ABT1, ABT2, ABT3, and ABT4.

- The lack of farmers' capital to invest, reported by Farmshine in quotes ABF1, ABF2, and ABF3, and by Debisi Araba

- The conservative environment, reported by Farmshine and Moringa Wave in quotes ABC1.

These three barriers to entrepreneurship are connected to the agrifood market structure of SSA. In this region, a large part of the supply chain focuses on agriculture, representing the sector where the highest value is created. However, entrepreneurship in the agricultural industry is mainly informal, strongly influencing business opportunities in these regions. In the informal sector, farmers have little income and no public support. The fact that they have no money to invest represents a significant constraint for firms willing to offer them additional products or services. Moreover, it is understandable that in such a context, where they have no savings nor public incentives, they are risk-averse, justifying the conservative behaviour in the environment where companies operate. To conclude, no regulations have set fair relationships between agrifood actors over time, leading to an industry where trust among them is often missing, and everyone acts in their interest to increase their earnings.

The face some of these barriers, startups implemented specific solutions. The list below illustrates the solution provided by the companies in the research concerning the barriers they refer to.

Trust among agrifood supply chain players

- *Traceability and transparency within the business model*: Farmshine addresses these barriers by forcing the actors in its platform to play legally. If a farmer or a buyer wants to sign to the platform, it must accept to make its activity transparent and traceable.

Farmers' capital to invest

- *Improving the supply chain's efficiency*: Farmshine identified that the agrifood supply chain includes many intermediary steps that do not add value to the final customer but significantly reduce the share of revenues obtained by producers. By

reducing the length of the supply chain and structuring it efficiently, it is possible to transfer a more significant part of the revenues to producers. Once they improve their condition, they can save some money to invest.

- *Formalisation of an informal market*: Formalisation is crucial to the development of the sector and benefits the poorest actors, giving them an identity and data about their business that they did not have before. By formalising the business, farmers can create a credit score to access services and benefits they did not have before.

Conservative environment

- *Involvement of women in the project*: Providing that men in the community were not interested nor trusted the project, Moringa Wave decided to involve women. In fact, they have more time available and see it as an opportunity to increase the family's salary. This solution has a double value, allowing to overcome the barrier of the conservative environment while generating a social impact.

Access to the market

- *Partnership with civil society organisations*: These partnerships allowed Moringa Wave to acquire the knowledge required to enter the market. As stated by Debisi Araba, they play a primary role for entrepreneurship in SSA, as they can be critical partners for the private sector. The knowledge they have of the local market and the social environment can compensate for the informal sector's lack of official information.

Regulatory framework

- *Direct provision of resources*: The regulations in Cote d'Ivoire prevented Seekewa from carrying out the traditional crowdfunding model. Thus, instead of providing the money to buy the necessary resources for realizing farmers' projects, the company supply goods and services directly.

Access to finance

- *Accelerator programs*: accelerator programs represent an interesting solution that Seekewa indicated as a channel to obtain funding. These programs can be very important for startups, considering their difficulties in directly accessing finance in Developing SSA.

A model representing the barrier to entrepreneurship in the agrifood supply chain in Developing SSA and the solutions startup implemented to them is provided in this thesis. This framework aims to answer the RQ2 and has been developed by integrating the set of barriers identified in the literature review with those unveiled by the case study and the solutions reported. The research question and the factors highlighted to answer it are shown in figure 4.13

┌───┐
│ RQ2: "What are the main barriers for SSA startups, and how are they addressing them?" │
└───┘

Barriers

- Infrastructures
- Access to market
- The regulatory framework
- Access to Finance
- Trust among agrifood supply chain players
- Farmers' capital to invest
- Conservative environment

Solutions

- Partnership with civil society organisations
- Direct provision of resources
- Accelerator programs
- Traceability and transparency within the business model
- Improving the supply chain's efficiency
- Formalisation of an informal market
- Involvement of women in the project

4.13 - Barriers and solutions identified in the case study.

4.3 RQ3: The Role of the Entrepreneur's Characteristics for startup development

This chapter displays the findings of the case study concerning RQ3: "How do the background and competences of the entrepreneurs influence the creation of startups in SSA countries". It is divided into five sections: the first three show the cases' results, the fourth the experts' contribution, and the last one summarizes them and formulates an answer to RQ3. Section 4.3.1 illustrates the findings stemming from the interview with Luca Alinovi, one of Farmshine's co-founders, 4.3.2 those obtained from the interview with Franco Emilio Risso, co-founder of Moringa Wave, and 4.3.3 those from the interview with Fred Zamblè, co-founder of Seekewa. Sections 4.3.4 illustrates the experts' perspective on the most important characteristics an entrepreneur operating in the agrifood sector in SSA must possess. Eventually, chapter 4.3.5 recaps the findings and provides an answer to the research question. This section highlights whether the reported characteristics correspond to those noted in the literature review or not, and differences between the two streams are explained. Sections 4.3.1, 4.3.2, and 4.3.3 start by presenting the entrepreneurs illustrating their study path and previous job experiences. The data used to reconstruct these elements has been gathered from both primary and secondary sources. The secondary source exploited was the entrepreneurs' LinkedIn profile. Primary information was collected through the last part of the questionnaire, which focused on the

entreprelnuer background and network. After this description, the interviewees' crucial quotes are shown in the coding table and interpreted to build a model of the entrepreneur's most essential characteristics for the startup's development. It was decided to dedicate a separated part of the chapter to the experts' contribution since their perspective focuses on the psychological traits of the entrepreneur, while the previous three are concentrated on the education and previous job experience.

4.3.1 Luca Alinovi

The first entrepreneur interviewed was Luca Alinovi, one of the four founders of Farmshine. He was born in Italy and has an educational background focused on agriculture and economics. He studied at "Università degli Studi di Firenze" where he obtained an MSc in tropical agriculture and a PhD in Agricultural Economics. For what concerns his career path, he started working with FAO, where he stayed for thirteen years. In this agency, he first occupied the Senior Economist position, then he became an Officer in Charge of UN FAO Somalia and Senior Emergency Coordinator, and eventually Representative to Kenya. After leaving the agency, he decided to join Global Resilience Partnership (GRP) as Executive Director. The organisation consists of a partnership between public and private sector to increase resilience among the most vulnerable populations. GRP defines itself in its website as it follows: *"GRP is an inclusive and diverse Partnership of organisations joining forces towards a world where vulnerable people and places are able to thrive in the face of shocks, uncertainty and change. We believe that resilience underpins sustainable development in an increasingly unpredictable world"*. After this experience, Luca's career as an entrepreneur has begun, founding Farmshine in 2017 and Aflazero in 2018. The latter is a company that deals with providing ozone-based specialised treatments to eliminate aflatoxin contamination in cereals and other crops.

How the education and career influenced the interviewee's entrepreneurship was discussed during the interview, and the results concerning this theme are highlighted in table 4.4. Furthermore, the coding table lists other aspects of Luca's background that influenced his career as an entrepreneur.

Category	Quote	Code number
Educational Background	"Academic education was essential to realize our idea, as the course of study I followed allowed me to acquire the technical skills required to build an agribusiness firm"	AE1
Previous Job Experience	"The professional experience was also fundamental because in the United Nations I was able to acquire that social-human component useful to operate in the context of Farmshine"	AJ1

Surrounding Environment	"The entrepreneurial component, on the other hand, came from my family. In fact, I come from a family of entrepreneurs, and since I was a child, I have seen what doing business is like"	AS1
Educational background/ Previous Job Experience	"It was very important to have acquired several streams of experience because in the context of Farmshine, they integrate well. Since the company wants to focus on an ecosystem, it was necessary to have many different pieces to put together, and to have a varied knowledge helps"	AE2/AJ2

Table 4.4 - Coding table for Luca Alinovi regarding RQ3

Educational Background (AE1, AE2)

The competences obtained during his course of study provided a big support to Luca Alinovi. During the interview, he reported that the educational path he followed allowed him to have the technical knowledge required to carry on the business in the agrifood sector. An open question that was identified in the literature is whether better results are driven by a specific or a general type of knowledge. Regarding this point, Luca Alinovi stated that in Farmshine, whose aim is to develop an ecosystem, it was very important to have acquired several streams of knowledge. This various skillset helped the entrepreneur to manage the different sides of the business, from the technical solution to negotiating with farmers and field agents.

Previous Job Experience (AJ1, AJ2)

The interviewee's previous work experience has played a significant role in Farmshine's success and development. In particular, Luca Alinovi reported how his FAO experience had added a social-human component within his competences. The literature suggests that the founders' previous job experience, especially when it is from the same sector, increases the firm's level of performance. The case of Luca Alinovi seems to confirm this statement since the entrepreneur developed a better knowledge of the stakeholders in the agrifood sector thanks to the previous occupation that facilitated the relationships with them.

Surrounding Environment (AS1)

The last factor underlined by Luca Alinovi as important for his entrepreneurial path is the environment in which he grew up. Coming from a family of entrepreneurs, he witnessed how a business is run since he was a child, which helped to prepare him for this experience. This feature complemented the technical knowledge acquired during the studies and the socio-human component formed from the previous job experience to create his entrepreneurship background.

4.3.2 Franco Emilio Risso

Franco Emilio Risso is one of Moringa Wave co-founders. He was born in Italy and studied International and Comparative Law in Rome at "Università Degli Studi di Roma Tre". Afterwards, he attended a course to work in cooperation and then started to work with an NGO on World Bank projects. Subsequently, he did a year of EVS (European Voluntary Service) in Madagascar, and after that, he worked in an Italian company operating for fair trade in Madagascar, Ravinala Sarl. During this experience, he also founded Moringa Wave, keeping the double job for several years. At a certain point, he realized the need for reinforcing business management skills. Therefore, he obtained an MBA from MIP Graduate School of Business, the Politecnico di Milano business school. Nowadays, he is the co-founder and CEO of Moringa Wave.

Table 4.5 illustrates the quote from the interview with Franco Emilio Risso where he highlights the link between his background and his entrepreneurial career.

Category	Quote	Code number
Educational Background	"The MBA gave me a set of strategic and financial competences which I did not previously have and significantly impacted the society"	FE1
Previous Job Experience	"To have previously worked in the fair trade in Madagascar helped me to understand how the sector works, which significantly affected the development of Moringa Wave"	FJ1
Volunteering	"My decision to become an entrepreneur was born from the experience of volunteering. If I had not gone to Senegal, I would not have gone to Madagascar, where I noticed the issues Moringa Wave want to solve. The company has been more affected by my experience of working with an NGO than from my education"	FV1
Volunteering	"After volunteering, I decided to create something that goes beyond a single project and stays over time, which led me to create my own company"	FV2
Volunteering	"I come from the non-profit sector, and I brought this background to the company to create partnerships between Moringa Wave and non-profit agencies in Madagascar. These partnerships represent a key point that allowed the constant growth of the firm"	FV3

Geographical Origin	"My geographical origin has no relevance to my company at all. Besides, with Moringa Wave we have no commercial trades with Italy"	FG1

Table 4.5 - Coding table for Luca Alinovi regarding RQ3

Educational Background (FE1)

The case of Franco Emilio Risso certainly evidences the importance of education for the company's success. Although he did not attend an academic course related to entrepreneurship or to the sector in which Moringa Wave operates, he felt the need to fill this lack at some point in his career. Therefore, he decided to attend an MBA. As stated in the interview, the knowledge acquired during this course has significantly improved his skillset by providing the strategic and financial competencies that were previously missing.

As in the case of Luca Alinovi, the interviewee did not follow a specialized educational path, but he acquired a set of different knowledge over time.

Previous Job Experience (FJ1)

The previous experience in Madagascar's fair trade sector helped Franco Emilio Risso understand how the sector works. This knowledge, as reported by the interviewee, significantly affected the development of Moringa Wave.

Volunteering (FV1, FV2, FV3)

The volunteer experience has been decisive for Franco Emilio Risso's choice to become an entrepreneur. In particular, thanks to this experience, he first went to Senegal and then to Madagascar. In Senegal, he discovered the Moringa and the value this tree has, while in Madagascar, he noticed specific problems that he did not know before and that he wanted to solve through Moringa Wave. Therefore, as he reported, volunteering played an even more important role than his education for the decision to become an entrepreneur.

Furthermore, the work done with NGOs and cooperatives has allowed Moringa Wave to establish those partnerships with the non-profit sector that still represent one of the company's major assets.

Geographical Origin (FG1)

The last factor of Franco Emilio Risso's background regarding his decision to become an entrepreneur is the geographical origin. Despite the literature, the entrepreneur's geographical origin had no role in its entrepreneurial decision. According to the literature, entrepreneurs often locate their business in areas where they grow, and firms created by locals tend to have better performances since they know the market better (Michelacci & Silva, 2007). In this case, this finding seems not to apply. The company overcame being foreign to the local market thanks to NGOs' partnerships, driven by the previous experience as a volunteer of Franco Emilio Risso.

4.3.3 Fred Zamble

Fred Zamble is one of Seekewa co-founders. He studied at Institut National Polytechnique Félix Houphouët-Boigny, attending Mechanical Engineering in his BSc and Computer Engineering in the MSc. He started working as a developer/UX Designer at Atemis, a firm providing CRM to companies via cloud. His entrepreneurial career started in 2004 when he found Neuropixels Inc, a digital agency offering web-related services, including design, strategy, training and marketing. Then he created Digicraft LLC, another enterprise in the information technology services industry, and Seekewa in 2018. All these three companies are still active, and Fred is in charge of their management. Among them, Seekewa is the largest.

Table 4.6 illustrates the results of the interview concerning to the link between his background and his entrepreneurial career.

Category	Quote	Code number
Previous Job Experience	"I created companies since 2004. Actually, I manage three companies, and Seekewa is the largest"	ZJ1
Educational Background	"My software engineering background was crucial to build the platform from scratch, while my brother's background in finance was very important to deal with the financial issues"	ZE1
Geographical Origin	"Being from Cote d'Ivoire had an impact on the business because in our country the main industry was agriculture, and being aware of that directed the choice toward this sector"	ZG1

Table 4.6 - Coding table for Fred Zamble regarding RQ3

Previous Job Experience (ZJ1)

Fred Zamble has a long experience in creating companies, an activity which he started in 2004. Now, he manages three of them, the largest of which is Seekewa. In the literature, it has been highlighted how having already created companies positively influences the startup's performance (Gompers, Kovner, Lerner, & Scharfstein, 2006; Vivarelli, 2016), and this case seems to validate the finding, being Seekewa the third founded and the one that is currently doing better.

Educational Background

The educational background played a fundamental role in Seekewa's development. In fact, Fred Zamble's computer skills acquired during his academic career allowed him to build the digital platform at the base of Seekewa from scratch. These skills were complemented by

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his brother Serge's financial background, who is in charge of the company's financial aspect. In this case, the entrepreneur's training was specialized in one area but supported by that of the other founder, his brother Serge Zamble, regarding other aspects not covered by his background.

Geographical Origin

As reported by the interviewee, his geographical origin impacted the decision of the sector where to locate the business. In fact, Cote d'Ivoire's main industry is agriculture, and Fred Zamble decision to create a digital platform in this sector was in part taken from the awareness of the importance this sector has for the country.

4.3.4 The Experts Contribution

This section analyzes the experts' contribution regarding what, according to them, are the most critical characteristics an entrepreneur in SSA must possess. In this case, the experts' contribution was addressed separately, not as an integration, from those of entrepreneurs. In fact, they stressed the importance of attitudinal characteristics rather than education and previous work experiences reported, which entrepreneurs instead mentioned.

Debisi Araba considers curiosity and tenacity the main characteristics an entrepreneur in SSA must possess to emerge, rather than the geographical region or the previous experiences. In his interview, he stated that: *"The geographical region has no importance for the business development, it's less about where you come from and what have you studied but is more about your tenacity and curiosity. […] Psychological traits are even more important than competences and knowledge"*. According to him, curiosity helps to overcome the issue of not knowing the environment, seize the most promising opportunities, and come up with innovative valuable solutions to address them. Moreover, curiosity is essential to create the vision the entrepreneur wants to achieve, seek help when it is needed, and create a valuable network: *"Curiosity helps you understand locality, the challenges, the opportunities and seek help. […] Curiosity helps you acquire the knowledge required. […] Curiosity will get you far. It builds the mental models in the entrepreneur's head, it shapes the vision of success in the entrepreneur's mind, it is what enables you to seek help, whether among your peers, in the sector or among the world, and drill down on where the opportunities are to come up with innovative solutions"*. On the other end, tenacity is essential to resist failures and difficulties: *"Tenacity helps you to double down when you know that there will be some pain and not ran away after the first losses"*.

Ritta Sabbas Shine points out that a crucial feature is resilience, which helps the entrepreneur endure adverse situations and failures. In her opinion, resilience also means having the ability to ask for help and have a long-term vision of the business, that must not stop after few failures, but it needs to always aim for long-term success: *"The most important characteristics for entrepreneur in SSA is resilience, to resist economic crisis and unusual circumstances,*

endure negative situations and have a long-term view on their busines. Resilience also means to be vulnerable, in the sense of being able to ask for assistance. However, she recognizes the importance of education, as a way to develop analytical skills, access better information and create a network: *"Education is important for developing analytical skills and better access to information. It also opens minds and opportunities for meeting more people in the network".* To conclude, she considers the previous job experience an important factor in the short-term, but less relevant compared to attitudinal characteristic: *"To have previous job experiences give you an advantage, in particular if from the same sector. This kind of advantage is very strong in the short-term, but in the long run, after entrepreneurs develop a better knowledge on how to structure the business and where to go when asking for help things will even out".*

4.3.5 Cross Case Analysis: The Most Important Characteristics and Background Factors for an Entrepreneur in SSA

This section presents the conclusions from the case study regarding RQ3: "How do the background and competences of the entrepreneurs influence the creation of startups in SSA countries". Starting from the elements reported by the entrepreneurs and experts interviewed, the background determinants that influenced their choice to enter the business and contribute to the company's development are presented. These are compared with the literature findings to see if they coincide or, if not, what differences exist. The result is to identify a group of elements of the entrepreneur's background that are particularly relevant to entrepreneurs operating sustainable startups in DCs located in SSA.

All the startups' interviewees highlighted the importance of education for the development of their business. In the literature, an open question is whether specialized or generic knowledge may be more appropriate for entrepreneurs. In the case analyzed, two entrepreneurs acquired a generic knowledge during their educations, while one followed a specialized path, Fred Zamble. However, it must be noticed that he founded the company together with his brother, who has a complementary and different background in finance. Therefore, rather than considering a single entrepreneur, it should be considered a group of founders. Providing the cases analyzed, it looks that for an entrepreneur of a startup operating in the agrifood sector in SSA it is crucial to have a set of founders possessing diverse and complementary educational backgrounds.

The results concerning the importance of geographical origin are still controversial. Franco Emilio Risso reported that it had no importance for his entrepreneurial career, while Fred Zamble stated that it influenced his decision on the company's sector. An interesting point of view regarding this topic is provided by Debisi Araba, which states that the geographical origin is not relevant, but what matters is the entrepreneur's curiosity. This characteristic enables them to go beyond being a foreigner on the market by stimulating to search for the required information and partners.

Franco Emilio Risso pointed out how his most significant experience for becoming an

entrepreneur of a sustainable company in SSA was volunteering. This element is interesting and not identified in the literature. The potential of volunteering as an influencing determinant on the decision to become an entrepreneur is because this experience allows people to visit SSA countries and look at firsthand the issues in them. Moreover, it is also an element contributing to a firm's performance since it permits understanding these countries' social texture and market conditions.

Eventually, the experts highlighted the importance of psychological traits over competences and geographical origins for entrepreneurs in SSA. Both Ritta Sabbas Shine and Debisis Araba considers the capacity to overcome failures and challenges as a primary characteristic of entrepreneurs operating in these areas. Moreover, Debisis Araba pointed out the importance of curiosity as a necessary factor to collect the information required to understand the business's environment, seize profitable opportunities, and implement innovative solutions to address them.

To address RQ3, the relevant elements of an entrepreneur who wants to operate in the SSA context influencing the decision to start a business and the startup's performance emerged from this research are presented.

Regarding education, the conclusion provided is that companies that want to emerge in SSA require a set of founders with different study paths that complement their technical knowledge. As the literature suggests, high-level education represents a predictor of performances (Bates, 1990; McPherson, 1996; cited by Vivarelli, 2016), given that all the interviewees had a MSc or higher-level diplomas. Concerning previous work experience, it has been noticed how the experience in the same sector helped all the interviewees to have a better knowledge of it. Moreover, it has been reported how taking part to international organizations or no-profit sector can drive the decision to create a sustainable company. Furthermore, this experience can also constitute an advantage through the market knowledge acquired and by creating a socio-human background that facilitates to fit into the social texture. Regarding geographic origin's influence, the results are conflicting, and it has not been possible to define whether it is a relevant factor. Finally, great attention was paid to the entrepreneur's attitudinal aspects, stressing the importance of resisting failure (defined as resilience or tenacity) and curiosity.

Figure 4.12 illustrates the characteristics identified related to RQ3.

RQ3: "How do the background and competences of the entrepreneurs influence the creation of startups in SSA countries?"

Educational Background

- High-level of education represents a predictor of companies' performances
- A founders group possessing different educational paths that complement each other favours the startups' development

Previous Job Experience

- Experience in the same sector where the company operates helps to achieve better results.
- Working for international organizations or in the no-profit sector can drive the decision to create a sustainable company in SSA.
- It can also provide the market knowledge and socio-human background facilitating firms to fit into the social texture

Psychological Traits

- Tenacity, or resilience, is essential to overcome failures and challenges.
- Curiosity drives to collect the information to understand the business's environment, seize profitable opportunities, and implement innovative solutions
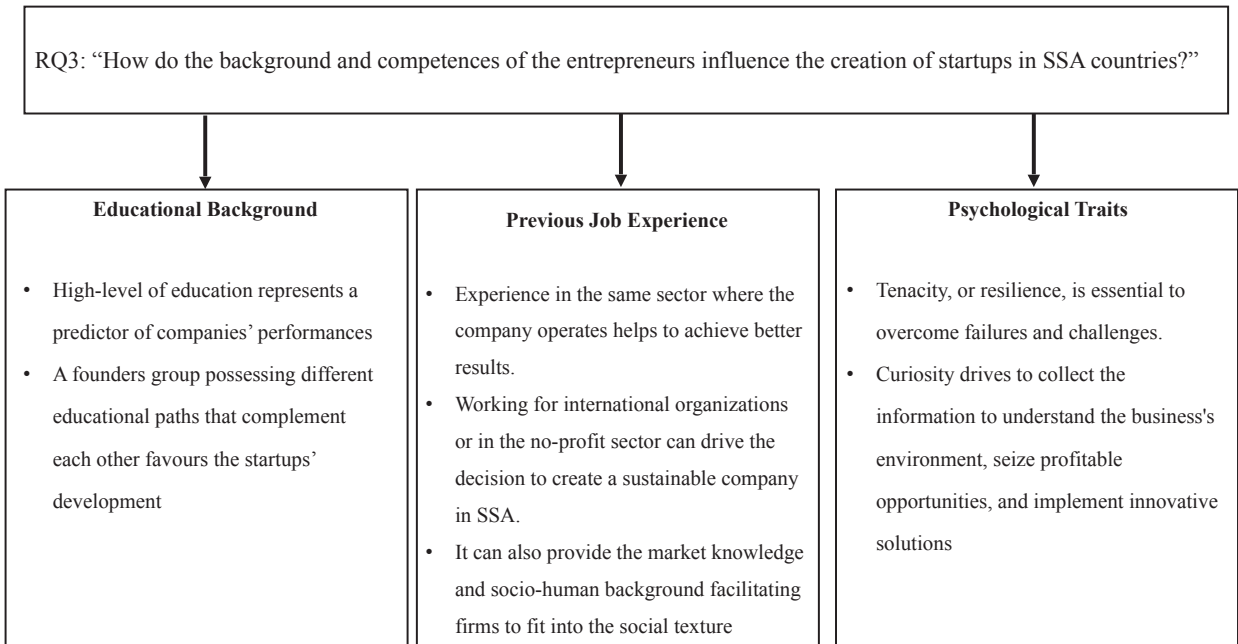
Figure 4.12 - Findings of the case study regarding RQ3

5. Conclusions

This chapter summarises the thesis findings and illustrates their implications for the academic community, entrepreneurs, and policymakers. Eventually, it presents the limitations of the study and possible future research areas.

In detail, Section 5.1 describes the results obtained from the analyses carried out, Section 5.2 shows how they fit into the literature and what gaps they solve, and Section 5.3 defines the managerial contribution that this research provides, explaining the implications for entrepreneurs and policymakers. Eventually, Section 5.4 exposes the limitations of the work, and Section 5.5 displays possible future research areas that this thesis opens up.

5.1 Main Results

This thesis's findings regard agrifood entrepreneurship in DCs (Developing Countries, Chapter 1), first adopting a general perspective and then focusing on a specific context, SSA (Sub Saharan Africa, Chapter 1).

Through an extensive study, agrifood entrepreneurship has been compared between DCs and developed countries to understand differences in the distribution of sustainable startups along the agrifood supply chain and their sustainability orientation. An additional focus has been directed to comprehend the agrifood industry's characteristics in SSA. Next, two models have been created from the literature by combining the contribution of different authors. The first represents the barriers to entrepreneurship in DCs, and the second concentrates on the most critical characteristics and background factors for entrepreneurs operating in DCs. These models have been tested to examine their applicability in the agrifood industry of Developing SSA (the group including DCs located in SSA, Section 3.1.5) and whether new relevant elements emerged in this context.

Regarding the main differences between agrifood entrepreneurship in developed and DCs, it has been shown how the concentration of sustainable startups is higher in developed countries than in DCs. However, the percentage of sustainable startups in DCs is significant, demonstrating the relevance of this phenomenon in the region. The most frequently addressed SDGs targets in both the groups, described in Section 3.1.3, belong to Goal 2: "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" (Targets 2.3 and 2.4) and Goal 12: "Ensure sustainable consumption and production patterns" (Targets 12.2, 12.3, and 12.4), but the distribution of startups into them differs dramatically between developed and DCs. Sustainable firms in DCs tend to focus on a specific problem, increasing agricultural production and the farmers' income (Target 2.3). Instead, in developed countries, the sustainability orientation is balanced among various issues, with the Targets mentioned

before representing the five most addressed. For what concerns the supply chain distribution, in both samples a prevalence of service provider startups along the agrifood supply chain emerged, but more evidently in DCs. Other meaningful differences are found in food processing, characterized by a higher concentration of sustainable startups in developed countries rather than in DCs, and retailers, relevant players of sustainable innovation in DCs but not in the other group.

When focusing on Developing SSA, many interesting findings have arisen. The region's agrifood entrepreneurship presents similar characteristics to those highlighted for DCs, apart from the incidence of sustainable startups. Firms included in this category account for 40% of startups, a very high value demonstrating the importance of sustainability in the region's agrifood industry and supporting the motivation to analyse this phenomenon. The sustainability orientation in Developing SSA is even more focused on target 2.3 than in the other DCs. The same pattern appears in the supply chain composition, with a strong predominance of service providers over the other stages and retailers as the second most populated stage.

In general, it is possible to conclude that agrifood entrepreneurship manifests similar traits between Developing SSA and the other DCs, at least concerning the dimensions analysed. However, it presents an even more marked sustainability orientation on Target 2.3 and a higher predominance of service providers in the supply chain stages. Table 5.1 summarises the results of the study performed..

	Developing Countries	Developed Countries	Developing SSA
Incidence of agrifood startups in the sample	20%	24%	40%
Sustainability Orientation	• Focused on Target 2.3 (51% of sustainable startups) • Second Target: 2.4 (11%) • Third Target: 12.3 (5%)	Balanced among the different Targets, the three most addressed are: • Target 2.3 (18) • Target 2.4 (16%) • Target 12.3 (12%)	• Focused on Target 2.3 (72% of sustainable startups) • Second Target: 2.4 (7%) • Third Target: 12.3 (7%)
Supply chain composition	• Predominance of Service providers (50% of startups) • Retailers as the second stage (14% of startups)	• Predominance of Service providers (38% of startups) • Food Processing as the second stage (21% of startups)	• Predominance of Service providers (62% of startups) • Retailers as the second stage (13.5% of startups)

Figure 5.1 – Summary of the study on agrifood entrepreneurship for RQ1.

Following this general analysis, the perspective has focused on a specific aspect: the barriers to entrepreneurship. A model representing the most challenging barriers in DCs has been developed by combining different literature studies, which includes infrastructures, regulatory framework, market access, and access to finance. Table 5.2 illustrates the authors whose works contributed to formulating the framework.

Barrier	Description	Authors
Infrastructures	The lack of adequate transportation and communicational facilities.	• Naudé (2009) • Dutz, Kessides, O'Connell, & Willig (2011) • Vivarelli, 2016; Ripoll, et al. (2017)
Regulatory Framework	Norms and regulations not aligned with the business ecosystem that hinder companies.	• Naudé (2009) • Dutz, Kessides, O'Connell, & Willig (2011) • Vivarelli (2016) • Cravo & Piza (2016) • infoDev 2016) • Quak (2018)
Access to market	Difficulties in accessing the domestic and international market.	• Naudé (2009) • Dutz, Kessides, O'Connell, & Willig (2011) • Cravo & Piza (2016) • Quak (2018) • Ripoll, et al. (2017) • infoDev (2014)
Access to Finance	Lack of a financial market able to provide the required financial services to companies.	• Naudé (2009) • Dutz, Kessides, O'Connell, & Willig (2011) • Vivarelli (2016) • Cravo & Piza (2016) • infoDev, (2014) • infoDev (2016)

Table 5.2 – The barriers to entrepreneurship in DCs identified and the authors reporting them

This model has been validated through a case study applied to the agrifood industry in Developing SSA. Nonetheless, it has resulted to be incomplete, as other relevant elements has emerged. The other barriers reported are the agricultural sector's conservative environment, the lack of trust between the supply chain actors, and the farmer's lack of capital to invest. Furthermore, the case study highlighted possible solutions adopted to address some of them. Forcing traceability and transparency between the actors included in the company's project has been indicated as a possible solution for the lack of trust between supply chain actors. Increasing farmers' earnings is necessary to make them invest in the startup's products or services. In this regard, two possible actions to pursue are enhancing the supply chain's efficiency and drive the market's formalisation. For what concerns the conservative environment, one solution reported is to involve women from rural communities, who have more time available and often search for a way to increase family income. Other suggestions have been described for three of the four barriers included in the literature model. Partnerships with civil society organisations allow collecting market data, facilitating market access. A specific solution to the regulations preventing a company from adopting a classic crowdfunding model to finance the weakest

actors in the supply chain is to use crowdfunding to provide the necessary goods and services instead of the money. Finally, the last answer highlighted concerns access to finance, which can be facilitated by accelerator or incubator programs. Table 5.3 summarises the results obtained.

Barrier	Solution
Infrastructures	/
Regulatory framework	• To provide the necessary goods and services instead of the money (regulations preventing a company from adopting a classic crowdfunding model)
Access to the market	• Partnerships with civil society organisations
Access to finance	• Accelerator programs
The agricultural sector's conservative environment	• Involving women from rural communities in the early stage of the project
lack of trust between the supply chain actors	• Forcing traceability and transparency between the actors involved in the project
farmer's lack of capital to invest	• To enhance the supply chain's efficiency • Market formalisation

Table 5.3 – The barriers identified in developing countries located in SSA and the solutions reported in the case study.

Finally, the last analysis regarded the influence of the entrepreneur's characteristics and background factor for startup's creation and development. The approach followed has been the same adopted in the study of the barriers to entrepreneurship. First, it has been created a model of the entrepreneur's most critical characteristics and background factors from the literature review, and then it has been tested in the context of the agrifood entrepreneurs operating in DCs of SSA. The model created encompasses the educational background, previous job experience, geographical origin, and psychological traits. Table 5.4 illustrates the authors from which the model has been created.

Factor	Authors
Educational Background	• Bates (1990) • Vivarelli (2016) • Colombo and Grilli (2004) • Balconi and Fontana (2011) • Wagner (2003) • Lazear (2005) • Van der Sluis, Van Praag, and Vijverberg (2005) • Goedhuys and Sleuwaegen (2000)

	• McPherson (1996)
	• Goedhuys and Sleuwaegen (2000)
Previous Job Experience	• Gompers, Kovner, Lerner, & Scharfstein (2006)
	• Vivarelli (2016)
	• (Roberts, Klepper, & Hayward, 2011).
Geographical Origin	• Michelacci & Silva, 2007
	• Vivarelli (2016)
	• Evans (1989)
Psychological Traits	• Blanchflower & Meyer (1994)
	• Vivarelli (2016)

Table 5.4 - The characteristics and background factors of an entrepreneur influencing business decisions.

Educational background confirms to be a relevant factor for starting the business and positively affects the performances. The case study has shown that acquiring general knowledge may be more appropriate for those starting a business. However, a more precise answer can be formulated considering the founders' group as the dimension of analysis. The founders' group needs to have different and complementary educational backgrounds to exploit synergies and cover each other's lack of knowledge. Having a previous job experience in the same sector where the startup operates helps the entrepreneur grow the business faster thanks to the deep knowledge he/she has developed. The case study also displays how taking part in international organisations or the no-profit sector can lead to the decision of creating a sustainable company, provides a knowledge of the context, and allows to acquire a socio-human background that facilitates comprehending the social texture. Regarding the geographical origin's influence, it has not been possible to define whether it is a relevant factor. Finally, the most critical entrepreneur's attitudinal aspects highlighted are the importance of resisting failure (defined as resilience or tenacity) and curiosity.

5.2 Scientific Implications

The factors identified led to the formulation of three research questions that have been addressed in this thesis, contributing to the existing literature.

RQ1: "What are the main differences and similarities in the agrifood startups from developing and developed countries?"

The first research question tackles the lack of information on DCs through extensive research in the agrifood sector to compare startups entrepreneurship between developing and developed countries. In this assessment, the focus is oriented towards sustainability and supply chain composition. A second study has been performed to highlight the characteristics of agrifood startups in Developing SSA. The answer provided to the RQ1 is the following.

"*Sustainable firms in DCs are primarily service providers and tend to focus on a specific problem, increasing agricultural production and farmers' income. In developed countries the*

sustainability orientation of startups is balanced among different issues, and no one emerged as significantly prevalent. In this group, startups are mainly service provider as well. Other meaningful differences are found in food processing companies, diffused in developed countries but rare in DCs, and retailers, relevant players in DCs but not spread in those developed".

Agrifood entrepreneurship in Developing SSA presents similar characteristics to DCs, apart from the incidence of sustainable startups, which is significantly higher than in all the others. The sustainability orientation of startups in Developing SSA is even more focused on target 2.3 than in the other DCs. The same pattern is found in the supply chain composition, with a strong predominance of service providers over the other stages and retailers as the second most frequent stage.

RQ2: "What are the main barriers for SSA startups, and how are these companies addressing them?"

This research question focuses on SSA to illustrate the barriers faced by startups operating in this area and the solutions they developed to address them. An answer has been formulated by creating a model from the literature and testing it on the referral context through a case study.

"The most significant barriers faced by agrifood startups operating in Developing SSA are the lack of adequate transportation and communicational facilities, norms and regulations not aligned with the business ecosystem, difficulties in accessing the domestic and international market, the lack of a diffused financial market able to provide the required financial services to companies, the agricultural sector's conservative environment, the lack of trust between the supply chain actors, and the farmer's lack of capital to invest. Possible solutions for some of them are adopting a crowdfunding model to provide the necessary goods and services, partnership with civil society organisations, participating to accelerator programs, involving women from rural communities in the early stage of the project, forcing supply chain actors to be traceable and transparent, enhancing the supply chain's efficiency, and formalising the market".

RQ3: "How do the competences and network of the entrepreneurs influence the creation of startups in SSA countries?"

This research's last scientific contribution is to present the characteristics and background factors of sustainable startups entrepreneurs in SSA influencing their business decisions. The answer to the corresponding research question is the following:

"The educational background is a relevant factor for starting the business and positively influence the performances. The founders' group needs to have different and complementary educational backgrounds to exploit synergies and cover each other's lack of knowledge. The previous job experience in the same sector helps the entrepreneur grow the business faster. An experience in international organisations or the no-profit sector in Developing SSA can lead to the decision of creating a sustainable company. It also provides a deeper knowledge of these

countries' context and stimulates the development of a socio-human background, helping to fit into the social texture. Finally, the most important entrepreneur's attitudinal aspects in these areas are the importance of resisting failure and curiosity."

5.3 Managerial implications

The findings of this research have a practical implication for both policymakers and entrepreneurs. For what concerns the policymakers' implications, they descend from the identification of the barriers to entrepreneurship in SSA and the solution provided by the entrepreneurs.

Section 2.3 reported how entrepreneurship can foster sustainable development in these areas by (i) generating innovation and providing better and lower-cost products to customers (Dutz, Kessides, O'Connell, & Willig, 2011; infoDev, 2016, p. 10-14; Olafsen & Cook, 2016; Naudé, 2009), (ii) directing the resources towards the most productive firms, (iii) driving the employment, (iv) and eventually leading to the structural transformation of the society from being predominantly rural and agriculturally based to being urban and manufacturing and service based (Naudé, 2009; Naudé, 2010; Dutz, Kessides, O'Connell, & Willig, 2011; Olafsen & Cook, 2016; Vivarelli, 2016; Ripoll, et al., 2017). Then, Section 2.1.4 has illustrated the importance that the agrifood sector occupies in these regions for sustainable development, with the potential to dramatically impacting poverty and improving food security while conserving natural resources (Pawlak & Kołodziejczak, 2020). These Sections have shown the importance of spurring agrifood entrepreneurship in these countries, which policymakers can promote by creating the right enabling environment for the private sector. This work helps them understand how to operate by highlighting the most relevant barriers hindering entrepreneurship development in SSA that should be mitigated to favour startups' growth.

Furthermore, some of the insights provided by the startups involved in the research can help policymakers establish how to address these barriers. For instance, a fundamental challenge to face to increase farmers' income is the agricultural market's formalisation, an essential driver that policymakers can promote.

The second class of actors for which the implications of this thesis can provide a significant contribution are SSA's entrepreneurs. Since there is little information regarding the entrepreneurial context in Developing SSA, this work provides them with valuable insights.

In fact, the thesis depicts both the internal context of startups in these regions, expressed by the SBMC of the firms included in the case study, and the external context where they are inserted, portrayed by the barriers to entrepreneurship discussed. Therefore, the research provides entrepreneurs with an overview of the environment influencing startups in SSA, which may help them to design a business model aligned with the context. Furthermore, it presented solutions adopted by startuppers to address the reported barriers, which can be particularly useful for entrepreneurs who face similar constraints.

5.4 Limitations

Despite the attempt to develop a comprehensive study regarding the topics covered within the thesis, some limitations emerged.

- A relevant limitation consists of the sample's small size. This element influences all the analyses made, especially considering the industry's size and the geographical area investigated. In fact, the sample represents just two among the stages of the supply chain described in Section 3.1.2, service providers (which is, in any case, the predominant) and food processing. Furthermore, the firms belong to only three of the several DCs in SSA. Therefore, it may result that the findings obtained do not express the conditions of the context but only those of the specific sample. However, the aim of the study is to provide a general overview of agrifood entrepreneurship in DCs and draw attention to the topics addressed rather than presenting an in-depth investigation for every sector and country.

- The source selected to collect the data used to update the database may have biased the analysis. CrunchBase is the business intelligence platform chosen to identify the startups included in the database. Considering that it requires online registration and not all the entrepreneurs know it, it may tend to include digital-friendly companies, excluding those encountering difficulties to interface on the Internet. This factor could lead to a distorted view in the analyses carried out, affecting the validity of the results. Nevertheless, the research aims to identify startups that can contribute to sustainable development, and the presence on the internet is a critical factor favouring the scalability of a company, essential to spur sustainability solution. Thus, including firms potentially more oriented towards the digital world can constitute an element of value rather than a limitation.

- The study of the importance of the sustainable agrifood entrepreneurs' background and personal characteristics in SSA has been realised through case studies focused principally on international founders. Since they do not come from SSA, their background is not representative of local entrepreneurs, posing a potential limit to the results' generalizability. However, considering that the dimensions analysed are the general area of study and the influence of previous job experience, they do not depend on the entrepreneur's geographical origin. Regarding the importance of geographical origin, a specific question has been posed to consider how it impacts the entrepreneurial path. Therefore, the fact that most of the entrepreneurs interviewed are international does not affect the analysis results.

- Eventually, the study was unable to provide an answer regarding the importance of geographic origin for an agrifood entrepreneur operating in a developing country in SSA. This question remains open and constitute a possible future research area.

5.5 Suggestions for Future Research

The innovative nature and the breadth of the analysis have led to several limitations on the one hand but open up various interesting fields on the other. Therefore, possible future research areas to continue the work carried out in this thesis are listed below.

- Given that this research analysed entrepreneurship in a specific time interval, it would be interesting to continue the study of the macro-differences between agrifood entrepreneurship in developed and DCs to monitor the evolution in the following years.

- This thesis has compared agrifood entrepreneurship in developed and DCs on the sustainability orientation and supply chain composition. Future researchers could expand the study by integrating the dimensions analysed with others.

- A relevant contribution to the study would be to further validate the taxonomy of barriers to entrepreneurship by collecting information on a greater number of agrifood startups in Developing SSA. This operation is essential, considering that the small sample size is one of the most critical limitations for the thesis' findings.

- An interesting research area for practitioners is to develop a general model of solutions to entrepreneurship's barriers in Developing SSA. Starting from those identified in this thesis the focus should expand to understand which ones are better for specific circumstances. In fact, differences among SSA countries are still relevant, and to build an advanced solution's framework describing which solutions are better in the presence of specific elements of the context is a relevant study.

- A significant research area complementary to this study is the analysis of the role of the entrepreneur's background elements and characteristics in sustainable entrepreneurship in DCs. The information collected in this thesis to investigate the phenomenon could be supported by additional data to develop more profound knowledge. In particular, it is interesting to understand the role performed by the geographical origin, for which both this thesis and the literature provided contrasting results.

- Finally, it could be interesting to expand the research performed in this thesis to other industries in SSA and other regions of the world to understand their peculiar characteristics and confront each other.

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7. Annexe

Annexe 7.1 – Broad Structure of the NACE

Section	Title	Division
A	Agriculture, forestry and fishing	01-03
B	Mining and quarrying	05-09
C	Manufacturing	10-33
D	Electricity, gas, steam and air conditioning supply	35
E	Water supply; sewerage, waste management and remediation activities	36-39
F	Construction	41-43
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	45-47
H	Transportation and storage	49-53
I	Accommodation and food service activities	55-56
J	Information and communication	58-63
K	Financial and insurance activities	64-66
L	Real estate activities	68
M	Professional, scientific and technical activities	69-75
N	Administrative and support service activities	77-82
O	Public administration and defence; compulsory social security	84
P	Education	85
Q	Human health and social work activities	86-88
R	Arts, entertainment and recreation	90-93
S	Other service activities	94-96
T	Activities of households as employers; undifferentiated goods-and services-producing activities of households for own use	97-98
U	Activities of extraterritorial organisations and bodies	99

Annexe 7.1 - Broad structure of NACE Classification. Source: Eurostat, (2008).

Annexe 7.2 - NACE Activities for Each Stage of the Supply Chain

Activities: Input Companies	
01.30	Plant propagation
01.64	Seed processing for propagation
10.91	Manufacture of prepared feeds for farm animals
20.15	Manufacture of fertilisers and nitrogen compounds
20.20	Manufacture of pesticides and other agrochemical products
46.12	Agents involved in the sale of fuels, ores, metals and industrial chemicals

Annexe 7.2.1: Activities of Input Companies

Activities: Farmers, Breeders and Fishers	
Farmers	
01.1	**Growth of non-perennial crops**
01.11	Growing of cereals (except rice), leguminous crops and oil seeds
01.12	Growing of rice
01.13	Growing of vegetables and melons, roots and tubers
01.14	Growing of sugar cane
01.19	Growing of other non-perennial crops
01.2	**Growth of perennial crops**
01.21	Growing of grapes
01.22	Growing of tropical and subtropical fruits
01.23	Growing of citrus fruits
01.24	Growing of pome fruits and stone fruits
01.25	Growing of other tree and bush fruits and nuts
01.26	Growing of oleaginous fruits
01.27	Growing of beverage crops

01.28	Growing of spices, aromatic, drug and pharmaceutical crops
01.29	Growing of other perennial crops
01.50	Mixed farming
01.61	Support activities for crop production
01.63	Post-harvest crop activities
Breeders	
01.4	**Animal production**
01.41	Raising of dairycattle
01.42	Raising of other cattle and buffaloes
01.43	Raising of horses and other equines
01.44	Raising of camels and camelids
01.45	Raising of sheep and goats
01.46	Raising of swine/pigs
01.47	Raising of poultry
01.49	Raising of other animals
01.62	Support activities for animal production
01.70	Hunting, trapping and related service activities
Fishers	
03.11	Marine fishing
03.12	Freshwater fishing
03.21	Marine acquaculture
03.22	Freshwater acquaculture

Annexe 7.2.2: Activities of Farmers, Breeders and Fishers

Activities: Food Processing Industry	
10	**Manufacture of food products**
10.11	Processing and preserving of meat
10.12	Processing and preserving of poultry meat
10.13	Production of meat and poultry meat products

10.20	Processing and preserving of fish, crustaceans and molluscs
10.31	Processing and preserving of potatoes
10.32	Manufacture of fruit and vegetable juice
10.39	Other processing and preserving of fruit and vegetables
10.41	Manufacture of oils and fats
10.42	Manufacture of margarine and similar edible fats
10.51	Operation of dairies and cheese making
10.52	Manufacture of ice cream
10.61	Manufacture of grain mill products
10.62	Manufacture of starches and starch products
10.71	Manufacture of bread; manufacture of fresh pastrygoods and cakes
10.72	Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes
10.73	Manufacture of macaroni, noodles, couscous and similar farinaceous products
10.81	Manufacture of sugar
10.82	Manufacture of cocoa, chocolate and sugar confectionery
10.83	Processing of tea and coffee
10.84	Manufacture of condiments and seasonings
10.85	Manufacture of prepared meals and dishes
10.86	Manufacture of homogenised food preparations and dietetic food
10.89	Manufacture of other food products n.e.c.
11	**Manufacture of beverages**
11.01	Distilling, rectifying and blending of spirits
11.02	Manufacture of wine from grape
11.03	Manufacture of cider and other fruit wines

11.04	Manufacture of other non-distilled fermented beverages
11.05	Manufacture of beer
11.06	Manufacture of malt
11.07	Manufacture of soft drinks; production of mineral waters and other bottled waters
Other	
20.59	Manufacture of other chemical products n.e.c.

Annexe 7.2.3: Activities of Food Processing Industry

Activities: Retailers	
46.29	Other retail sale of food in specialized stores
47.20	Retail sale of food and beverages in specialized stores
47.21	Retail sale of fruit and vegetables in specialised stores
47.22	Retail sale of meat and meat products in specialised stores
47.23	Retail sale of fish, crustaceans and molluscs in specialised stores
47.24	Retail sale of bread, cakes, flour confectionery and sugar confectionery in specialized stores
47.25	Retail sale of beverages in specialised stores
47.29	Other retail sale of food in specialised stores
47.76	Retail sale of flowers, plants, seeds, fertilisers, pet animals and pet food in specialised stores
47.81	Retail sale via stalls and markets of food beverages and tobacco products
47.91	Retail sale via mail order houses or via Internet

47.99	Other retail sale not in stores stalls or markets

Annexe 7.2.4: Activities of Retailers

Activities: Food Service	
55.10	Hotels and similar accommodation
56.10	Restaurants and mobile food service activities
56.21	Event catering activities
56.29	Other food service activities
56.30	Beverage serving activities

Annexe 7.2.5: Activities of Food Service

Activities: Wholesalers	
Wholesalers of Input Companies and Farmers	
46. 11	Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods
46. 21	Wholesale of grain, unmanufactured tobacco, seeds and animal feeds
46. 23	Wholesale of live animals
Wholesalers of Farmers, Food Companies and Retailers	
46. 31	Wholesale of fruit and vegetables
46. 32	Wholesale of meat and meat products
46. 33	Wholesale of dairy products, eggs and edible oils and fats
46. 37	Wholesale of coffee, tea, cocoa and spices
46. 38	Wholesale of other food, including fish, crustaceans and molluscs
Wholesalers of Food Companies and Retailers	
46. 17	Agents involved in the sale of food, beverages and tobacco

46. 19	Agents involved in the sale of a variety of goods
46. 34	Wholesale of beverages
46. 36	Wholesale of sugar and chocolate and sugar confectionery
46. 39	Non-specialised wholesale of food, beverages and tobacco

Annexe 7.2.6: Activities of Wholesalers

Class	Criteria
Technology Suppliers	- Provision of technological means
Support Activities	Spatial transformation Conservation of food products
Service Providers	Communication to consumers Management of demand and supply Innovation of inputs and food products of food productionprocesses

Annexe 7.2.7: Activities of Technology Suppliers

Activities: Support Activities	
Criterion: Spatial Transformation	
49.20	Freight rail transport
49.41	Freight transport by road
50.20	Sea and coastal freight water transport
50.40	Inland freight water transport
51.21	Freight air transport
52.10	Warehousing and storage
52.21	Service activities incidental to land transportation
52.22	Service activities incidental to water transportation
52.23	Service activities incidental to air transportation
52.24	Cargo handling
52.29	Other transportation support activities

53.20	Other postal and courier activities
Criterion: Food Conservation	
17.21	Manufacture of corrugated paper and paperboard and of containers of paper and paperboard
22.22	Manufacture of plastic packing goods
23.13	Manufacture of hollow glass
25.91	Manufacture of steel drums and similar containers
25.92	Manufacture of light metal packaging
82.92	Packaging activities

Annexe 7.2.8: Activities of Support Activities

Activity	Activities Included	
Criterion: Communication to Consumers		
58.19	Other publishing activities	Publishing (including on-line)of: • catalogues • engravings andpostcards • greeting cards • forms • reproduction ofworks of art • advertising material • other printed matter On-line publishing of statisticsand other information

63.11	Data processing hosting and relatedactivities	Provision of infrastructure for hosting, data processing services and related activities; Specialized hosting activities such as: Web hosting Streaming services Application hosting • serviceprovisioning
		General time-share provision of mainframe facilities to clients Data processing activities: complete processing of datasupplied by clients generation of specialized reports from data supplied byclients Provision of data entry services
63.12	Web Portals	Operation of web sites that use a search engine to generate and maintain extensive databases ofInternet addresses and contentin an easily searchable format periodically updated content
73.11	Advertising agencies	Creation and realisation of advertising campaigns: creating and placing advertising in newspapers, periodicals, radio, television, the Internet and other media creating and placing of outdoor advertising, e.g. billboards, panels, bulletins and frames, window dressing,

		showroom design, car and bus carding etc. aerial advertising
		distribution or delivery ofadvertising material orsamples
		creation of stands and other display structures and sites marketingcampaigns and other advertising services aimed at attracting and retainingcustomers: promotion of products
		point-of-sale marketing
		direct mail advertisingmarketing consulting
73.20	Market research and public opinionpolling	awareness,acceptance and familiarity of goods and services and buying habits of consumers for the purpose of sales promotion and development of new goods and services,including statistical analysesof the results Investigation into collective opinions of the public about political, economic and socialissues and statistical analysis thereof
79.90	Other reservation service and relatedactivities	Reservations for transportation, hotels, restaurants, car rentals, entertainment and sport etc.

	Criterion: Enhancement of Food Production Processes	
62.01	Computer programming activities	This class includes the writing, modifying, testing and supporting of software. This class includes: Designing the structure and content of, and/or writing the computer code necessary to create and implement: systems software (including updates and patches) applications (including updates and patches) databases web pages Customising of software, i.e. modifying and configuring an existing application so that it is functional within the clients' information system environment
74.90	Other professional, scientific and technical activities n.e.c.	Weather forecasting activities Security consulting Agronomy consulting Environmental consultingOther technical consulting
75.00	Veterinary activities	Animal health care and control activities for farm animals

		Animal health care and control activities for pet animals
	Criterion: Management of Demand and Supply	
66.11	Administration of Financial Markets	This class includes the operation and supervision of financialmarkets other than by publicauthorities, such as: • contractsexchanges • Futures commodity contractsexchanges Stock or commodity options exchanges

Criterion: Innovation of Inputs and Food Products		
72.11	Research and experimental developmenton biotechnology	DNA/RNA: genomics, pharmacogenomics, gene probes, genetic engineering, DNA/RNA sequencing/synthesis/amplification, gene expression profiling, and use of antisense technology Proteins and other molecules:sequencing/synthesis/engineering of proteins and peptides (including large molecule hormones); improved delivery methods for large molecule drugs; proteomics, protein isolation and purification, signalling,
		identification of cellreceptors Cell and tissue culture and engineering: cell/tissue culture, tissue engineering (including tissue scaffolds and biomedical engineering),cellular fusion, vaccine/immune stimulants, embryo manipulation Process biotechnology techniques: fermentation using bioreactors, bioprocessing, bioleaching, biopulping, biobleaching, biodesulphurisation, bioremediation, biofiltrationand phytoremediation Gene and RNA vectors: genetherapy, viral vectors Bioinformatics: constructionof databases on genomes, protein sequences; modelling complex biological processes, including systemsbiology Nanobiotechnology: applies the tools and processes of nano/microfabrication to build devices for studying biosystems and applications in drug delivery, diagnostics etc.

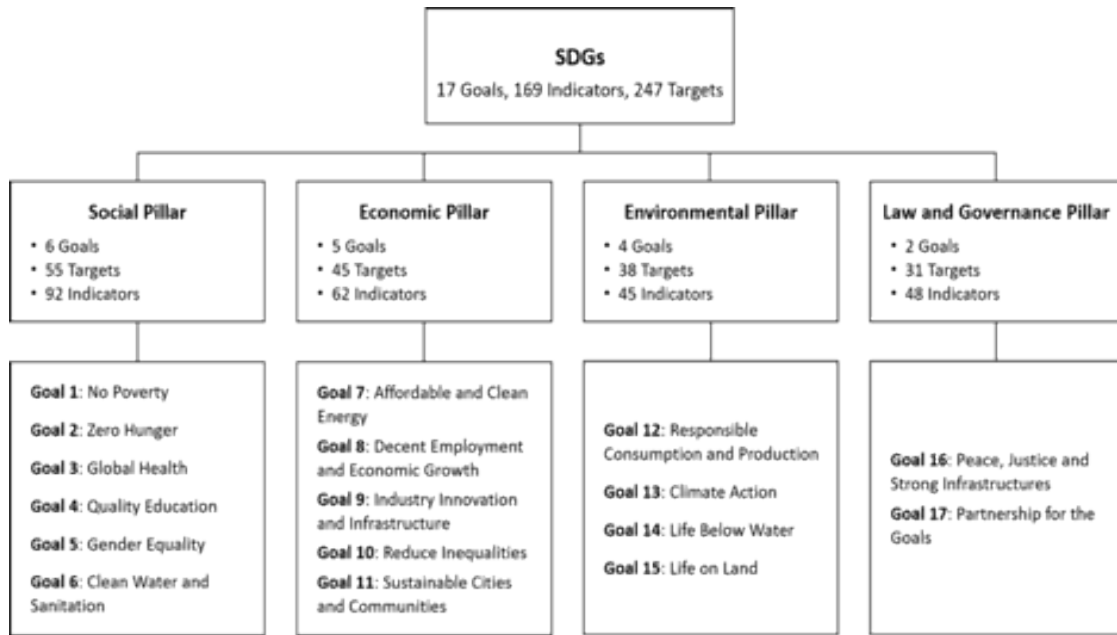| 72.19	Other research and experimental development on natural sciences and engineering	• biotechnological research and experimental development: research and development on natural sciences research and development on engineering and technology research and development on medical sciences research and development on agricultural sciences interdisciplinary research and development, predominantly on natural sciences and engineering

Annexe 7.2.9: Activities of Service Providers

Annexe 7.3 – The Sustainable Development Goals

Goal	Description
Goal 1	End poverty in all its forms everywhere
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3	Ensure healthy lives and promote wellbeing for all at all ages
Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5	Achieve gender equality and empower all women and girls
Goal 6	Ensure availability and sustainable management of water and sanitation for all
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 10	Reduce inequality within and among countries
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12	Ensure sustainable consumption and production patterns
Goal 13	Take urgent action to combat climate change and its impacts
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable Development
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Annexe 7.3 – The SDGs. Source: United Nations, (2015); Bartezzaghi et al. (2018); Segatta and Tanara (2017); Caliceti, (2017)

Annexe 7.4 – The Structure of the Sustainable Developing Goals


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                        ┌─────────────────────────────────┐
                        │              SDGs               │
                        │ 17 Goals, 169 Indicators, 247 Targets │
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Social Pillar	Economic Pillar	Environmental Pillar	Law and Governance Pillar
• 6 Goals • 55 Targets • 92 Indicators	• 5 Goals • 45 Targets • 62 Indicators	• 4 Goals • 38 Targets • 45 Indicators	• 2 Goals • 31 Targets • 48 Indicators
Goal 1: No Poverty **Goal 2**: Zero Hunger **Goal 3**: Global Health **Goal 4**: Quality Education **Goal 5**: Gender Equality **Goal 6**: Clean Water and Sanitation	**Goal 7**: Affordable and Clean Energy **Goal 8**: Decent Employment and Economic Growth **Goal 9**: Industry Innovation and Infrastructure **Goal 10**: Reduce Inequalities **Goal 11**: Sustainable Cities and Communities	**Goal 12**: Responsible Consumption and Production **Goal 13**: Climate Action **Goal 14**: Life Below Water **Goal 15**: Life on Land	**Goal 16**: Peace, Justice and Strong Infrastructures **Goal 17**: Partnership for the Goals

Annexe 7.4 – Structure of the SDGs framework. Source: Sustainability Knowledge Group (2018). The Why's and How's of Sustainable Development Goals (SDGs).