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"Sustainab-lization": Sustainability and Digitalization as a Strategy for Resilience in the Coffee Sector

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Abstract: COVID-19 has had a dramatic impact on the world. This study aims to investigate the possible implications of COVID-19 on sustainability and digitalization initiatives, by exploring a sample of 15 Italian coffee companies located in Northern, Central and Southern Italy, to highlight any differences and at the same time identify which are the main strands of their resilient behaviors. "Sustainab-lization" is our idea to define a business model in which sustainability and digitalization are closely related in companies' strategic initiatives. We have analyzed the various actions which have been undertaken to get out of the COVID-19 crisis, focusing on initiatives related to sustainable development and digitalization, critical also to fulfilling some of the 17 Sustainable Development Goals of the 2030 Agenda. Most of the companies have invested in sustainability and digitalization. The results show, for most of them, a resilient approach towards a sustainable business model, and also through increased digitalization.

Keywords: sustainability; digitalization; coffee sector; COVID-19; crisis; resilience; strategies

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1. Introduction

The new 21st century has opened with a progressive phase of digital modernization, both in people's private and working lives. The period that has been affected by the COVID-19 virus has further accelerated its evolution [1]. Big data, artificial intelligence, cloud computing, and blockchain have rapidly pushed all kinds of companies into the digital age. Digital resources are increasingly becoming a key productive factor. During the lockdowns, which paralyzed all physical movement, severely impacting the economies of each country, digital resources showed their value, allowing companies to continue and to keep people's contacts alive. Digital transformation has, thus, represented a driving force for innovation, inclusiveness, and sustainable growth. In addition, technology has allowed the maintenance of contact and communication—the only way by which many businesses have been able to continue to exist. The 2030 Agenda includes 17 goals. Goal No. 9 proposes the development of a resilient infrastructure to improve technological capabilities, increase internet access in less developed countries, and promote the integration of small industries and enterprises into their value chains [2].

The past three years can be considered among the most difficult in history, especially in Europe. The spread of the COVID-19 pandemic, but also the explosion of the conflict between Russia and Ukraine, have created a truly complex social and economic environment for companies in this area. These events caused a crisis without precedent in history. The improvements in sustainable development and digitalization have represented the winning strategy to cope with the crisis-related turbulences. For this reason, many governments have chosen to include these objectives among the social goals for redefining their country's competitiveness [3]. Artificial intelligence is revolutionizing all societies and economies, both in public and in private life. However, it is also raising new challenges and new ethical concerns. Governments need to ensure that the AI systems are designed in accordance

with different values and laws—in this way, people can be assured that their security and privacy are protected. AI systems must be designed to be robust, secure, fair, and reliable.

During the last OECD meeting in Paris [4], the first intergovernmental guidelines on Artificial Intelligence (AI) were adopted: "Harnessing the Digital Transition for Sustainable Development". An expert group of over 50 members from governments, universities, companies, civil society, international organizations, trade unions, and the technological community developed the five key value-based principles to achieve this goal. Their purpose was to guide governments, organizations, and individuals in designing and operating AI systems, in a way that puts people's interests first and ensures that designers and operators take them under careful consideration. Although not legally binding, in other policy areas the OECD principles have proven to be very influential in setting international standards and in helping governments to draft national legislation.

In recent years, there has been a rapid growth of works in the literature investigating the nexus between sustainable development and digitalization, and then how business sustainability can be improved through the support of technology [5,6]. Corporate sustainability refers to continued profitability and a competitive advantage in specific areas [7]. Data information, explosive growth and the wide application of digital technology have become strategic resources for companies. Indeed, they allow them to improve their core competitiveness, to obtain potential opportunities, and to benefit from positive effects on resilience [8–11]. In addition, digitalization could accelerate the implementation of sustainable development practices in companies [9,12]. Even before the arrival of the pandemic, several authors had claimed that developing sustainable development policies could not only help with regard to efficiency, but also in obtaining and maintaining appreciable legitimacy judgments [13–15].

This study focuses on the agribusiness area and, specifically, coffee, which represents one of the excellences of the 'Made in Italy' products. Italy, indeed, despite being thirteenth in the world in terms of per capita coffee consumption, represents excellence in the production and export of Italian espresso which, in January 2022, was nominated to enter the Intangible Heritage of Humanity.

The MIPAAF, the Ministry of Agricultural, Environmental and Forestry Policies, had submitted this nomination under the title "Italian Espresso Coffee between Culture, Ritual, Sociality and Literature in Emblematic Communities from Venice to Naples". The UN has rejected this proposal, but the nomination will be submitted again. A total of 60% of the coffee that is roasted in Italy is exported abroad. Of this, 60% of it remains in Europe, whereas the remaining 40% reaches non-European countries. The know-how of Italian coffee producers, along with the excellence of espresso machine manufacturers, have enabled the coffee drink to become one of the best-known and most popular products in the world. In the past five years even the Asian continent, which had always been devoted to tea consumption, has enthusiastically embraced the black beverage, which there has been less common. One of the reasons is that the large Chinese market, because of the growth of the middle class, has been increasingly embracing Western trends, including the consumption of coffee and wine. After the setback experienced in the restaurant industry in 2020, the world trade of coffee chain products has shown significantly positive dynamics in 2021 (the value of espresso machines has increased by 13.6 percent, that of decaffeinated coffee by 13.1 percent, and that of unroasted coffee by 8.8 percent) [16]. Italian coffee exports reached EUR 2.6 billion in 2021, registering a +14% increase over 2020. The forecast is for a +5.5 percentage growth, for a total export value which should reach EUR 3.3 billion. Coffee is a beverage that is evolving, despite its age, thanks in part to the changing tastes of consumers, who are increasingly aware and demanding in terms of consumption habits. In addition, the range of offerings is also being expanded, depending on the trends among new generations and the social dynamics which have been launched during the lockdown period. Dalgona and Proffee coffee are two recipes that have come out of the unleashed imagination on social media during the lockdown: both contain coffee [17]. This shows a clear appreciation towards a drink that should not, at least among young people, exceed

certain amounts, as shown by the recent research of Prof. Campanozzi [18]. In any case, this drink represents one of the most well-known Made in Italy products, and this is also the reason for the choice of the present study.

This paper analyzes 15 companies operating in coffee production and marketing in Italy. They have been chosen based on selective criteria, including their different geographical locations. The aim of this paper is to detect possible future business trends in this area, such as new strategies to support sustainable development and an increase in companies' digitalization, especially following the deep crisis caused by COVID-19. This work also aims to capture the influence dictated by the pandemic period. Specifically, this study investigates the following: how companies have responded to COVID-19 spreading, which actions they have decided to undertake, what role sustainability and digitalization policies have played in organizations and, finally, whether and how companies' strategies have been influenced by the presence of a pandemic and its consequent critical situation. We have coined the expression "sustainab-lization business model" to emphasize the value of the following two activities: sustainable development and digitalization. We have analyzed whether the companies surveyed have moved toward this business model or have at least expressed a future willingness to invest in it, highlighting the progress in their operations and helping to underline the importance of the nexus between sustainability and digitalization.

This study found that digitalization has enabled the investigated companies to better adapt to new and completely unforeseen market conditions. In particular, the adoption of digital communication systems, such as social media channels or online sales channels, has allowed them to maintain contacts with customers, suppliers, or other categories of stakeholders. Other companies are investing in organic and sustainable coffee cultivation, which reduces the use of pesticides and chemical fertilizers. Finally, for other companies, the focus is on reducing environmental impact through the use of environmentally friendly packaging and the recycling of waste materials. In general, it is confirmed that the coffee sector is becoming increasingly sustainability- and digitalization-conscious: this allows companies to increase efficiency, improve product quality, and simultaneously reduce environmental impact [19–21].

This study offers its contribution to several aspects of the literature: that on corporate crisis, that on sustainable and digitalization development, and that on business strategies. It also highlights the growing importance of more sustainable productive business models, of an acceleration in digital transformation, and of the introduction of advanced services. This evolution has proved particularly important in helping companies to overcome the crisis, and even to better position themselves after the pandemic. The companies' operative business has changed, and those who run a company need to know and to be aware of which choices are the right ones to cope with a situation which is beyond the "new normal".

This work has been restricted to only one country (Italy) and to a small panel of companies observed and interviewed. Thus, these practices may differ from those of other countries or contexts in the same industry.

The RQs to be answered are the following:

RQ1: Which phases did companies experience during the following periods: before, during, and after the arrival of COVID-19?

RQ2: With regard to these phases, is it possible to identify the "fundamental features", in order to formulate the most appropriate strategies to deal with such an unprecedented crisis?

RQ3: Which actions have been implemented to address the crisis due to COVID-19?

RQ4: Are there new strategies to deal with this period? Are there any actions that can foster sustainability and digitalization in each company?

RQ5: In the sample surveyed, is there a direction toward a sustainab-lization business model?

The structure of this paper is as follows. The next part reviews the theoretical framework, which is structured into three sections: resilience during the pandemic period, sustainability, and digitalization in the coffee sector. The third part presents the methodol-

ogy of this research. The fourth part refers to data collection, whereas the fifth one presents our results.

The sixth part presents the discussion related to the RQs, whereas the seventh shows our conclusions, highlighting the contribution and the limits of this research.

2. Theoretical Framework

The theoretical framework of this study is structured in three sections, as follows: resilience in the time of COVID-19, sustainability in the coffee sector, followed by digitalization in the coffee sector.

Sustainability and digitalization are two megatrends which, according to the literature, are critical to shaping future economies and economic activities [9].

2.1. Resilience in COVID-19 Time

Even before the advent of COVID-19, the scientific literature had already addressed resilience as"truly resilience" or "strategic resilience". This refers to the kind of reaction, by public or private organizations, to the dynamism and unpredictability of the external environment [22,23].

Thus, the concept is that organizational resilience is the ability to react, both from a structural and managerial perspective, and in a timely and appropriate manner, to the multiple and changing competitive challenges that modern organizations must face [24].

In today's socio-economic environment, the levels of environmental uncertainty, complexity and risk are continuously increasing. Organizations must cope with them, along with other pressures, such as competitiveness. In a historical moment such as the one beginning in 2020, characterized by the presence of a global pandemic and, from 2022, also by the presence of a war conflict in Europe, resilience has become a strategic concern for organizations. Thus, resilience can be defined as the ability to recover from one or more negative and destabilizing events, to take the blow (resistance) and regain a new equilibrium (recovery). Hence, given the systemic nature of the corporate complex, it appears necessary to adopt a holistic approach. The concept of Strategic Renewal has been formulated by focusing on internal characteristics and on the strategic orientation of organizations [25], and on finding a balance between the internal characteristics of the organization and the external environment.

Therefore, for the purposes of this study, it is useful to consider the graphic representation in Figure 1, which has been proposed by two scholars and adapted by us. It summarizes the crucial elements for the development of resilient organizations [26].

The key pivot is the role of human resources and their adaptability and proactivity in achieving organizational resilience. There have been more efforts in this period than in the pre-COVID-19 one to achieve corporate sustainability goals. They have mainly leveraged the psychosocial factors of human resources, and have proven crucial [27].

COVID-19 has globally challenged all organizations and all types of industries, causing unprecedented difficulties. In this new scenario, companies have been wondering which new strategies to adopt to cope with the dramatic crisis. On the one hand, the pandemic period has caused quite a few problems, pushing companies to improvise and manage a time of profound unpredictability. On the other hand, it has pushed each company, through the awareness of its own inclinations and beliefs, to react and demonstrate its resilience, establishing business models that have become the new ordinary.

For the sake of this paper, we have decided to embrace a framework that has been adapted from a recent study. It clearly highlights which stages were involved in the turnover and what were the internal reactions of companies operating in the manufacturing sector during the pandemic period [28]. Moreover, it describes their transformation in terms of resilience. This model has been developed on four main phases, calamity, quick and dirty, restart, and adapt, and it describes how companies have handled the crisis.

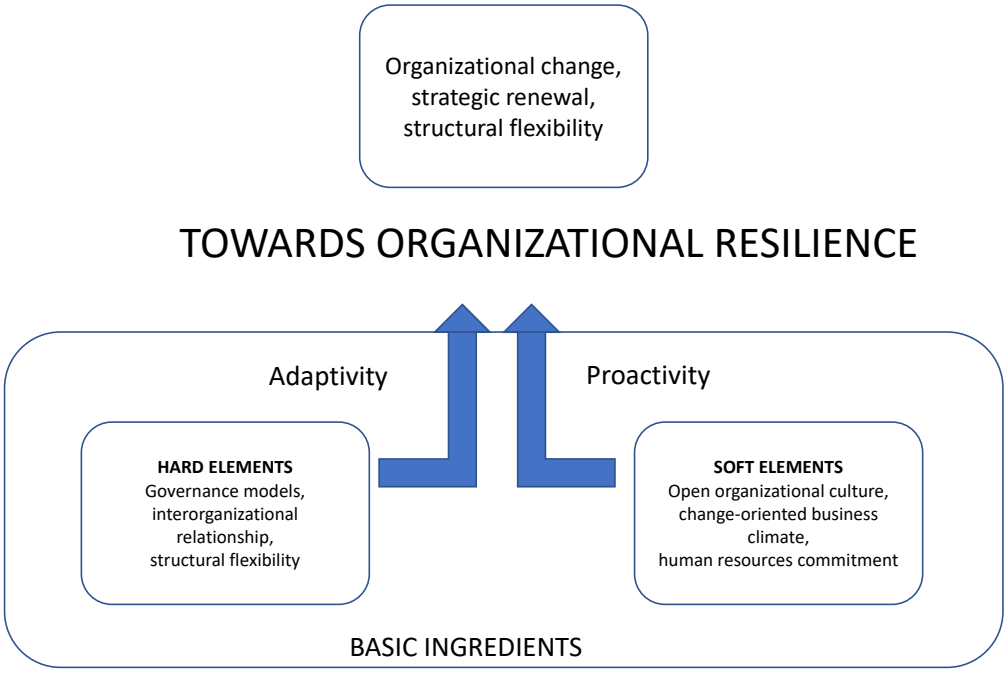

Figure 1. The recipe for organizational resilience (adapted from Palumbo and Manna, 2019) [26].

1. *Calamity*

The first phase, just after the spreading of the "calamity" that came upon Italy from the end of February 2020, has been marked by the awareness of the phenomenon gravity.

2. *Quick and Dirty*

The second phase has been characterized by the adoption of security measures and by the creation of activities, even in partnership with customers and suppliers, to address the business issues which have been caused by the lockdown closures.

3. *Restart*

This phase has been characterized by a general reorganization of activities, as well as by the acquisition of a greater elasticity in business, consequent to the profound market turbulence.

4. *Adapt to Next Normal*

The last phase is characterized by a deep understanding of changes and by the ability to adopt new strategies, embarking in a new way into a new reality, to get out of the crisis and to perform business with a new awareness. The guideline is to "define and put in place pathways which are consistent with each situation that shows up in the "next normal" [28].

Independently of the pandemic period, the concept of resilience has been linked for several decades to challenges related to the environmental variations which companies have had to face. For this reason, more and more attention has been paid to policies linked to sustainability, in its dual environmental and social connotations. The global movement for sustainability, indeed, encompasses several areas (economic, social, environmental), and for this reason it is known as the "triple bottom line". In this regard, within the 2030 Agenda, the United Nations refers to the 17 SDGs (sustainable development goals), which should permeate the various spheres of human life and economic activity. Those companies combining the economic perspective with the socio-environmental dimension pursue a value creation which extends to a broader set of stakeholders [29]. In addition, specific strategies and managerial control tools support the integration of sustainability within business models [30]. Therefore, sustainability can strengthen the resilience of enterprises.

Furthermore, recent studies have shown that digital transformation has had a positive effect on resilience [10,31]. Indeed, they have shown that, from an internal perspective, it

is able to improve the efficiency of production systems; from an external perspective, on the other hand, it can improve relationships and relations efficiently and effectively. In addition, an increased digitalization can facilitate internal business exploration, stimulating innovation and making a company resilient in the long run, as it becomes increasing able to cope with uncertainty.

In general, companies have already been taking a digital approach for some time, to cope with the product complexity, to employ technology in their production processes, as well as to meet the growing expectations of customers and business partners. This relates to the definition of resilience and sustainability [32]. Digitalization, then, can support sustainable development: it allows a more efficient management of activities and the monitoring of progress or negativity [33].

2.2. Sustainability in the Coffee Sector

An early definition of sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [34,35]. Later, scholars identified three dimensions of sustainable development: economic, social and ecological development [36–38]. Many definitions integrate several concepts: expansion, growth, progress, development, and satisfaction. Thus, they show a direct relationship between economic growth and people's satisfaction [39–41].

Freeman, with the stakeholder theory, has established that companies choose to address sustainability as a response to stakeholders'"demands" [42]. Moreover, corporate social responsibility has become a value for stakeholders [43] to create shareholder value [44]. Sustainable development has replaced the traditional corporate performance model, as the only way for owners to accumulate capital [45]. Sustainability is a necessary path to respond to the demands of increasingly attentive and sensitive consumers, who demand this commitment from companies and reward more those products and services coming from sustainable businesses [46–48]. It is a direction that has been charted by European legislation and international commitments on the climate change front, such as the European Union's ambitious targets for reducing greenhouse gas emissions, international climate agreements, or the United Nations Sustainable Development Goals [49].

The 21st Conference of the Parties to the United Nations Convention on Climate Change [50] also outlined a new way for climate change: the imperative action is that of a more timely, responsible, and equitable sustainability [51,52]. In the sustainability field, decision makers are challenged with complex and ambiguous scenarios and often, especially in the past, they have failed to make radical changes to foster corporate sustainability. Scenarios have been changing faster and faster, and sustainability has become the priority in any sector, including the food one.

In particular, the coffee sector, which is the second most traded commodity in the world, as it involves thousands of companies and several million farmers [53–55], provides a good example of this new trend. Indeed, over the past decades, coffee industries have undertaken significant activities in adopting sustainability [56]. The main reasons for adopting sustainability strategies are as follows: to reduce regulatory risk while simultaneously filling a policy gap, to meet stakeholder expectations, to increase revenues, to improve one's brand and reputation, or simply to differentiate oneself from competitors [57]. The coffee production and consumption chain has been involved in several environmental controversies. The sector is facing many sustainability challenges, including water pollution, biodiversity loss, soil erosion, use of agrochemicals, deforestation, waste generation, and labor exploitation [58], but also low prices, aging farmers, and dangerous climate change [59]. All these elements cause a complicated situation for the actors involved in this sector. First, cultivation can deteriorate aquatic ecosystems, habits, and soils [60]. Second, in the production and industrialization stages, coffee produces substances that are harmful to humans and the environment [61]. Last but not least, roasting and consumption of this product produces coffee waste that alters the natural environment [62].

At the global level, the share of coffee in total export earnings has a positive and significant reflection on both the Gross Domestic Product (GDP) and on economic growth [63] for most of the producing countries, particularly for developing and least developed countries [64,65]. According to the International Coffee Organization, South America holds about 43% of the total world coffee production, followed by Asia and Oceania, with 33% [16]. The Food and Agriculture Organization of the United Nations estimates that Brazil and Vietnam are the two biggest producers and exporters of coffee in the world [64,66].

In the wake of sustainability, the coffee sector has the duty to become more efficient. The coffee industry already adopts sustainable practices, including tree planting programs and recycling and water consumption policies [67]. Furthermore, the use of renewable energy sources, such as solar energy, reduces energy costs [68]. Sustainability also must involve the adoption of circular practices, in which by-products from production sidestreams are reinserted into the production chain. Furthermore, when food producers develop new products meeting sustainability criteria, they must understand the consumers' reaction to the adoption of more resource efficient production approaches and of new ingredients [69]. Within the food and beverage market, of which the coffee market is a part, Döhler Market Intelligence has identified some top consumer trends [70]. The first trend is one toward sustainability and naturalness, which are related to human health and the planet's resources. In the food and beverage market there has long been a need to return to what is natural and simple. In addition, consumers are increasingly demanding transparency about the products they are being offered. Nowadays, consumers prefer those products which are characterized by an increasingly short list of ingredients and by the greatest possible transparency. Customers are driven by curiosity and, before buying a product, they inquire about its origin, composition, production methods and the manufacturer's social responsibility. The second trend revolves around health and nutrition. Consumers increasingly expect that products are characterized by the free-from formula, that is, without unwanted ingredients, meaning no sugar, gluten, or lactose, or without additional ingredients such as vitamins, proteins, minerals, and so on. Another trend is characterized by the consumers' desire to experience food products with all their senses. Innovation must be pursued with regard to flavor and to the product formula itself. A combination of various products components, such as color, aroma and texture, represent a multisensory experience [70]. The result of the roasting and instilling processes, i.e., the processing of silver coffee husks and exhausted coffee grounds, provides an important bioactive function. Moreover, the silver husk of coffee is used in the production of other food products, including baking. Coffee and its waste have a great potential as a food ingredient, because they are composed of a high amount of fiber, antioxidant compounds, and color pigments [12].

With regard to waste, the agribusiness industry produces large amounts of rubbish worldwide, and its non-reuse generates a non-negligible amount of environmental pollution [70–72]. Coffee processing produces several million cubic tons of waste each year, which is incinerated, dumped in landfills, or mixed with animal fodder. Because of its high tannin and caffeine content, coffee waste can degrade soil and, when mixed with animal fodder, can have carcinogenic effects. Furthermore, wastewater generated from coffee processing is highly polluting. If it is directly re-injected into surface waters, it causes harm to aquatic life and human health.

Recent studies show how coffee operators can be more sustainable [67,73–75]. For a more sustainable future, it is important to consider the importance of value co-creation, for example through the involvement of farmers in business strategies, transforming Burundi's coffee sector through strategic value chain investments [76]. Other research highlights the importance of greater stakeholder empowerment and involvement, to promote a greater engagement in the agri-food value chains (AFVCs) [77]. Sustainability, especially in the agribusiness sector, helps to gain, strengthen, and maintain legitimacy [13]. It has also been highlighted that the environmental performance and accounting can help companies to demonstrate accountability and, in turn, gain legitimacy [11].

Several authors agreed, even before the arrival of the pandemic, that sustainability efforts can help to gain and maintain legitimacy [13,15]. Companies are increasingly highlighting their interest in sustainability, beginning from the mission statement. They emphasize, indeed, that safeguarding the territory value, their products' quality, respect for people and the health of the end consumers are all indispensable aspects of their business. This can be accomplished by observing values such as respect, transparency, and authenticity. They can be achieved through a constant engagement in daily activities, an increased knowledge, and an ability to create innovation and to build trusting relationships, based on a solid reputation. Moreover, partly due to the lessons acquired and certainly accelerated during the pandemic period, companies are moving closer and closer towards a "zero waste" model.

In this scenario, digital technologies represent the potential to obtain the improvement of farmers' capabilities and of results in terms of sustainable agriculture. A frame of inclusion, cooperation and responsibility for the entire chain is necessary, from farmers to consumers and also industries [78]. From a practical perspective, the new forms of sustainability in the coffee sector should use new solutions of dialogue between farmers and computer programs (for instance, blockchain or IoT, Internet of Things), which will require the development of socially and environmentally conscious programs and, not least, of conscious consumers.

2.3. Digitalization in Coffee Sector

Industry 5.0 requires technological innovations and an implementation of values and knowledge in order to be part of a hyperconnected value network [79]. Companies should have the competency to implement integrated technological innovations such as blockchain, Internet of Things, big data analytics, intelligent transport systems, robotics, artificial intelligence, etc. [80]. Furthermore, it is necessary to dispose of digital transformation competencies (DTC), including digital and technical ones, knowledge, and strategic management [81]. Industry 5.0 emphasizes the need to possess the right skills to manage technological transformation and the ability to manage the risk of digitalization [82]. Digitalization is an innovation that can introduce changes for business, sustainability, growth and prosperity, and the pandemic period has accelerated its development.

Since 2000, Industry 4.0 has introduced IoT, Big Data, electric vehicles, cloud computing, artificial intelligence and 3D printing [83]. From 2016, Industry 5.0 is giving rise to a smart digital society that integrates virtual and physical spaces, augmented reality, IoT, robots, and the brain–machine interface. With this new approach, it is easier to promote sustainable development goals (Aslam et al., 2020). In particular, prior to the arrival of COVID-19, the challenges which have been posed by digital transformation have mainly focused on the fourth industrial revolution, thus on Industry 4.0 and Web 4.0 [5,7]. The new direction is to move towards a new concept of innovation that includes environmental and social innovation. The first includes changes that allow business products, processes, and services to be implemented for a more environmentally sustainable economy [84]. Social innovation involves improving the well-being of society through the introduction of innovative solutions that encourage changes in products, processes, models, and collaborative networks [85]. This new "roadmap" includes, for example, smartening the work environment, improving customer satisfaction, and inclusive business models [86], in order to achieve a new concept of enterprise value for the post-COVID-19 period.

The latest studies have shown that the digitalization of food ecosystems is the key to a post-pandemic future [77,87]. Communication tools such as video calls and virtual platforms make it possible to meet and collaborate, at any time, with people from all over the world. Furthermore, digitalization offers unlimited possibilities in all areas, from health, to work, to socialization, and so on. Social media such as Twitter, Facebook, WhatsApp, or Instagram are increasingly being used by consumers to exchange advice on products and services and to inform each other about discounts and bargains. In addition, the economic difficulties that have arisen after the COVID-19 pandemic have offered the advantage of

accelerating the digital transformation process in companies [88–92]. Digitalization has enabled companies to increase productivity and competitiveness and, as a result, overcome the crisis [91–95]. However, there are often many obstacles that need to be addressed and challenges that are often closely related to their relevant industry [6,91,96,97].

The agribusiness sector has distinctive characteristics; indeed, these companies must face various uncertainties, including crop yields, weather conditions, procurement time, shelf life and spoilage rates of products, market prices, pests, diseases, regulations, etc. [91,96,98,99]. These sources of uncertainty are completely unpredictable [96,100]. Thus, in 2018, the FAO stressed the importance of the development of innovative digital technologies which can help this industry in risk management, greatly improving both the conditions of the individual enterprise and the sustainability of the whole system.

Numerous studies have analyzed the various barriers to the adoption of digital technologies by these companies [91,101,102]. Some of them have specifically focused on the agribusiness sector [6,94,103]. The results show that, due to scarce resources and limited capacity, the companies with the greatest barriers to digital innovation are the SMEs [91,97,104]. These obstacles have been further amplified by the crisis, which has made SMEs more vulnerable. Nowadays, speed is the key word. Consumers, indeed, do not have the patience to wait, and want to receive, as soon as possible, goods and services from the companies that they approach. People also make increasing use of apps, which facilitate them in various areas of their lives, from education to street driving directions.

Digitalization also directly affects the food and beverage market. To create, maintain and improve relationships with consumers within this sector, manufacturers and vendors must make a clever use of digital tools [105]. The trend is that, soon, ordering coffee from vending machines supporting the "facial recognition" function and able to personalize orders will become routine. Baristas will be replaced by robots, to cut costs and speed up time [70]. The use of increasingly advanced technologies, such as drones, sensors, and robots, means that the food sector is experiencing a strong digitalization. This is helpful in providing consumers with cheaper, tastier, safer, and more nourishing food, and in making a more efficient use of natural resources. The data emerging from the different stages of the food value chain provide very useful information to enable a proper planning of production activities and, for example, to identify when and how to harvest and deliver the different products. Various levels of data are generated, including those that detect the storage conditions of raw materials and ingredients, the food composition, the shelf life, and the nutritional content. In addition, information collected from sensors measuring temperature, humidity, chemical and biochemical components is used to predict actual shelf life, the microbiological stability of food products, or the ripeness of fruits and vegetables during logistics and distribution. The information obtained is useful data in the hands of researchers, dietitians, epidemiologists, and policy makers. It also represents a valuable tool for public health and nutrition, as it is useful for assessing the quality of populations' diets or the success of certain dietary guidelines. Moreover, new information and communication technologies (ICTs) offer both opportunities and threats. One definition of an intelligent company may be one which is able to integrate the set of skills and knowledge of the individuals working in it—the human intelligence—with the new ICTs—the artificial intelligence.

The digitalization process requires a strong business strategy, to enable companies to cope with the different stages of business metamorphosis through smart business solution procedures. This pandemic period has made it necessary to redesign the management and collaboration models, so that no one within organizations could be left behind or felt excluded from the ongoing digitalization process. Many organizations, if not nearly all, have been forced to adopt new internal work practices (restrictive limitations and smart working) and have had to quickly reorganize, to offer products through digital channels. COVID-19 has caused difficult and uncertain times, and this crisis has inevitably accelerated the digital transformation processes everywhere, not only in companies, but also in public organizations and for single individuals.

In this moment, the digital transformation can be defined as a fusion of advanced technologies integrated with physical and digital systems. Because of this emergence, there has been a spread of innovative business models, of new production processes and of new organizational forms, and it has become the norm [106]. Digitalization cannot be defined as a new phenomenon, but the challenges and opportunities associated with it are constantly evolving [107].

In the COVID-19 era, the challenges have changed, and both the entire organization and all the stakeholders are involved in this transformation process. Moreover, this change has happened in a lightning-fast manner. The radical shift into digital technologies has come at a time when many companies, especially SMEs, were unprepared for this kind of change. The COVID-19 pandemic has led to the widespread adoption of digital technologies in companies, particularly in remote work management and in e-commerce. The steps following COVID-19 involve constant analysis and research on the best way to exploit challenges and turn them into new opportunities, both in companies and in internal organizations.

3. Methods of Research

To explore how companies in the coffee industry have managed their business to improve sustainability and digitalization, demonstrating resilience during the pandemic period, this study takes an exploratory and qualitative approach [83,108,109]. It is based on the case-study method [83,110], since it is considered appropriate for the investigation and understanding of such a complex phenomenon as the unprecedented pandemic, which has generated a large-scale crisis. All data and information collected have been examined using qualitative thematic coding techniques [96,110], making it possible to build a solid foundation for theory building [83,110,111]. Specifically, the method adopted aims to investigate COVID-19's effects on the strategic planning of companies operating in the Italian coffee industry. Furthermore, it is a method particularly valued by studies on the food and beverage sector, which is strongly influenced by personal and spatial factors [108]. Indeed, it allows a greater level of detail and insight to be obtained than quantitative research [112], as well as the observation of the investigated aspects in a practical context, in which the company's experience represents a critical success factor [113,114].

Thus, the present work consists of four parts:

(1) The identification of the sample of the investigated companies;
(2) The observation of the activities that have been planned and introduced before the arrival of COVID-19, during the full spread of the pandemic and after, up to the present period, and looking ahead to the future;
(3) A comparison of the results among companies selected in the sample and their analysis, aimed at the further development of new elements of crisis management;
(4) The identification of the main actions which have enabled the investigated companies to emerge from the COVID-19 crisis, showing their resilience, the investment choices in sustainability and digitalization (at all levels), the new strategies, the new challenges, and the future scenarios.

The sample has been identified by selecting fifteen business companies. We have adopted theoretical sampling, as suggested by Eisenhardt and Graebner [115]; these companies have been selected for their "similar" characteristics and for their location in the same territorial contexts, among northern, central, and southern areas of Italy. Moreover, they have been chosen for the presence of a particular "sensibility" concerning the theme of sustainability, as stated on their website. The objective is to investigate whether and which investments have been made to cope with the numerous difficulties of that period, reconciling the functioning and the optimization of all the areas involved in the production, and to understand what kind of reaction there has been towards sustainability and digitalization behaviors and practices.

Thus, the purpose is to investigate the openness to embrace technological modernity, to generate benefits in terms of business results and, at the same time, to produce "efficient"

behaviors, in view of an ever-increasing focus on sustainability, reconciling production processes which are in line with the goals of Agenda 2030 and with the 17 SDGs (Sustainable Development Goals).

The sources which have been adopted for this study are the following:

- Corporate documents and press releases published on corporate websites;
- News, in the form of articles which have been published by newspapers, released by press offices, and those coming from industry research that are specifically referring to the companies under investigation;
- Economic and financial data which have been extrapolated from the Aida-Bureau van Dijk database;
- Information obtained through direct contact (via e-mail and/or telephone) with various members of the families to which the investigated companies belong;
- Information obtained through various social channels: Facebook, Instagram, Twitter, Pinterest, LinkedIn;
- Online videos and tutorials, from which news about the investigated companies, initiatives, and other information linked to them has been extrapolated.

Each company in our sample has received an e-mail survey with the following questions:

1. Briefly describe what stages you have gone through since March 2020 and what decisions have been made to deal with the crisis;
2. What actions have you decided to take in general and in particular on the sustainability and digitalization front?
3. What do you foresee for the future?

Some managers made themselves available for interview, while for other companies all the information needed for the study was obtained from the other sources already mentioned above.

The following is the list of companies with which interview has been possible.

Company	Respondent/Role
Dersut	Giulia Caballini (family member)
Gioppion	Paola Goppion (family member)
MARCAFÈ	(Export Department)
Serrani	Emiliano Serrani (family member)
Trucillo	Antonia and Andrea Trucillo (family member)
ZICAFÈ	(Export office)
Valentino	(Administrative office)

We have critically integrated the existing literature on digitalization and sustainability regarding the coffee sector with the results emerging from the present study. In this way, it has been possible to obtain several findings.

The sample to be included in the present study has been chosen following the logic of theoretical sampling, selecting those companies with the following characteristics:

Ateco Code	*108301 coffee processing*
SAE CODE	*430 manufacturing companies*

The ATECO code is the classification of economic activities adopted by Istat (National Institute of Statistics) for statistical purposes, that is, for the production and dissemination of official statistical data. The SAE code, on the other hand, indicates the subgroup of economic activity of each specific company. The list of SAE codes is released by the Bank of Italy. It is a code that is used, among other things, as a criterion for assessing a company's creditworthiness.

In addition, the Recommendation 2003/361/EC of 6th May 2003 and the decree of the Minister of Economic Development of 18th April 2005, Recommendation of the Commission of the European Communities of 06/05/2003, define the micro, small and medium-sized enterprises (SMEs) as those employing less than 250 people, and whose annual turnover

does not exceed 50 million euros or whose total annual balance sheet does not exceed 43 million euros. In this regard, in order not to create inequalities in the comparison, we decided to select companies with between 20 and 60 employees (an exception was made for two companies in Central Italy, which fall a bit outside of this range but which are particularly interesting for this paper's purpose).

The last parameter for choosing the sample has involved the selection of companies whose legal status is SpA (Joint Stock Companies) and which were established no less than 40 years ago.

As already anticipated, to obtain a more meaningful comparison and to capture any difference due to the geographical context of reference, our sample is composed of five companies from northern, five from central, and five from southern Italy.

Table 1 summarizes the main data of the analyzed companies, which were used for the first phase of our research:

Table 1. Surveyed companies.

Company	Corporate Headquarters	Year of Establishment of the Joint Stock Company	Number of Employees
NORTHERN ITALY			
Musetti	Pontenure (Pc)	1967	44
Cagliari	Modena	1981	35
Dersut	Conegliano (Tv)	1947	41
Diemme	Albignasego (Pd)	1975	52
Goppion	Preganziol (Tv)	1975	30
CENTRAL ITALY			
Camardo	Ripamolisani (Cb)	1972	27
Danesi	Roma	1965	36
MARCAFÈ	Giulianova (Te)	1982	15
Pascucci	Monte Cerignone (PU)	1992	61
Serrani	Todi (Pg)	1972	7
SOUTHERN ITALY			
Barbera 1870	Messina	1970	27
Mauro	Reggio Calabria	1959	40
Trucillo	Salerno	1967	22
Valentino	Lecce	1992	44
ZICAFFÈ	Marsala (Tp)	1971	36

4. Data Collection

Fifteen companies have been analyzed for this multiple-case study. The key information has been collected in Table 2. First, we have reported the main information that we have chosen, namely a summary of the company's birth, the number of generations that have succeeded each other, where possible, and the number of countries to which the company exports. From the latter information, we can deduce some of the difficulties which have been encountered in managing these relationships, especially in the early stages of the pandemic period and considering the different regulations introduced from country to country.

Table 2. Key information on the analyzed companies.

Company	N. of Countries to Which the Company Exports (Approximation)	Company's Birth and Other Main Information
MUSETTI	45	Musetti's story began in Piacenza in 1934, when Luigi Musetti founded, in the heart of the city, "La casa del caffè". The company is now in its third generation.
CAGLIARI	40	It was founded in 1909, when Ambrogio, after years on plantations in Brazil, came back and opened a roasting and tasting store in Modena. In 2009, on its centenary, it inaugurated a museum dedicated to professional coffee machines, one of the most comprehensive collections in the world.
DERSUT	20	In 1949, the Conti Caballini family of Sassoferrato took over Dersut Caffè in Conegliano, Treviso, pursuing the dream of running a small roasting company. The late 1990s saw the third generation of the company. Dersut has provided each point of sale with a dedicated technical support service, being able to count on a team of specialized technicians, and holds the coffee taster's license (INEI) and which are EUROISA sensory judges. In 2010 it opened the Conegliano Coffee Museum, bearing witness to the history of the industry and of the city.
DIEMME	40	In 1927, Romeo Dubbini founded Diemme Industria Caffè Torrefatti in Padua. Currently it is led by his grandchildren, so it is now in its third generation.
GOPPION	30	The history of the Goppion family has seen a long history, starting with Luigi Goppion, born in 1858, who began the food business. The company is currently in the hands of its fourth generation, and the recent addition, Silvia, represents the fifth. The Italian market constitutes 80% of sales, 60% of which is represented by the Ho.Re.Ca. channel, whereas the remaining 40% is composed of the large-scale retail trade.
CAMARDO	10	The company's history began in 1948 with Cav. Bartolomeo Camardo and is now in its fourth generation. The issue of sustainability is increasingly at the center of the company's daily life. Since 2009, it has adopted photovoltaic systems for its plant, covering all its manufacturing energy needs.
DANESI	60	In 1933, following the death of Alfredo Danesi (who had started with a coffee emporium in the center of Rome), his son Giovanni, known as Nino, pursued his father's business as an espresso coffee taster and popularizer. In the 2000s, the fourth generation is carrying on the family business.
MARCAFÈ	25	The history of MARCAFÈ (Torrefazione Adriatica SpA) began in 1942, from an idea of Mr. Silvestro Marcozzi, a man endowed with a strong entrepreneurial spirit and passion for his work, which was as the owner of a food wholesaler in Teramo. In the late 1990s, the founder's grandchildren joined the company with a business vision based on innovation, sustainability, and internationalization.
PASCUCCI	60	The company is currently run by the third generation. In 2006, Alberto Pascucci was honored by the Chamber of Commerce for having led the family business to goals of excellence in quality.
SERRANI	7	In 1948, Giovanni Serrani started his business in the food industry at the same time as our country's rebirth after the war. Today, the company is run by the third generation.

Table 2. *Cont.*

Company	N. of Countries to Which the Company Exports (Approximation)	Company's Birth and Other Main Information
BARBERA	65	In 1870, Domenico Barbera started a small coffee roasting business in Messina, becoming the "Wizard of Coffee". In 2014, the sixth generation has joined the company. Since its very beginnings, the company has embraced the use of solar energy, taking advantage of the first incentives, and installing a system of photovoltaic panels: a 40 KW system allowing energy savings between the 20 and 30%.
MAURO	60	The history of Caffè Mauro began in 1949, when Demetrio Mauro had the intuition to install the first roasting machine in a small warehouse in the port of Reggio Calabria. In 1967, Demetrio Mauro received the prestigious "Mercurio D'Oro", an award from the then-Minister of Economy Hon. Giulio Andreotti. In 2009, Demetrio Mauro SpA changed its name to Caffè Mauro SpA. Now, the company, with Fabio Capua, is in its fourth generation.
TRUCILLO	40	In 1950, Cesare Trucillo began among ships and sacks of raw materials, working with the best importers and traders of the time. Since 2015, the third generation has joined the company, with Cesare's three grandchildren, sons of Matteo Trucillo, CEO of Cesare Trucillo SpA since the 1980s.
VALENTINO	10	Valentino Caffè is a company that has been led by the Montefrancesco family for three generations. In 2016, Chiara, who represents the third generation, received the Guido Dorso award as the best female entrepreneur in the Mezzogiorno region.
ZICAFFÈ	40	In 1929, Vito Zichittella, a coffee connoisseur, decided to follow his passion by creating a small roasting company in Marsala. Since 2011, the fourth generation has entered the business. In recent years, the company has built a photovoltaic system which allows the production of clean energy, which is necessary for the production cycle and to monitor emissions while respecting the environment.

We also wanted to highlight quantitative data collected from the Aida platform (Table 3), and other qualitative information collected from the various company websites and other media and social networks (Table 4). This information, which has been extracted from companies' financial situations, is useful for understanding the consequences in terms of turnover, profits, as well as of any decrease or increase in assets (namely of investments or disinvestments).

Table 3. Key quantitative information about the companies in the sample.

Company	Years	Sales Revenue	Income	Total Assets
MUSETTI	2019	EUR26,304,208	EUR1,242,309	EUR31,792,238
	2020	EUR 16,193,764	EUR−574,409	EUR46,434,371
	2021	EUR25,031,877	EUR1,410,848	EUR48,460,475
CAGLIARI	2019	EUR16,639,950	EUR690,960	EUR13,314,251
	2020	EUR15,295,739	EUR113,225	EUR12,797,498
	2021	EUR16,440,264	EUR236,357	EUR16,251,104

Table 3. *Cont.*

Company	Years	Sales Revenue	Income	Total Assets
DERSUT	2019	EUR15,051,102	EUR1,061,117	EUR30,024,615
	2020	EUR9,307,804	EUR−928,931	EUR29,292,821
	2021	EUR11,226,543	EUR−194,743	EUR29,932,077
DIEMME	2019	EUR16,850,897	EUR1,108,523	EUR15,031,862
	2020	EUR11,579,111	EUR577,845	EUR21,560,985
	2021	EUR14,915,907	EUR1,011,004	EUR24,262,742
GOPPION	2019	EUR12,039,328	EUR670,962	EUR15,455,597
	2020	EUR9,645,218	EUR39,371	EUR16,234,029
	2021	EUR12,577,882	EUR574,125	EUR17,519,638
CAMARDO	2019	EUR5,430,296	EUR346,006	EUR6,103,722
	2020	EUR3,989,484	EUR592,734	EUR12,445,185
	2021	EUR5,580,692	EUR148,961	EUR13,257,826
DANESI	2019	EUR9,958,609	EUR1,624,236	EUR23,551,423
	2020	EUR6,813,861	EUR464,905	EUR23,286,034
	2021	EUR7,857,387	EUR1,315,076	EUR24,015,090
MARCAFÈ	2019	EUR4,708,156	EUR124,600	EUR4,982,234
	2020	EUR3,295,307	EUR−204,318	EUR4,869,483
	2021	EUR3,778,013	EUR93,537	EUR4,527,626
PASCUCCI	2019	EUR22,060,372	EUR1,136,480	EUR23,732,428
	2020	EUR17,010,008	EUR324,484	EUR27,976,508
	2021	EUR19,107,030	EUR612,678	EUR30,903,076
SERRANI	2019	EUR842,403	EUR851	EUR3,305,624
	2020	EUR805,809	EUR3,848	EUR3,670,359
	2021	EUR751,159	EUR−1,260,076	EUR2,474,015
BARBERA 1870	2019	EUR8,007,157	EUR357,253	EUR10,543,694
	2020	EUR7,444,173	EUR104,118	EUR10,397,057
	2021	EUR5,169,883	EUR−162,570	EUR12,298,499
MAURO	2019	EUR18,705,001	EUR334,581	EUR23,167,810
	2020	EUR11,906,230	EUR−113,288	EUR29,450,526
	2021	EUR12,396,694	EUR−794,939	EUR28,163,530
TRUCILLO	2019	EUR4,445,637	EUR128,641	EUR7,626,537
	2020	EUR3,343,305	EUR102,569	EUR6,820,830
	2021	EUR4,011,534	EUR150,748	EUR6,457,553
VALENTINO	2019	EUR9,500,446	EUR1,028,321	EUR11,460,291
	2020	EUR7,087,301	EUR234,407	EUR11,440,636
	2021	EUR8,148,668	EUR722,779	EUR10,442,344
ZICAFFÈ	2019	EUR11,031,315	EUR161,895	EUR11,277,113
	2020	EUR8,105,612	EUR39,388	EUR16,312,074
	2021	EUR10,009,353	EUR41,885	EUR17,176,971

Table 4. Other qualitative information about the companies under investigation.

Company	Academy Presence	Social Channels
MUSETTI	In 2003, Musetti founded the Musetti Coffee Academy, a school which aims is to promote and to transmit the culture of good coffee. In 2018, it was certified "Premium Training Campus" by SCA in all five training modules.	Facebook, Instagram, YouTube

Table 4. *Cont.*

Company	Academy Presence	Social Channels
CAGLIARI	Cagliari caffè offers training courses for the dissemination of the coffee culture, with the goal of obtaining good, quality coffee.	Facebook, Instagram, YouTube
DERSUT	September 2020 saw the birth of "ABCD" (Accademia Baristi Caffè Dersut), an acronym of the Dersut training school. Its aim is to spread the excellence of Italian Espresso, fully training anyone who wants to approach the world of coffee.	Facebook, Instagram, Twitter, Pinterest, LinkedIn
DIEMME	Thanks to the experience and expertise of the SCA (Specialty Coffee Association) in-house trainers, the Diemme Academy can boast a complete and customized training program. It starts with coffee in its several forms and extractions, and covers every-thing from more appropriate personnel management to marketing, up to the study of the food and beverage offer.	Facebook, Instagram
GOPPION	The Goppion Coffee School: for over 20 years, the company has been organizing Training Courses for its customers. These meetings represent an occasion for sharing business experiences and important moments for refining skills and competencies.	Facebook, Instagram, Twitter, YouTube
CAMARDO	Academia, the Master Barista Academy, was inaugurated in 2016 with the aim of spreading the culture of coffee. Coffee, therefore, has become the subject of real academic teaching. Having an exceptional espresso is not enough; real rules are also needed.	Facebook, Instagram, LinkedIn
DANESI	Information not available.	Facebook, Instagram

Table 4. *Cont.*

Company	Academy Presence	Social Channels
MARCAFÈ	In 2016, Marcafè founded the Coffee Academy from the desire to transmit knowledge and skills specific to the world of coffee, promoting and spreading the culture of quality coffee, combined with high professionalism in the dispensing of the drink. The courses are taught by international trainers and, in addition to the Marcafè Diploma, the Scae International Diploma is also conferred.	Facebook, Instagram
PASCUCCI	The Espresso School, a training center focused on espresso and coffee recipes, was founded in 1996.	Facebook, Instagram, YouTube
SERRANI	The company has always chosen its own way of supporting and enhancing the growth of its clients, without too stringent constraints. From time to time, it provides training courses for them according to their specific needs.	Facebook, Instagram, YouTube
BARBERA 1870	The company offers training and upgrade courses for operators and professionals in the industry, with courses dedicated to cafeteria and coffee knowledge.	Facebook, LinkedIn, Instagram
MAURO	Mauro founded The Coffee Academy, where culture and education are at the disposal of professionals and passionate enthusiasts of the art of coffee.	Facebook, Instagram
TRUCILLO	In 1998, by the will of Fausta, Managing Director and wife of Matteo (CEO of the company), the Academy was born: the coffee school for Ho.Re.Ca. professionals and enthusiasts.	Facebook, Instagram, YouTube, Twitter, LinkedIn
VALENTINO	Since 2014, the company has been hosting, in the headquarters of the industrial area of Lecce, the professional training school Maestri Caffettieri, directed by Marina Montefrancesco.	Facebook, Instagram, Twitter, YouTube

Table 4. *Cont.*

Company	Academy Presence	Social Channels
ZICAFFÈ	The Zicaffè Academy offers periodic courses which aim at familiarizing people with botany and different coffee qualities, including its specific organoleptic characteristics, its processing, its best extraction methods, the appropriate equipment, and its maintenance.	Facebook, Instagram, YouTube, Pinterest

Table 4 provides a range of information on the presence of Academies. It is useful to understand whether they were introduced before or after the arrival of the pandemic, whether they have always been a part of the activity or if they have been just a consequence of lockdown. In addition, the table includes a quick summary of the social channels owned by the analyzed companies to highlight which are the most used channels and to communicate and create engagement with all the stakeholders.

5. Results

COVID-19 has globally challenged all organizations and all types of industries, causing unprecedented difficulties. The situation has required considerable efforts and quick reactions, strategies, and adaptation to a new and completely disrupted environment. In addition to the pandemic, the disastrous Russia–Ukraine war has implied, for the investigated companies and for all other business entities, a serious disruption of relations with the two nations.

In the analyzed companies, particularly those that have most highlighted their interest in sustainability, the latter begins to manifest right from the mission statement. They emphasize, indeed, that safeguarding the value of the land, the quality of their products, and the respect for people and for the end consumers' health are all indispensable aspects of their business. This is to be accomplished by observing values such as respect, transparency, and authenticity. They can be achieved through a constant engagement in daily activities, and an increased knowledge which can create innovation and can lead to build trusting relationships, based on a solid reputation. Moreover, partly due to the lessons acquired and certainly accelerated during the pandemic period, companies are moving closer and closer towards a "zero waste" model. On the one hand, the pandemic period has caused quite a few problems, pushing companies to improvise and manage a time of profound unpredictability. On the other hand, it has driven each company, through an awareness of its own inclinations and beliefs, to react and demonstrate its resilience, by establishing business models which have become the new ordinary.

The first difficulties, due to the lockdown and to national distancing decrees, have been mainly related to travel restrictions on a national and international scale. They have significantly affected import–export and, since they have stopped most trade, they have provoked a deep crisis. The closure of borders and the limitation of transportation have blocked connections, revealing the first fragilities of a global market. With the borders reopening, the situation has improved, but not immediately with the same sales of the pre-COVID-19 period. Therefore, most of the analyzed companies have had to make up this deficit, with online sales (at first focused on the domestic market) and by opening new distribution channels, such as, for example, large-scale retail trade (GDO). Many companies have also addressed the state of "shutdown" by investing in free training hours; thanks to the presence of the Academies (Table 4), they have decided to promote courses, tutorials, and more, free of charge for anyone interested in enriching their knowledge about the world of coffee. This initiative has been aimed at end consumers, as well as distributors,

bartenders, and all those interested in various ways. To do this, they have taken advantage of social channels. In particular, companies that before the pandemic period were not very familiar with these latter have been "forced" to improve their use, as well as to create social profiles that they previously did not possess (Table 4).

Next, we reviewed which other investments and activities have been implemented by companies under investigation, to cope with the crisis period consequent to COVID-19 (RQ3).

The impact of the COVID-19 pandemic and the subsequent closures and reopenings generated by the government interventions, in Italy as well in the rest of the world, have forced companies to undertake a necessary and rapid strategic reaction to unexpected and totally unfamiliar challenges. Indeed, the various measures and policies which have been undertaken by governments in response to the global crisis have accelerated the volatility, the uncertainty, the complexity, and the risks in every industry. The coffee sector has been particularly impacted since it is involved, upstream, with the sourcing of raw materials from countries abroad, and downstream with sales and consumption, as the Ho.Re.Ca. sector, forced to close, has been severely affected. This scenario highlighted what was happening even more drastically and even before the virus spreading: the digital transformation. In some companies, the pandemic provoked a disruption in the already ongoing processes of digital transformation, while in others, which were already digitalized, it has given them an additional boost, pushing them to adapt as quickly and effectively as possible to the new reality.

Table 5 summarizes the main activities which have been undertaken by the companies under investigation. It can be observed that their actions have tended towards both sustainability and digitalization. They have also included investments and measures to achieve a greater involvement in both the local communities in which the companies operate and other communities across the borders, where the coffee bean is grown and harvested, as well as to achieve improvements in CSR (Corporate Social Responsibility) activities. Thus, a trend has emerged towards strategic engagement actions of the entire supply chain. All actions, although different from each other, have been aimed at creating continuity and adapting to the new reality consequent to the spread of the virus, demonstrating their resilience. There has also been a commitment to digital modernization, in terms of production processes, in all those stages concerning the distribution chain (especially online sales) and with regard to communication channels. The latter have registered a sharp increase, both in terms of investment in improvements and in terms of use.

The main obstacles which have been observed in the companies surveyed have generally concerned the lack of financial availability to invest in modernization (both technological and of other types) and the lack of expertise. The latter has highlighted the need to infuse new knowledge into the company, to improve expertise levels, to acquire the ability of predicting future scenarios, and to be able to react by quickly generating new ideas (also in terms of products) and integrations aimed at generating value for the entire supply chain.

Table 5. Main activities undertaken during 2020–2022 by the companies under investigation.

Company	"New" Investment	Other Information
MUSETTI	EUR 15 million (it purchased the Bonomo SpA Company)	Kosher Certification
CAGLIARI	2021: inauguration of new headquarters and major investments in digitalization; new semi-automatic warehouse	BRC and IFS certification Old headquarters have been transformed into a museum dedicated to espresso, with a multi-sensorial path, a store open to the public, and a larger area dedicated to training

Table 5. *Cont.*

Company	"New" Investment	Other Information
DERSUT	2022: the company has planned the expansion of its new city operational headquarters. The company has built a photovoltaic system, which provides great energy efficiency, and an automated 4.0 warehouse. 2022: Dersut has engaged in non-financial reporting, producing and publishing (on its website) its first Sustainability Report, referred to 2021	New coffee museum; eight-thousand-square-meter public parking; creation of a city park for all "four-legged friends"; the company will build, in an area of about one thousand square meters, an air-conditioned greenhouse to produce about one hundred kilos of 100% Made in Italy coffee
DIEMME	2021: it acquired the Moka Sir's Spa Company	Willingness to enter foreign markets and to expand on the large-scale retail trade
GOPPION	More careful and meticulous handling of management control, especially with regard to main customers (bars and the entire Ho.Re.Ca. sector). Interventions in the smart warehouse and in other automated production processes, succeeding in eliminating and simultaneously refining certain steps, thus optimizing production processes in the pursuit of a greater efficiency	The company has implemented numerous interventions in the area of both promotional and educational initiatives on coffee consumption. Both social tools and the local press have been used for this purpose. The purpose has been, in addition to maintain turnover levels, to consolidate the union with local realities, such as associations or schools, or other entities, helping and supporting them in their institutional purposes
CAMARDO	Technology and innovation investments	Certification from TUV Austria (pods and capsules). 2021 Gold Metal IIAC
DANESI	The company has strengthened its ties with the local area, through initiatives of various kinds	Initiatives to spread awareness among consumers
MARCAFÈ	Investments in communication; New website; Improvement of online store	2020: the company launched the campaign "Six photographic images", which narrates the MARCAFÈ experience (Brand Communication)
PASCUCCI	2022: new project in Burundi to obtain sustainable objectives. Investment in communication	
SERRANI	EUR 140,000 has been used for an investment aimed at the implementation of a 4.0 Industry. EUR 130,000 has been aimed at the disposal of asbestos plants	Online campaigns to find, above all, professional agents operating abroad
BARBERA	The first innovative investment in technology: the first e-commerce coffee with payment in cryptocurrency	2022: it has been included in the register of Italian Historical Marks. Since 2020, many social initiatives have been implemented for the nation, as well as for territories across the border.

Table 5. *Cont.*

Company	"New" Investment	Other Information
MAURO	—	It has been acquired by the Gimoka group
TRUCILLO	Numerous initiatives and projects, having at their core good practices and other environmental, social, and economic sustainability actions	The Sustainability Report, according to the GRI STANDARD method, narrates the company's performance and sustainability achievements in 2020
VALENTINO	Product diversification, aiming to enter into large-scale retail and e-commerce	Relationships with the local community
ZICAFÈ	Process of environmental sustainability. Improving the commercialization of online sales	Photovoltaic system to produce clean energy

6. Discussion

The last two years have globally challenged all organizations and all types of industries, causing unprecedented difficulties.

Reviewing the contents of the model proposed in Figure 1, it is possible to verify a full coherence of the statements proposed by their study.

The investigated companies, indeed, have been forced to apply their resilience in terms of resilience and recovery. They had to prove, indeed, that they had the capacity to bite the bullet generated by the spreading of the virus. In Europe, Italy was the first country to experience the arrival of COVID-19, which has been followed by another serious event, the Russia-Ukraine war, with its heavy consequences on the energy supply market as well. In this scenario, companies have coined a new Strategic Renewal [25], each to varying degrees, demonstrating resilience and seeking new balances, driven by internal decisions and consequent to external dynamics. Moreover, the adoption of a holistic approach has proven to be essential with the evolving situations that have occurred since March 2020 and which are still ongoing.

Thus, to answer RQ1 and RQ2, we have revisited (Figure 2) Rapaccini's model. We relied on findings and evidence obtained from the companies under investigation in order to show the focus and activities that have been undertaken during this period.

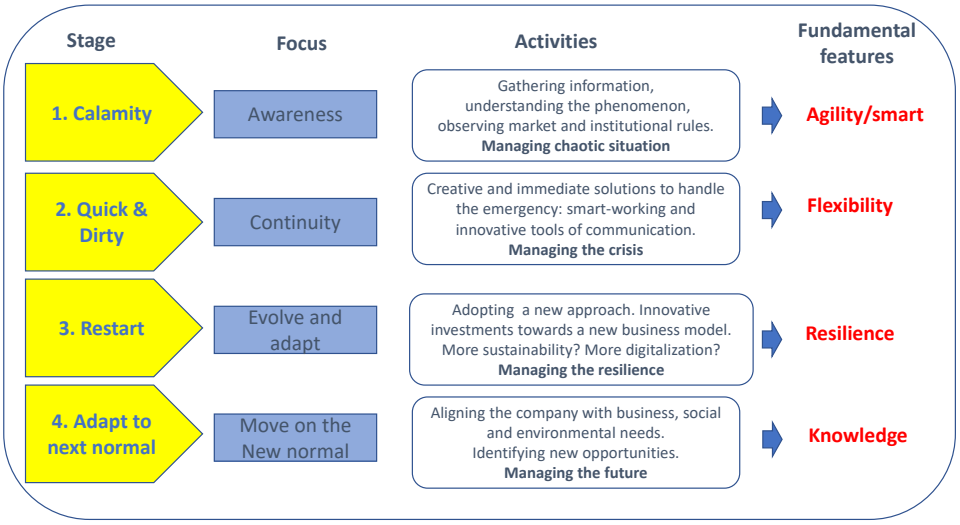

Figure 2. The four stages during COVID-19 (revisitation of Rapaccini et al., 2020) [28].

First, as a starting point and in order to better understand the overall research, we have highlighted the stages that have characterized the COVID-19 period (referring to the Rapaccini et al. model) and that the companies have had to deal with, in a chronological order. We then highlighted the focuses during these phases and which main actions were implemented. In addition, we have identified and summarized the fundamental features that every company should have possessed. These characteristics are certainly not brand new, and at this historical moment they have proven to be crucial to ensure the companies coped with the crisis, continued their activities and improved their businesses.

Through observation of the surveyed companies, it has emerged that the first phase (calamity) was characterized by the sudden and severe spreading of the pandemic. Thus, the companies' activities were mainly focused on becoming aware (awareness) of what was happening, gathering information, and implementing government interventions. It forced all the involved organizations and people to take necessary measures. In this first phase, the focus was on understanding the phenomenon and gathering all the information to decide how to cope with future scenarios. A sudden change in a company forces a clear awareness of the situation and of one's skills and capabilities, to understand how to move forward. As in other circumstances, since there was no time to formulate any initiative from zero, it proved essential to act immediately, with ready solutions and the knowledge already acquired. Thus, the agility and the ability to implement the necessary measures to observe the emergency regulations which had been issued, such as safety protocols, proved to be crucial elements since the priority was to manage the chaotic situation.

The next phase (quick and dirty) required promptness and speed to cope with the continuous emergencies and risks due to the changing and uncertain market conditions. The companies which we have analyzed are food producers, and they did not suffer a total business closure. However, their businesses were affected indirectly, whereas their customers had to face the crisis directly. The entire Ho.Re.Ca. channel, indeed, was forced to close. When possible, the fastest and most responsive companies immediately organized themselves with smart working and developed innovative "creative" solutions in order to not interrupt contact with customers, whether they are from the channel itself or end consumers. Social channels were abundantly used by all the companies in the sample and, to reduce the gap with the market caused by the lockdown, many companies invested in improving their existing channels, such as YouTube, and increased the amount of content posted on social media, such as tutorials or stories. Due to the great uncertainty and unpredictability, flexibility became the watchword. Indeed, it was proven to be necessary and vital to be flexible in handling new opening situations and potential new closures (which then punctually occurred); in this second stage, indeed, it was crucial to provide business continuity. Managing the crisis was the only way to ensure continuity.

With regard to the restart phase, when economic conditions change dramatically one should not give up investing. The best reaction to have in such cases is to come out of the state of shock, to coldly analyze what is happening, and try to predict future scenarios by developing strategies to cope with the risk [116]. Therefore, in cases such as this particular one, it is crucial to develop the ability to understand risks, address them, and put in place actions that include new skills, achieving new results, even better than in the pre-shock period. The focus must be on evolving and adapting, such as identifying strategies to anticipate adversity [117–119]. The post-COVID-19 world is not the same as the previous one. The priority is to evolve, in order not to succumb. It is on these occasions that resilience rises to the surface. The key to coping with such an "unknown" period is to restart with new organizational arrangements and "resilience" strategies. Thus, the indispensable characteristics to possess are resilience and the ability to overcome the crisis. Being able to manage resilience has been the imperative for the "new normal".

The last phase, "adapt to next normal, "required new strategies for dealing with the crisis first, and launching into a new reality later. It has represented the new way out of the crisis and has consisted of new ways of doing business, with a new awareness. To implement these "new" activities, companies must be able to demonstrate their ability

to do business and their knowledge, both old and new. In summary, they must be able to manage the future. At this stage, it is important to evolve and not to succumb [120]. Thus, knowing how to manage the future has proven to be the real starting point for the "next normal".

Responses to RQ4 need to be linked to the responses already given to RQ3. Table 5, indeed, shows the initiatives and investments which have been adopted in the 2020–2022 biennium. Against these results, in Table 6 we have summarized and highlighted which are the strategic renewals [25].

Table 6. The Strategic Renewal in the investigated companies.

Company	Strategic Renewal
MUSETTI	To strengthen the industrial capabilities The commitment is to expand in the domestic and international market
CAGLIARI	To improve sustainable development and digitalization
DERSUT	To improve sustainable development and digitalization
DIEMME	To strengthen the industrial capabilities The commitment is to expand in the domestic and international market
GOPPION	To improve the relationship with the territory To improve the value of the corporate reputation through partnerships and collaborations with the community To improve sustainable development and digitalization
CAMARDO	To improve sustainable development and digitalization
DANESI	Initiatives in the territory and on social activities, sustainable (and social) development
MARCAFÈ	To improve the value of brand communication
PASCUCCI	Initiatives in the territory and on social activities, sustainable (and social) development
SERRANI	To improve sustainability development digitalization
BARBERA	Initiatives in the territory and on social activities, sustainable (and social) development To improve the value of the corporate reputation
MAURO	—
TRUCILLO	To improve sustainable development and digitalization To improve the value of the corporate reputation
VALENTINO	Initiatives in the territory and on social activities, sustainable (and social) development
ZICAFÈ	To improve sustainable development

As has been extensively reported in the theoretical framework of this paper, sustainability and the trend toward naturalness are linked to human health and the planet's resources. Consumers want to experience food products with all their senses [70]. In addition, sustainability involves the adoption of circular practices, in which by-products of production are put back into the production cycle. In addition, the use of renewable energy sources, such as solar energy, reduces costs, saves the planet [68] and combats environmental pollution [71,72]. The emerging of innovative business models, new production processes, and new organizational forms has become the norm [106]. In the COVID-19 era, the challenges have changed and both the entire organization and all stakeholders are involved in this transformation process. Digitalization cannot be called a new phenomenon, but the challenges and the opportunities associated with it are constantly evolving [107]. Industry 5.0 requires technological innovations, with a necessary implementation of value and knowledge as part of a hyperconnected value network [77]. Through this new ap-

proach, it has been easier to promote sustainable development goals [82]. The economic difficulties that have arisen since the COVID-19 pandemic have offered the advantage of accelerating the digital transformation process in companies [88,90–92]. It has enabled them to increase productivity and competitiveness and to overcome the crisis [93–95]. The digitization of food ecosystems is the key to a post-pandemic future [77,87].

Indeed, from the present research, there are signs emerging in this direction. Specifically, Table 6 displays the relevant synthesis considerations in response to RQ4. They concern the actions that have been taken and the investments that have been allocated to face the period (Table 5, RQ3). It has not been possible to formulate a Strategic Renewal hypothesis on Mauro Caffè, since it has been acquired by the Gimoka Group (probably because of the severe difficulties it accumulated and its losses, which were even worse in 2021 than in 2020). For these reasons, and because it has different characteristics from the companies considered (see Section 3), it has not been included in this analysis.

In general, almost all of the companies have worked on implementing numerous initiatives in the area, such as various support activities or simply donating products or medical supplies to local hospitals. In this way, they have actively participated in overcoming the crisis that has affected everyone. Companies such as Musetti and Diemme have invested in strengthening their business, by proceeding to the acquisition of new groups already existing in the market. Both companies were already oriented toward sustainability policies. Acquiring other firms in the industry has contributed to further strengthening them, thanks to the expansion of their product offerings in the market. In addition, the union of the two realities has generated new competitive forces and new investments, especially in terms of digital technologies.

Danesi, Pascucci, Barbera, and Valentino have worked on initiatives on their own territory, as well as in less developed ones, or on solidarity initiatives in support of the numerous sectors experiencing serious difficulty. For example, Danesi has worked to improve women's working conditions in the coffee supply chain, Pascucci on a project with Burundi, Valentino on initiatives on the revitalization of the Puglia region, and Barbera in favor of artists native to Sicily.

Other companies, such as Cagliari, Dersut, Goppion, Camardo, Serrani, Trucillo, and Zicafè, have invested in activities focused on the implementation of more digitalized production processes, as well as in sustainable development activities. In 2021, after significant investments in digitalization, Cagliari inaugurated its new headquarters, within which there is a new semi-automated warehouse. The old headquarters has become a museum dedicated to espresso, with a multi-sensorial path, a store dedicated to the public and a further enlarged training area. During 2022, Dersut launched several activities:

- the company has planned to build an eight-thousand-square-meter public parking lot for the community, and a bicycle and pedestrian path;
- it has announced a willingness to create a city park for all "four-legged friends".
- it has announced its intention to build, in an area of about one thousand square meters, an air-conditioned greenhouse, which will be used to produce about one hundred kilos of 100% Made in Italy coffee. It represents another tangible element of digitalization, through the control, starting from the field, of the entire manufacture of the final product.

During the pandemic, Goppion focused its energies, both work-related and financial, on improving multiple aspects. First, since it was a particularly difficult time, a more careful and scrupulous management control was carried out, especially regarding main customers (bars and the entire Ho.Re.Ca. sector). Then, the company made interventions on the smart warehouse and other automated production processes, managing to eliminate and simultaneously refine some steps, thus optimizing production processes in the pursuit of greater efficiency. Camardo has invested in the creation of sustainable packaging, as well as in technology and innovation in production processes. Serrani used about EUR 140,000 for an investment aimed at implementing an Industry 4.0 system. It has also invested EUR 130,000 for the disposal of asbestos plants. Their choices are geared toward innovation

and sustainable progress. Already in 2019, before the arrival of COVID-19, Trucillo had made an investment of about two million euros in equipment with 4.0 technology. In the process system, there is software that can collect and process data and constantly improve efficiency through automation. In addition, the company has introduced a new photovoltaic system that can cover most of its energy needs. During the pandemic period, the company continued to improve through other activities aimed at improving its effectiveness and efficiency. The company worked on numerous initiatives and projects, which have best practices and other environmental, social, and economic sustainability actions at their core. In addition, it has been one of the first in the coffee industry to believe in and to continuously invest in best practices for sustainable development and the improvement of waste resulting from production processes, working towards a circular economy. Zicafè has focused its attention on environmental protection. Indeed, it has engaged in a process of environmental sustainability. It has achieved energy self-sufficiency through a photovoltaic plant, to produce clean energy necessary for the processing cycle and to keep emissions under control, while simultaneously respecting the environment. The company's choices have mainly focused on commercial policies, aimed at strengthening the positions it had already acquired for more than three decades and at an international level. Furthermore, the company has devoted much of its efforts to improving online sales marketing. Dersut and Trucillo also published their first Sustainability Report, demonstrating a deep commitment to sustainable policies as evidenced by the contents of the document.

Finally, Marcafè has invested in communication: in 2020 it launched the "Six Photographic Images" campaign, which narrates the Marcafè (brand communication) experience. During the pandemic period, the company decided to invest in a new website and in a new style of communication on social channels, including an ongoing image promotion and an outreach activity. It also improved the online store by making it more accessible and intuitive.

In addition, as has already emerged, many companies have dedicated themselves to spreading a real coffee culture among their partners, through training courses, tastings, and sensory analysis of the blends produced. Online sales have also increased significantly (for some companies, online sales even tripled in 2020 alone, allowing them to contain the damage in terms of the declining revenues consequent to the lockdown).

Finally, a common finding for all companies has been the abnormal use of social media. In fact, almost all of the companies investigated are active on the following social channels: Facebook, Twitter, Instagram, YouTube, and LinkedIn. The biggest investment has been in terms of time, and of the appearance of famous testimonials who have lent their image for the publication of content or other initiatives, to communicate during this particular period. In other cases, however, as in the case of Serrani, social channels have been used for searching and selecting new personnel to hire. Serrani, indeed, invested in a recruitment campaign on LinkedIn, with the aim of searching for and selecting qualified agents to be employed abroad.

Finally, in response to RQ5, we have tried to summarize and identify whether there is a trend toward sustainability and digitalization policies among the analyses conducted. For the companies under investigation, being "sustainable" is a term that incorporates multiple meanings. It begins upstream, with the selection of the countries where raw materials are grown, of the suppliers of those raw materials, and of all other suppliers in the supply chain, who must be able to guarantee quality. It concludes downstream, with the customers' recognition of the premium price of the product of superior quality and, at the same time, with a low environmental impact and which is respectful of different social dynamics and situations. We have observed, based on Table 5, that in most of the companies under investigation the opportunity to move toward a greater sustainability has emerged, with not a few difficulties. New investments and strategies have resulted in an increasing digitalization of production processes. The current direction is moving beyond typical and established models, in terms of excellence in CSR (Corporate Social

Responsibility), managing to give a concrete and successful response to the difficulties generated by COVID-19, generating a model that has become the focus for the near future.

In the context of the present study, sustainability in the first place and digitization in the second place (or on the same level, as is the case in different companies) can be seen as the main trend. Indeed, there have been investments aimed at better communication to third parties, through the use of social tools; an improvement in the online sales channel; an increased engagement in activities that have made it possible to obtain new certifications; and an increase in technologies used in the manufacturing system. There have also been broader investments, such as, for example, the implementation of an intelligent warehouse or the introduction of digitalized facilities in the production process or in the collection and systematization of data, such as, for example, a digitalized management control, managed by intelligent software. This study also revealed the close ties that have been created with the local area; each company has paid more attention to all employees, customers, partners, suppliers, and end consumers. The aim of many of the companies in the sample has been to achieve greater engagement and relationship care, or just educational content (with posts, videos and initiatives in the local press). For most of the companies surveyed, the greatest investment and interest has been in initiatives and activities aimed at a more "sustainable" management of their operations. However, the current trend, for almost all of them, is to move toward new investments, geared toward a greater digitalization of activities and to each business sector. In addition, from the interviews, although they did not cover all the companies under investigation, and from statements that have emerged from the press, companies declare themselves to be absolutely in favor of embedding more automation, starting with production processes, for those who have not already done so.

Thus, a sustainable business model in this sector seems to be able to attest to a future path of improvement, accelerated by COVID-19, and by the reflections and awareness generated by this long period of difficulty. This can be confirmed by looking at what happened in the companies in the sample that were already digitalized. They have succeeded better than others, unprepared and with less knowledge, in managing the introduction of new tools in the company. Time, in this case, has turned out to be a decisive factor. Indeed, those who have acted first have had a great advantage and have been able to handle uncertainties better, being able to benefit in the following period as well. In addition, digitalization has provided the organization with greater flexibility and agility, allowing a better management of the strategies to be implemented.

A resilient company enables an alignment between strategy and technology readiness. This has emerged from the experiences observed in the case of the companies under investigation, which have strengthened their resilience in their production processes and beyond. Support in achieving attainable goals has not been overlooked. Not least, it has become easier to control quality results, to bridge the gap between the theory and the practice of the circular economy model, and to improve the information flow and the communication between the stakeholders in the value chain. The development of technologies and the creation of new business models in which the research and implementation of new sustainable development processes is involved (not coincidentally, the term sustainab-lization business model has been coined in this study), is a growing phenomenon, although the risks associated with it should not be underestimated: social and economic threats must be considered in advance to avoid compromising digital innovations. Finally, digitization should support sustainable development and the realization of business economics goals. However, care must be taken not to underestimate the risks that this important innovation could bring, namely the possibility that, from a solution to get out of a period of deep decline, we could re-enter a new period of social and economic crisis.

Future research should, therefore, deepen these issues and develop a more holistic and interdisciplinary understanding of complex interactions. The goal is to harness the potential of digitization for social progress, thereby pursuing the goal of sustainable development and seeking to encompass as many of the Agenda 2030 goals as possible.

7. Conclusions

With the aim of analyzing the situation regarding the coffee sector and exploring the behavior of companies during COVID-19, in terms of sustainability and digitalization, this paper adopts a qualitative approach. Qualitative studies, through the direct exploration of multiple case studies, are well suited to produce a valuable contribution to the understanding of a complex phenomenon such as this unprecedented pandemic, which has generated a large-scale crisis. It is a method particularly valued by food and beverage studies, which are strongly influenced by personal and spatial factors. In fact, it allows for a greater level of detail and insight than quantitative research, as well as for observing the aspects being investigated in a practical context, where business experience is a critical success factor.

This paper contributes to several strands of the literature. First, this study contributes to studies on the business crisis, as it provides new information on how companies have responded to an unprecedented crisis affecting the entire planet. Second, it contributes to studies on sustainable development, as it provides information on the evolution of the coffee sector, which is increasingly focused on traceability and sustainability throughout the supply chain, up to the final consumer. As for digital evolution, it has experienced a strong acceleration in this pandemic period, mainly because of the need to provide continuity in its activities. We identified the elements of resilience of coffee companies in response to the crisis due to the COVID-19 emergency. Third, this study provides an input for strategic management studies. Increased sustainability and improved performance, due to progressive digitalization within companies, represent important drivers of change in the business model. Sustainability and digitalization are two business activities that increasingly support each other. Digitalization enables more efficiency because, through process automation, it can optimize many steps in production processes, for example, that of reducing errors, thus rationalizing costs, and improving quality. Moreover, because it offers the possibility of constantly monitoring the measurement of the environmental impact, with almost no margin of error, it provides valuable support for the company in pursuing a sustainable development.

Finally, we have set out a framework that, by revisiting each of the stages covered so far, clearly highlights which are the key characteristics for a new business model, in this case represented by sustainability: flexibility, resilience, and knowledge.

This study shows that the companies under investigation have created new business opportunities. They have been related to the attitude of being sustainable, and therefore responsible for their business and its consequent impact, starting from the selection of suppliers, the countries of origin from which the "raw" coffee arrives, to the last actor in the market: the final consumer. In terms of business, each company has acquired a greater capacity to do business and a propensity for sustainable development, also in relation to digitalization. During their strategic renewal, these companies have generated an opportunity for leadership and at the same time resilience; a strategy for survival and success that has also produced a strong reputational leverage. During such a critical time, these elements have represented, as it turned out, the key turning point.

Limits

This study is only limited to a single country (Italy), and to a small panel of companies which have been observed and interviewed, and may not reflect similar practices in other countries or contexts in the same industry. Given the limitations just highlighted, this work paves the way for future case studies that could confirm, complement, or counteract the empirical evidence presented. In the future, it might be interesting to investigate, adopting a quantitative analysis perspective, impacts which have been produced by digitalization and more sustainable practices (the sustainab-lization business model), both on the bottom line and on other intangible values, such as, for example, a company's reputation.

Thus, in the future, a contribution might come from investigating the effective value of the sustainab-lization business model for other realities as well, not limiting it to the coffee business alone. Finally, the work offers important managerial implications as it highlights

the importance of increased digitalization in the company. A major initial investment corresponds to an increased cost efficiency and to a significant reduction in errors.

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