
RE-THINK OF A BUSINESS MODEL: A CASE BOOSTED BY COVID-19

Marrelli Antonio

Master in Management of Services and Technology

ISCTE Supervisor:

Prof. Carlos Jerónimo, Invited Assistant Professor,

Iscte Business School

UNIPA Supervisors:

Prof. Bruccoleri Manfredi, Ordinary Professor,

Engineering Department

Prof. Micale Rosa, Researcher,

Engineering Department

November, 2021

iscte

INSTITUTO
UNIVERSITÁRIO
DE LISBOA



**Università
degli Studi
di Palermo**

**RE-THINK OF A BUSINESS MODEL: A
CASE BOOSTED BY COVID-19**

ANTONIO MARRELLI

Believe to become;
Proud of yourself, always.
[Antonio Marrelli]

ABSTRACT

2020 was suddenly struck by a pandemic caused by the spread of the new **COVID-19**.

It is important to analyse the current **business model** to remain competitive after COVID-19, especially in the **industry 4.0**.

The **main goal** of the research is to re-think, where necessary, the business model through the **Canvas** framework for **IRRITEC S.p.A.**

As a **main conclusion**, and based on the example of IRRITEC S.p.A., the research shows that companies need to change some aspects in their business models in order to adapt to the new reality.

Keywords: COVID-19, business model, Canvas, industry 4.0, IRRITEC S.p.A.

RESUMO

2020 foi subitamente atingido por uma pandemia causada pela propagação da nova **COVID-19**.

É importante analisar o atual **modelo de negócios** para permanecer competitivo após a COVID-19, especialmente na **indústria 4.0**.

O **objetivo principal** da dissertação é repensar, onde necessário, o modelo de negócio através da estrutura de **Canvas** da **IRRITEC S.p.A.**

Como **conclusão principal**, e com base no exemplo da IRRITEC S.p.A., a investigação mostra que as empresas precisam de alterar alguns aspectos dos seus modelos de negócio para se adaptarem à nova realidade.

Palavras-chave: COVID-19, modelo de negócio, Canvas, indústria 4.0, IRRITEC S.p.A.

INDEX

INTRODUCTION	1
LITERATURE REVIEW	3
1.1 - INDUSTRY 4.0 DEFINITION	3
1.2 - ARRIVE OF COVID IN THE INDUSTRY 4.0	3
1.3 - HOW INDUSTRY 4.0 MUST REACT TO THE PANDEMIC	4
1.4 - BUSINESS MODELS	6
1.5 - CANVAS FRAMEWORK	11
METHODOLOGY	13
2.1 - RESEARCH OBJECTIVES AND QUESTIONS	13
2.2 - RESEARCH APPROACH	14
2.3 - CASE STUDY	15
2.3.1 - <i>VISION</i>	18
2.3.2 - <i>MISSION</i>	18
2.4 - DATA COLLECTION	18
DATA ANALYSIS	27
3.1 - FRONT-END	27
3.1.1 - <i>VALUE PROPOSITION</i>	27
3.1.2 - <i>CUSTOMER SEGMENT</i>	28
3.1.3 - <i>CUSTOMER RELATIONSHIP</i>	28
3.1.4 - <i>CHANNELS</i>	28
3.1.5 - <i>REVENUE STREAMS</i>	29
3.2 - BACK-END	29
3.2.1 - <i>KEY RESOURCES</i>	29
3.2.2 - <i>KEY ACTIVITIES</i>	29
3.2.3 - <i>KEY PARTNERSHIP</i>	30
3.2.4 - <i>COSTS</i>	30
DISCUSSION	32
CONCLUSION	35
APPENDIX	36
GLOSSARY	37
REFERENCES	38

LIST OF TABLES

<i>Table 1 - Research Questions</i> _____	14
<i>Table 2 - Different firm's typology</i> _____	21
<i>Table 3 - Percentage of products that customers send to foreign markets</i> _____	22
<i>Table 4 - Companies considering to change type of crops due to the emergency</i> _____	22
<i>Table 5 - Customers plan to upgrade their irrigation system within the year</i> _____	23
<i>Table 6 - Supply issues</i> _____	23
<i>Table 7 - Harvest forecast compared to previous season</i> _____	24
<i>Table 8 - Sales forecast compared to previous season</i> _____	24
<i>Table 9 - How customers think national crop prices will react</i> _____	24
<i>Table 10 - Questionnaire for the Operational Marketing Manager</i> _____	36

LIST OF FIGURES

<i>Figure 1 - Inductive Process Approach (Source: Dudovskiy, J., 2015)</i>	14
<i>Figure 2 - Canvas Before COVID-19</i>	20
<i>Figure 3 - Canvas During COVID-19</i>	34

INTRODUCTION

The use of Cutting-Edge Digital Technology in Industry has led to a New Industrial Revolution called **Industry 4.0**; a term first used at the Hannover trade fair in Germany in 2011.

In recent years, most of the biggest technological giants have been trying, with enormous efforts, to achieve this level of industry, which certainly translates into a better ability to be competitive in the Global Market (Lin et Al., 2016). The small and medium industries, in fact, having neither enough money nor the right resources, are not able to attain such a high level of technology. Therefore, most of them are forced to survive for a short time or even exit the market (Lin et Al., 2016).

This **Fourth Industrial Revolution** focuses on the adoption of certain technologies defined as enablers, some of which are old knowledge, concepts that have never broken through the wall of division between applied research and real production systems (Maci, 2021). Today, thanks to the interconnection and collaboration amongst the machinery, the panorama of the Global Market is changing, leading to mass customisation, i.e., the ability of a company to produce a customised product at an economically viable cost (Maci, 2021).

This Fourth Industrial Revolution is leading man to review production systems by introducing more and more technological elements throughout the entire production phase, as never before in history. Previously, when the market was not as full of competitors, entrepreneurs used to start a business and its model evolved over time. As the number of players in the market increased, the development of a business model became a necessity to decide how to operate, connect with customers and differentiate oneself in the market.

Organisation in the company is crucial, and it occurs through management of different business models.

The **business models** are analysed by different disciplines with different objectives and aims. After the advent of the New-Economy, this concept is involving both Business Practice and Scientific Research, although the latter is suffering because it is not yet possible to have a clear idea and unanimous definition of business model (D'Atri & Braccini, 2008).

Defining and understanding the various business models might be difficult. However, there is a growing belief that if a company wants to be successful, it is essential to

implement these different business models. These models not only influence the success of the company but also influence the revenues of the various companies. Therefore, the **main mission** of the business models is to give the company a Global Vision of both the Strategic Objectives that the company must achieve and the Value Proposal (Alt & Zimmermann, 2001).

As of 2019, the business models of the various companies need to be revised and adapted to a situation that has never arisen but has significantly affected the whole world, COVID-19 (Agrawal et Al., 2020).

Every company tries its best in different operations to make everything work well as before the pandemic.

This research focuses on the impact that COVID-19 has on the Manufactory Industry, how and to what extent companies try to respond. The **main objective** will be to analyse all the data collected and re-think, where necessary, the business model through the Canvas framework for IRRITEC S.p.A.

This work aims to clarify this phenomenon, both with regard to future developments and with reference to the consequences that re-inventing the Canvas framework may have at an organisational level and in the competitive environment.

LITERATURE REVIEW

The aim of this **Research** is to update readers on the status of the research in the specific domain that is going to be analysed (Cottone, 2014).

1.1 - INDUSTRY 4.0 DEFINITION

Industry 4.0 is increasingly connecting people with machines, but the real revolution lies in making machines communicate with each other (Roblek et Al., 2016).

The increasingly rapid advancement of industry 4.0 can have both negative and positive effects. On the one hand, you might witness an increase in layoffs due to the increased use of machines that speed up work (Jerman et Al., 2019).

On the other hand, the increase in production might foster potential higher demand that would lead to higher profits (Jerman et Al. 2019).

The most interesting feature of industry 4.0 is that the machines improve production processes independently (Roblek et Al., 2016).

1.2 - ARRIVE OF COVID IN THE INDUSTRY 4.0

Since before the advent of COVID-19, industry 4.0 was already bringing production-level transformations within companies (Agrawal et Al., 2020).

Companies are beginning to adopt to a new kind of pandemic-influenced normalcy, and the first step is to move as much as possible into the digital world (Agrawal et Al., 2020).

“Industry leaders are leveraging Industry 4.0 solutions: 39 percent have implemented a nerve-center, or control-tower, approach to increase end-to-end supply-chain transparency, and around a quarter are fast-tracking automation programs to stem worker shortages arising from COVID-19” (Agrawal et Al., 2020).

“A recent McKinsey survey of manufacturing and supply-chain professionals found that 93 percent plan to focus on resilience of their supply chain, and 90 percent plan to invest in talent for digitization” (Agrawal et Al., 2020).

In order to safeguard the health of employees, due to the pandemic, there have been reductions in the scope of production (Agrawal et Al., 2020). This can be improved through digital technologies that enhance both the safety of their employees and greater efficiency of the company (Agrawal et Al., 2020). An example can be using applications to enable online contact, remote work, or video conferencing (Agrawal et Al., 2020).

Moreover, the use of technology helps companies with the use and research of data, which thanks to machines are directly processed and displayed by the company (Agrawal et Al., 2020).

The support provided by both wearable technologies and automated monitoring systems are of great benefit as, due to travel limitations, they still help customers remotely, reducing maintenance downtime and process controls that aid continuity of operations (Agrawal et Al., 2020).

Furthermore, once you get the finished products, you need to deliver them to customers, who usually receive them through a third party (Agrawal et Al., 2020). Unfortunately, due to the pandemic, restrictions have arisen, and they can be overcome through digital solutions that increase both the supply and demand visibility of different logistics systems by improving requirements regarding both packaging and delivery security by avoiding contact (Agrawal et Al., 2020).

Warehouses also perform better through digitisation, as companies implement automated storage systems, material retrieval, intelligent shelves, etc. (Agrawal et Al., 2020).

1.3 - HOW INDUSTRY 4.0 MUST REACT TO THE PANDEMIC

The key to succeeding in increasing business value for a company in a post COVID-19 world is the ability to transform business models in the most efficient way possible (Linz, 2020). Unfortunately, as there is not yet a clear understanding of these models, a few companies undertake such transformations, but many try to achieve their goals and benefits through automation, new processes or even changes to the different business models they use (Linz, 2020).

Change is therefore pivotal during this economic climate (Linz, 2020). Companies must try to develop real changes keeping the pace with innovation (Linz, 2020).

In fact, 80% of business leaders believe that their business models are at risk, while 60% of companies believe that digital changes have given birth to new business models (Linz, 2020).

Some examples could be the Speed-Factory approach developed by Adidas: some new trends change supply chains, such as 3D printing, or another example could be the one developed by banks that establish a hub to provide some financial services to other banks (Linz, 2020).

So far, only a few have taken advantage from the transformation of their business models, such as Microsoft through the use of cloud platforms that help them integrate with partners such as LinkedIn (Linz, 2020). Therefore, they no longer rely solely on the production of Windows-based software products (Linz, 2020). Through this transformation, Microsoft was able to not only quadruple its share price but also to increase its revenues by 65% (Linz, 2020).

The pandemic crisis has not affected all business models (Linz, 2020). The corporate sector did suffer while companies such as Roche were successful as major suppliers of both test kits and test devices which increased their earnings (Linz, 2020). On the one hand E-commerce companies such as Amazon received increased demand and thus increased profits, the largest ever (Linz, 2020). On the other hand, retailers, who were suddenly hit, suffered major losses and some others such as J.C. Penny, Neimann Marcus and Galeria were forced to close down permanently (Linz, 2020). Logistics companies, such as UPS or FedEx, also witnessed a boom in demand due to these circumstances, and quarantines also increased the profits of streaming companies such as Netflix (Linz, 2020).

While travel companies, airlines and hotels heavily suffered the effects of lockdowns (Linz, 2020). Many of these have been forced to lay off large numbers of employees, one example being Airbnb was forced to lay off 1,900 employees. The car rental sector such as Hertz was also hit hard, which also affected the oil and gas sector (Linz, 2020).

Furthermore, according Linz, 2020, *“the higher the offering’s breadth and depth, the bigger the ecosystem around its customers, and the more premium services are integrated (e.g., free-of-charge shipping, unique content), the less reasons exist to change vendors. Furthermore, subscription-based monetization models increase the probability that the customer will continue the relationship with the same vendor and often leads to a chain of transactions”*.

Suitable business models should strike a perfect balance between the digital, physical and human worlds (Linz, 2020).

Financial services are reaching the point of zero interest rates and some banks such as Deutsche Bank have been forced to close one out of every five outlets in their domestic market, while Chinese insurance group PingAn has managed to transform itself and access services such as healthcare, cars, real estate and smart cities (Linz, 2020).

Other companies, such as sports and fitness companies have had to create virtual courses due to the impossibility of conducting in-person courses (Linz, 2020). Well-known

companies such as Apple have also developed their own apps, in this case Fitness+ where subscribers can access personalised training programmes for the Apple Watch (Linz, 2020). Professional services such as consultancies, whose good relationships with clients have enabled them to reach agreements and release projects remotely (Linz, 2020).

All this means that you are facing a very particular period. It is worth quoting Peter Drucker's words: "*The greatest danger in turbulence is not turbulence; it is to act with yesterday's logic*" (Linz, 2020).

1.4 - BUSINESS MODELS

In order to have a clearer idea about business models, it is first necessary to understand the difference between business model and strategy.

Casadesus & Ricart, 2011, explain the substantial difference between business models and strategy as follows "*Whereas business models refer to the logic of the company – how it operates and creates and captures value for stakeholders in a competitive marketplace – strategy is the plan to create a unique and valuable position involving a distinctive set of activities*".

Interestingly, these two definitions together lead to Porter, 1996, definition of strategy, "*Strategy is making trade-offs in competing. The essence of strategy is choosing what not to do... strategy is about combining activities*".

Using a business model may also help companies to predict the potential monetisation from the use of certain strategies (Mahadevan, 2000). For example, Mahadevan, 2000, describes which methods can be used by companies to increase their revenues by exploiting free access to information on online platforms, reducing search costs and communication issues with suppliers and customers.

As reported in the literature, business models need to undergo some modifications over time in order to be as adapted as possible to changes in the market.

Because of this, a strategy is pivotal to guide these processes of change and therefore improve business models.

An example is reported in the literature by Zott & Amit, 2013, who explain that a business model "*is crafted by a focal firm's manager*", that the development of the business model is "*a key task for entrepreneurial leaders*" and that the design and redesign of these business models is incumbent on "*entrepreneurs and senior executives throughout the world*".

A final distinction that arises between business models and strategy is about the opportunity to create value.

Another key factor for business models is the focus on the manager/entrepreneur as decision maker and the malleability of the different models that will be referred to.

Models, in most cases, identify and provide information about it concerning (Kopp, 2020):

- Products or services that the business plans want to see;
- Identified target market;
- Planned business expenses.

A company that is neither able to develop a business model nor to modify its existing one will not be able to meet future challenges full of rapid and continuous changes (Kopp, 2020). Incredibly, business models enable the company to offer its customers products and services at sustainable costs and at a competitive price (Kopp, 2020).

Each type of business has a suitable business model. Some examples of Traditional Business Models are (Kopp, 2020):

- **Direct selling**, i.e., a form of sales made at the consumer's home;
- **Franchising**, i.e., a commercial form that is based on the affiliation of several entrepreneurs to a sign/brand owned by companies that allow affiliates to sell their products or services taking advantage of their network membership;
- **Advertising**, i.e., a communication, designed to bring measurable results to those who need to obtain consensus, turnover, customers and visibility;
- **Brick and mortar shops**, are all those traditional activities that have one or more physical shops where people choose and buy products in person. These types of businesses, with the arrival of the digital economy, have had quite a difficult time due to the use of the web, such as eBay or Amazon, by retailers who had more flexibility for customers and lower operating costs.

Some companies use Hybrid Models, i.e., they manage to combine internet retailing with brick-and-mortar shops or even sports organisations such as the NBA. Gillette, for example, which works in the shaving industry, sells the handles of the various razor models at low prices as it aims to obtain more revenue from the sale of razor blades (Kopp, 2020).

This type of model can also be used in other sectors, such as the printer industry. The main product is sold at a low and competitive price in the market, while the good on which the main product depends, in this case the cartridges, has a higher price.

Airlines are another example. Initially, the Airlines aimed to take ownership of the lots at the main airports in the different countries (Kopp, 2020). Later on, companies such as Ryanair for example, started to target secondary airports which reduced costs and consequently prices for customers, so people shifted their attention to these new airlines even though they do not land at major airports (Kopp, 2020).

Another example concerns two shops selling and renting films. Imagine that after the arrival of the internet only shop owners decide to evolve their business and exploit the internet by streaming movies online instead of renting or selling physical copies. This decision positively disrupts the company's current business model. Thanks to this brilliant idea, the company manages to reduce certain costs such as the cost of maintaining inventory, for example. In doing so, the company has reduced its costs and therefore profits, with equal revenue, will be higher than previous profits (Kopp, 2020).

It is surprising that, despite the lack of a single straightforward definition of business models, in the last decades, both practitioners and academics are becoming interested in using this term.

That said, the term **Business Model** appears in the educational article, "*And many more problems arise to plague us in the construction of these business models than ever confronted an engineer*", for the first time with Bellman et Al., 1957.

It is important to build a wider perspective of the business model.

A definition of a business model was given by Girotra & Netessine, 2014: "*Essentially a set of key decisions that collectively determine how a business earns its revenue, incurs its costs, and manages its risks*".

Another definition of business model is given by Zott et Al., 2011, who explain that the business model is nothing but an identification and structuring of some interrelated activities that manage to increase not only the value of the company but also of its customers and stakeholders.

While Sirmon et Al., 2007, responds that in order to create value, a company must not only accumulate resources but also structure them appropriately in order to take advantage of opportunities in the market.

The former top editor at the Harvard Business Review, Magretta, 2002, defines, correcting Lewis, what a business model is in her book "*Why Business Models Matter*". Unlike Lewis, who defines business models in terms of money, Magretta, 2002, refers to the so-called value chain. Magretta, 2002, thinks of the model as composed by two parts: "*Part one includes all the activities associated with making something: designing it,*

purchasing raw materials, manufacturing, and so forth. Part two includes all the activities associated with selling something: finding and reaching customers, transacting a sale, distributing the product, or delivering the service”.

Furthermore, Magretta, 2002, highlights the description of how an activity works, which starts precisely through the use of the various business models and the competitive strategy, which instead is the one implemented by the company to do better than its rivals on the market.

Obviously, each business model, based on the company's interests, can be better or worse than another. In the event that this new business model is introduced in an already existing market and is superior to the business model in use, we deal with the so-called **Disruptive Innovation** (Ovans, 2015).

Disruptive Innovation should not be considered with a simple result but as a process (Ansari et Al., 2015).

This type of innovation, at the beginning, focuses on low-end markets or mostly new markets (Christensen et Al., 2015).

The most interesting thing about Disruptive Innovation is that the products or services offered by entrepreneurs are at a lower level than those of the incumbents, therefore with lower quality and attributes, but still manage to satisfy low-end customers or customers in new markets (Huesig et Al., 2014).

Indeed, as these markets are ignored by most incumbents, disruptive companies avoid competition and at the same time gain space within the market (Huesig et Al., 2014).

Obviously, as time goes by, disruptive entrepreneurs will keep improving their products and services until they enter more important markets (Christensen et Al., 2015).

From the most recent analysis of business models, we can find several useful information to understand what these business models are. One key factor concerns operations and strategy development, which can be used and applied in different ways (Foss & Saebi, 2017).

Furthermore, these business models have an important function in the economic domain. In fact, they are seen as methods that will lead to more sustainable economic systems (Wainstein & Bumpus, 2016).

Over the years, more and more attention is being paid to the environment. Also, business models are being built paying attention to this important factor, and actually the term **Sustainable Business Model** has been developed, describing the way companies manage

to acquire economic value both maintaining and generating Natural Social Capital, and in so doing they reflect a higher value towards the client (Boons & Lüdeke, 2013).

Today the competition between companies is increasingly strong. Sustainable Business Models are also identified as methods through which it is possible to recognize new business opportunities and to create competitive advantages over other companies (Yang et Al., 2017).

The Sustainable Business Model has added the integration of environmental, social and corporate activities (Awan et Al., 2018).

Furthermore, lately these new models are becoming increasingly common as we move forward (Evans et Al., 2017).

Obviously, once these different sectors are filled, companies can easily deliberate on any business idea and also create a suitable strategy that will allow them to achieve their main objective (Ferranti & Jaluzot, 2020).

Famous academics such as Afuah, 2004, identify business models as the foundation through which companies can achieve success, among them Microsoft, eBay and Southwest Airlines for example.

Since 2000 the business model has been seen as a Strategic Method (Wirtz et Al. 2016).

The author Teece, 2010, explains that *“Like other interdisciplinary topics, business models are frequently mentioned but rarely analysed; therefore, they are often poorly understood”*, and that *“the concept of business model has no established theoretical grounding in economics or in business studies”* (Teece, 2010).

Another author, Arend, 2013, believes, instead, that: *“... the use of the term business model as a description of how a traditional enterprise operates is strong on redundancy and weak on theoretical foundation...”*.

While, Porter, 2001, went so far as to argue that the concept of the business model is nothing more than *“... an invitation for faulty thinking and self-delusion”*.

Business models may have more than three activities, which leads to combinations of activities, i.e., a fairly large number of business models. Therefore, understanding which of these activities should be connected is essential to have a good business performance (Bigelow & Barney, 2020).

Unfortunately, activities within the business models are still unclear. Therefore, some academics have proposed several key activities.

Osterwalder & Pigneur, 2010, for example, based their construction of the business model on nine key elements, Slywotzky relied on eleven elements, Hambrick and Fredrickson, in 2005, proposed five and finally Markides, in 2008, only three.

An example might refer to Zara and H&M, which, despite yielding the same market position and having access to similarly homogeneous resources and capabilities, have quite different competitive performances. This is due to the fact that Zara's Business Model is fully vertically integrated while H&M's Business Model refers to both outsourcing and third parties (Zott & Amit, 2010).

It is well known from the literature that business models are often used for competitive differentiation, in fact they are very useful when we have a low level of both barriers to imitation and heterogeneity of resources and capabilities.

What makes business models different from strategy are the interdependencies, in fact, in order to be able to reach an unambiguous definition of the term we should focus on some questions such as:

- 1) Which activities should be interlinked?
- 2) How can interdependence be created between activities that cannot be imitated?
- 3) How can superior interdependencies be created in cases with a wide availability of both resources and non-differentiated capacities and barriers?

1.5 - CANVAS FRAMEWORK

The business model referring to IRRITEC S.p.A., which will be analysed below, is the **Canvas framework**.

It was designed in 2004 by Alexander Osterwalder and later, in 2010, thanks to Yves Pigneur, Alan Smith and the support of a community of 470 experts in 45 countries, the model was developed.

Osterwalder & Pigneur, 2010, define a business model as "*the rationale of how an organization creates, delivers and capture value*".

The Canvas framework consists of nine building blocks, including: Key Partners; Key Activities; Key Resources; Value propositions; Customer Relationships; Channels; Customer Segment; Cost Structure; Revenue Streams (Osterwalder & Pigneur, 2010).

Its nine components are able to bring out the primary aspects of a company and its strategy, and the use of colours; and a fairly streamlined graphics allows an immediate vision of the key points.

These nine blocks are in turn divided into 4 categories: Customer, Offer, Infrastructure and Financial viability (Osterwalder & Pigneur, 2010).

Furthermore, the Canvas framework can be split in two faces (Monaco, F., 2019):

- Front-End: is the section of the company that deals directly with customers.
- Back-End: required resources aimed at supplying the appropriate half

METHODOLOGY

One of the main aspects in the drafting process of the research is the methodology. It is not important where the information comes from, but how concise and specific the research questions are (Baldwin & Rose, 2009).

In this regard, the focal point is the relationship between the research questions and the method (Baldwin & Rose, 2009).

The aim of this research is to re-analyse the previous Canvas framework, already made, of IRRITEC S.p.A. in order to adapt it to the pandemic based on studies in the literature regarding business models and the industry 4.0 and the interviews and survey within the company.

An analysis with a precise structure “*gives framework and purposiveness to thinking that might otherwise meander indefinitely and purposelessly among the vast marshes of intellect and culture*” (Wilson, 1971).

This chapter is composed by four sub-chapters, related to the research objectives, the research approach that has been used, the data collection regarding the study and last but not least the data analysis of the study.

2.1 - RESEARCH OBJECTIVES AND QUESTIONS

One of the main topics is to focus on the main objective and the research questions in order to have a prospect of the study in terms of analysis and development. The literature review is aimed at fulfilling this aspect.

According to that, the **main objective** of the study is to carry out research in a way that the company can improve or modify, where it is needed, the existent Canvas framework for the company IRRITEC S.p.A. compatible with the COVID-19 situation.

The research questions are divided in two parts: the main research question and the sub-research questions that will help to answer to the main one. The questions have been developed on the base of the literature review (Table 1).

Table 1 - Research Questions

Main research question	
1	Does IRRITEC S.p.A. have to re-invent their business model?
Sub-research questions	
2	What changed in IRRITEC S.p.A due to COVID-19?
3	How did the pandemic affect clients of IRRITEC S.p.A?
4	What are the required actions to re-adapt the business model to the new incoming needs of IRRITEC S.p.A.?

2.2 - RESEARCH APPROACH

The approach used for the research is inductive because it does not follow hypothesis formulation but refers to research questions, aims and objectives that will be sought at the conclusion of the research.

The path followed by this type of approach is shown below (Figure 2):

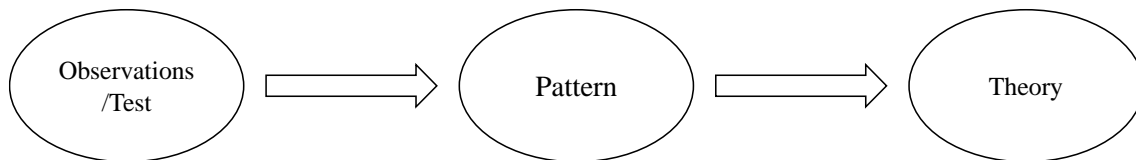


Figure 1 - Inductive Process Approach (Source: Dudovskiy, J., 2015)

In a nut shell:

- Everything that is known is used to arrive at unverified conclusions;
- Data is collected in order to explore and identify themes and patterns of the phenomenon in order to create a conceptual framework;
- Finally, the theory is constructed and generated.

Subsequently, there is the analysis of the **Concept Model of Research**.

The first step taken, in order to achieve the final objective of the research, was to contact the company by e-mail explaining the motivation for the study. Once positive feedback was received from IRRITEC S.p.A., the questionnaire, present in the index, was developed in order to create the first Canvas framework, preceding COVID-19. The company entrusted the questionnaire to the Operational Marketing Manager, who was of fundamental help in compiling every single block of the Canvas framework.

Having completed the first step, the pre-pandemic Canvas framework, it is important to understand whether the customers' business has changed or remained the same due to the pandemic. As IRRITEC S.p.A. is a company that places great importance on its customers, it is necessary to understand and analyse how the company can improve or help its customers. The company has developed a survey, which has been sent out and subsequently filled in by a good number of customers.

Finally, another interview was carried out with a company manager, that represented the company, made available by them, in order to understand what is actually happening within the company, what is changing because of the pandemic and how the company should deal with it.

Once all this information has been analysed, adding the knowledge developed within the literature review will enable to develop a proposal for a Canvas framework after COVID-19.

This sub-chapter explains how data collection and data analysis will be conducted.

2.3 - CASE STUDY



This chapter focuses on a case of a company: Industry 4.0, IRRITEC S.p.A.

The company started in Capo d'Orlando, a town in the area of Messina, in 1974, when the brothers Giuffrè, Rosario and Cono together with their son Carmelo, set up the aforesaid company with the main activity of manufacturing PVC roller shutters.

Initially the company was so small that it only had 18 employees.

In the following years, IRRITEC S.p.A. started to grow and, at the same time, **Carmelo Giuffrè** - who is now twenty-five years old - thought of a different way to work plastics.

“My father and my uncle bought a machine for the manufacturing of window blinds and I came up with the idea, or maybe intuition, that my family and I could do something to irrigate our thirsty land. We started to produce irrigation pipes and to develop irrigation systems that could convey the water exactly where the plants needed it. That is where and how our commitment to sustainability began” (Giuffrè, 2020).

IRRITEC S.p.A was able to transform a structural difficulty into a resource.

Water saving is a very important issue in Sicily. This region - characterised by water scarcity - has become the place to design, experiment and develop drip irrigation systems. The company aims to ensure that every drop is used in the best possible way, minimizing the ecological footprint and waste of resources.

IRRITEC S.p.A. decided to work in the micro-irrigation sector.

The need to adopt new agricultural and residential irrigation systems has developed more and more throughout the country. Therefore, the company began to expand its offer by developing different types of pipes for both agriculture and construction.

However, the real success of IRRITEC S.p.A. occurred during the 1990s when the production of drip wings started in Siplast (today Irritec), which completes the product package required to start an irrigation system.

The company's rise in the vast areas of the market began thanks to the current CEO Carmelo Giuffrè. He decided to purchase a patent, in 1990, through which he was able to start both the production and sale of the first line of drip wings aimed at the drip irrigation market. These were followed by the second and third in 1991 and 1992 respectively.

Thanks to this brilliant intuition, IRRITEC S.p.A. counts more than 700 employees and produces products that will later be distributed in more than 140 Countries Worldwide. The company works to give its employees the most comfortable environment, in order to better monitor the activities of its employees as well as their satisfaction. Workers are required to submit a report to the company on a monthly basis. The company also rewards employees according to their results and also adheres to the **Social Rewards System** by giving away vouchers that can be used for social services, for example school reimbursements, study vacations and even language courses not only for the employee but for the whole family. In terms of production, IRRITEC S.p.A has a **Manufactory Branch** in Capo d'Orlando (Sicily -Headquarters), Carmona (Spain), Indaiatuba (Brazil), Fresno (USA) and Queretaro (Mexico). The **Commercial Branch** is based in Assemini (Italy), Neu-Ulm (Germany), Algeri (Algeria), Santiago (Chile) and Valdosta (USA). Last but not least are the **New 2020 Strategic Hub**, Bologna (Italy).

In 40 years, the company has been improving and growing constantly, always looking for new important innovations in the irrigation sector but still maintaining a solid foundation. In 2015, IRRITEC S.p.A., together with **Slow Food**, supported the **Orti in Condotta** campaign, a project that helps to improve the food habits of children and families by making them understand the importance of relations with the environment together with Slow Food.

Also, in 2015, the company participated in the **Green City** campaign promoted by the city of Milan.

In the same year, a new project was developed and implemented by the company in Italy: **Green Fields**. Later on, it was exported to Mexico where, in 2018, it received the innovative product award. They are also trying to export this project to all the other branches.

The project aims at promoting waste disposal, mostly plastic, giving aid to various farmers. Therefore, IRRITEC S.p.A not only issues a certification of excellence in sustainable irrigation and makes these farmers **Green Fields Ambassadors** but also gives them the chance to own good purchases for other new products. Moreover, the company also accepts products of other brands always for the purpose of recycling them to avoid environmental pollution.

In addition to sustainability, the company also has the desire to promote sports. It supports both basketball initiatives, “*Costa d’Orlando*”, and “*The European Tour Cycling Experience of Coming Untrue*” as far as cycling is concerned. Obviously, the use of alcohol and drugs is prohibited and smoking within the company is not permitted. The company works to minimize the risks of workers and improve their safety. Employee must undergo periodic medical check-ups and follow certain safety courses. All this motivates employees to a sense of responsibility towards themselves and others.

Some extra activities carried out by IRRITECT S.p.A. concern alternating school-work, meetings and conferences for schools to talk about their work experience and to encourage training for future work placements and to talk about their experience and participation in internship curricular activities. This allows university students to carefully design their future careers.

“We’ve become a reference for smart

irrigation, but will accomplish our sustainability mission when everyone looking at a tomato in a supermarket will ask how much water was used to irrigate it” (Giuffrè, 2020).

The company is also recognised as an **Élite Company**. “*Élite is the program launched by Borsa Italiana within London Stock Exchange Group for the organizational and managerial development of the best Italian companies*”.

2.3.1 - VISION

In terms of Values and Policy, IRRITEC S.p.A. aims at simplifying the life of both those who have professional aims and those who are triggered by their passion, in all possible ways, with efficiency. All this, however, trying to avoid as much as possible the waste of water, a resource of important value, using every single drop of water. The CEO **Carmelo Giuffrè**, in 2020, said *“We make life easier for those who take care of the plants, for work and for passion. We work to ensure that every drop is used as well as possible, avoiding the waste of resources”*.

2.3.2 - MISSION

IRRITEC S.p.A. guarantees an efficiency of both products and services with the least possible impact on the environment and with fairly contained costs.

The company constantly invests in research and development in order to improve both extrusion and injection moulding production processes for drip irrigation systems. In addition, they are always looking for new materials that can lead to the creation of innovative and more efficient products. Therefore, the company also helps employees to spend less energies on their job. They can decide whether to install a manual or automatic irrigation system. If this is manual, farmers simply have to open and close the valves to operate the system. If this is automatic, any action can be managed remotely.

Ensuring that the quality of the products, which has made the company an international leader in the sector, is one of the principal foundations.

Collaborating with important partner IRRITEC S.p.A. has also landed in the most disparate sectors such as water, building and thermohydraulic.

In addition, the company tries to follow and help its customers in the best way possible by offering increasingly closer solutions and finding the most appropriate irrigation systems according to the various uses.

2.4 - DATA COLLECTION

In order to achieve the main objective of the research and to answer to the research questions it is important to develop the first Canvas framework for IRRITEC S.p.A. The framework has been created thanks to a crowdsourcing from the literature review analysed in the previous chapter and public information, about the company, available in

the web. Furthermore, the most important help to fulfil the first Canvas framework was given by the Operational Marketing Manager, representing the company, that, answering to different questions make it possible. The interview is based on main questions for each one of the nine blocks of the Canvas framework. The questionnaire can be found in the index. The Canvas framework developed can be seen below:

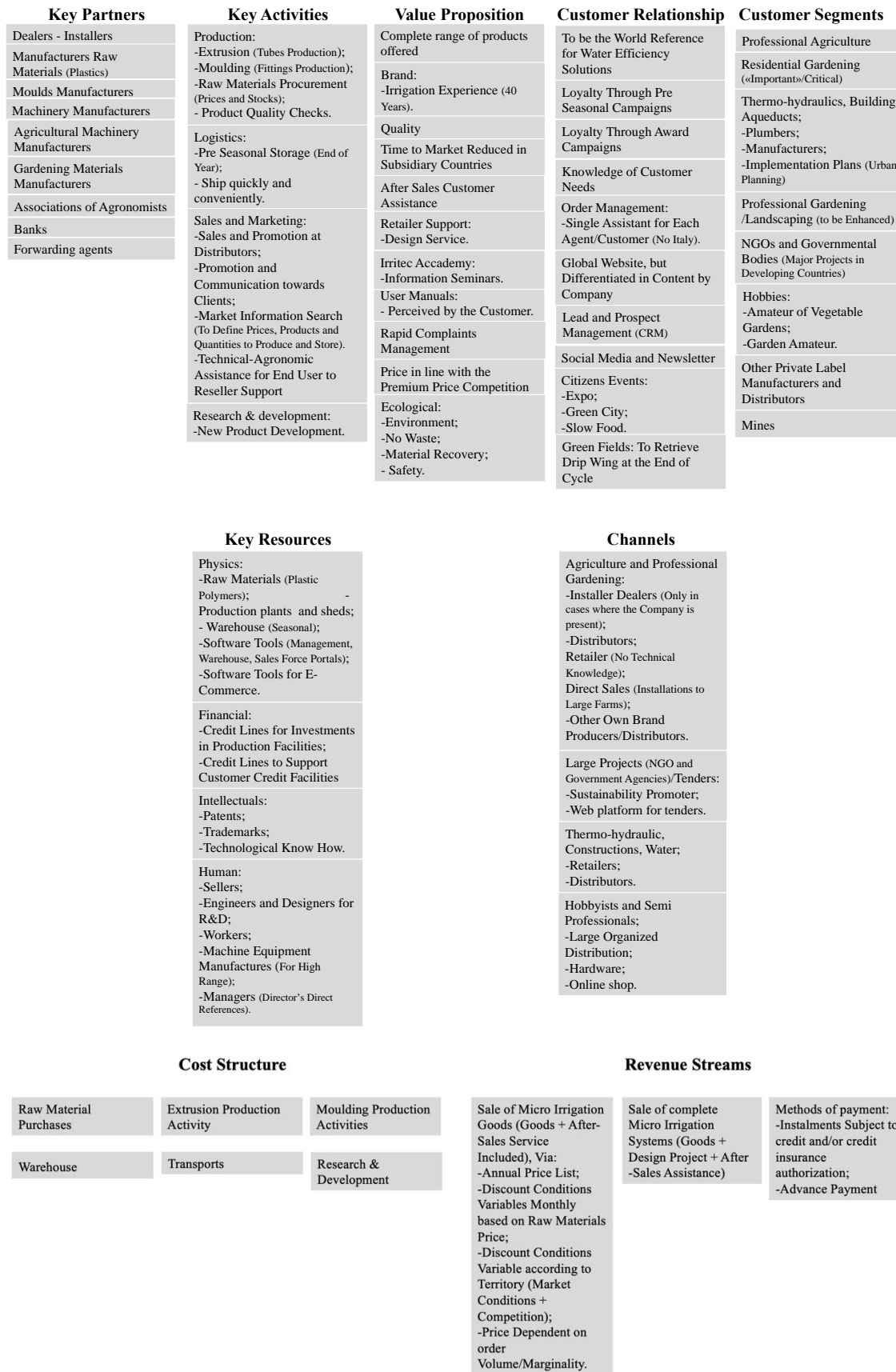


Figure 2 - Canvas Before COVID-19

The business model of the company during the COVID-19 has been studied through the use of a survey that IRRITEC S.p.A. delivered to their loyal Italian customers, and they have been served by the company since before the arrival of the pandemic. Therefore, the company's main goal is to satisfy the needs of the customers and understand in which way, the pandemic, modified their business. It is fundamental to understand where they want to move and if they want to change their working methods, and in that case how IRRITEC S.p.A. can help them.

333 questionnaires were sent out and received from customers including:

- 219 (66%), number of users that fulfilled completely the questionnaire;
- 114 (34%), number of users that started to fill in the questionnaire but later abandoned it.

Responses were given through the following communication and promotion channels:

- E-card newsletter: 211 (63%);
- Social network posts: 89 (27%);
- IRRITEC S.p.A. team: 22 (7%);
- Newsletter sent out for Earth Day: 11 (3%).

The questionnaires delivered have been distributed to the customers according to the different farms (Table 2):

Table 2 - Different firm's typology

Zootechnics	3,2%
Vegetables in greenhouses or tunnels	5,48%
Open field vegetables	23,74%
Orchards	26,48%
Other	41,1%

Concerning the "Other", the companies that actually answered the survey are working in the sector with: wood plants, plant and flower crops in the nursery, crops realized through the vertical farming technique.

Once the differentiation of the sectors has been completed, each company has been required to include the percentage of the products intended for the foreign market (Table 3).

Table 3 - Percentage of products that customers send to foreign markets

Percentage of customers answering	Products in the foreign market
4,21%	> 70%
6,39%	51% < X < 70%
9,59%	31% < X < 50%
12,33%	11% < X < 30%
67,58%	0% < X < 10%

The table above indicates that the majority of the companies do not allocate large quantities of their products to the foreign market, in fact only 9 answers (4.21%) show that the companies allocate more than 70% of their products to the foreign market, in contrast to the 148 answers (67.58%) that concern foreign sales between 0% and 10%. Further on, we have 27 answers (12.33%) between 11% and 30% of their products, 21 answers (9.59%) between 31% and 50% and finally 14 answers (6.39%) between 51% and 70%.

Another question in the survey looked at whether or not the companies are thinking to move on another kind of crops due to the fact that the pandemic could influence their business in a bad way (Table 4).

Table 4 - Companies considering to change type of crops due to the emergency

No	88,13%
Yes	11,87%

Remarkably, 193 (88,13%) respondents gave a negative result to the crop change while only 26 (11,87%) are thinking of making the farm more efficient through a new type of crop during the pandemic.

Another interesting factor is the customers' decision on whether to upgrade or expand their irrigation system within the year to be more efficient in the production (Table 5).

Table 5 - Customers plan to upgrade their irrigation system within the year

No need	36,53%
Planned an upgrade but postponed	19,63%
Want to upgrade	9,59%
Not sure to upgrade or not	11,42%
Would like to upgrade	22,83%

The survey shows that 36.53% of the customers think that they do not need to upgrade or extend their irrigation system because their current one is still suitable for their needs. 19.63% had planned an upgrade but, due to the pandemic, they were forced to postpone. 9.59% of customers want to upgrade to the same system as before, while 22.83% would like to upgrade to a more technological system. Finally, 11.42% of customers chose other, more specific reasons, which only partly relate to the expansion or non-expansion of the system.

Furthermore, one of the biggest problems caused by COVID-19 regarding the industries concerns the suppliers as, due to this pandemic, there have been delays in the delivery of goods. All companies, in fact, have suffered delays in several areas that have been analysed in the table below (Table 6):

Table 6 - Supply issues

No difficulties	41,01%
Labour	29,95%
Machinery and technology (e.g., agricultural machinery, irrigation systems, etc.)	22,12%
Materials (e.g., seeds, feed, fertilisers, etc.)	21,66%
Other difficulties (e.g., water, currency, greenhouse structure)	3,23%

From the data collected, there is a good percentage of customers that did not get any difficulty related to the supplier. That means that their job is not getting damaged from supply delays as it is happening instead in many industries.

Another important data that must be considered is what kind of crops the different companies expect compared to the previous season (Table 7).

Table 7 - Harvest forecast compared to previous season

Stable	47,03%
Decreasing	34,70%
Increasing	18,27%

According to these data, the majority of the customers think that it should be stable but many are expecting that the crops will increase despite the pandemic, in fact this has not affected farmers' land.

The customers, moreover are not really positive about the expected sales compared to the last season (Table 8).

Table 8 - Sales forecast compared to previous season

Decreasing	47,03%
Stable	37,44%
Increasing	15,53%

Both tables show a very low percentage of people that expect an increasing.

The last but not least information that has been introduced concerns the prices of the national agricultural products. The table below shows that the majority of the costumers still believe that the prices of agricultural products will be a bet between a decrease of -20% or an increase of the 20% (Table 9).

Table 9 - How customers think national crop prices will react

Percentage of customers answer	Expected change of prices
1,83%	+ 40%
18,72%	+ 20% < X < + 40%
59,36%	- 20% < X < + 20%
16,89%	- 40% < X < - 20%
3,20%	- 40%

The table above illustrates customers' approach to pandemics. Furthermore, another interview with one of the company's executives -subject to COVID-19 safety restrictions- made it possible to obtain some information about the internal activities of the company during the pandemic.

After the outbreak of COVID-19, IRRITEC S.p.A., being part of the agri-food chain, has been operating without ever stopping production and sales, complying with all current regulations.

During the lock down period, the company further invested in both sanitation and safety, trying to preserve both the health and safety of its employees and their families. The company has always tried to adapt as much as possible to COVID-19.

The company's priority has therefore been to ensure safety in the working place.

Within a few days, IRRITEC S.p.A. activated telework for hundreds of people working in the office. It has guaranteed the workers, who continue to work on site, the availability of protective masks and helmets. In addition, it has also redefined the entry procedures to avoid crowds of people.

All this took place in an atmosphere of collaboration and commitment, starting with the employees, which the IRRITEC S.p.A. manager decided to support by doubling the contribution for the days of work in the office provided for by the Care Italy decree. In addition, in support of families, employees were able to take advantage from more flexible working hours, paid extraordinary leave of up to 5 days for parents with school-age children. The company has also taken out a COVID-19 insurance policy for all staff members. The commitment of IRRITEC S.p.A. also involved the community. The company has made its know-how and technology available to the health emergency to make a contribution. Among the various activities, the main one concerns the creation of valves to convert diving masks Decathlon into emergency masks for lung ventilators, in collaboration with the university of study of Messina according to the project shared by Isinnova. The company was able to produce the valves quickly and in large quantities. They have been donated to several hospitals, mostly in Sicily.

Emergency management was implemented through the organisation of a Task Force made up of managers, who meet every day to take stock of the situation on various issues: devices, reorganisation, hardware and software tools, customer relations, etc.

In addition, what the company learned in Italy was shared with colleagues abroad who were about to enter the emergency phase: the company had to help colleagues, customers

and partners in other countries in order to deal with the situation, also ensuring stocks for its subsidiaries.

During the lockdown, the company also participated in campaigns such as Blocked Prices of the agri-food sector. Given the current pandemic, the company has decided not to increase the prices of its products in order to support the Italian supply chain, which is fundamental for safeguarding agricultural production. In 2020, Carmelo Giuffrè, states that *“We want to make a concrete commitment to support farmers and companies involved in the production process, with the aim of helping to protect Italians’ spending”*. The company, obviously following the ANTI-COVID regulations, continues to help farmers by providing the necessary irrigation systems to support national agricultural production.

In order to best support its customers/retailers, the company delivered the goods to the end user, if the retailer could not fulfil this obligation because of COVID-19 restrictions. This was proof of the collaboration and trust that characterizes the relationships with its customers, many of whom have been following the company since its foundation.

From the sales point of view, the company did not suffer a significant drop in sales, as most orders were delayed in March and April to the following months.

The in-presence meetings were replaced with online meetings, setting up a special Webinar Programme for its customers, assisting them remotely.

Today IRRITEC S.p.A. is also involved in the new digital mode of the main trade fairs such as virtual stands.

The strong ICT structure has allowed an immediate adaptation, based on the experience and tools already used by the company.

The already mentioned data highlight a client-centred approach based on their future needs and mindset. Therefore, the company needs to re-think its business model by modifying -where needed- the previous Canvas framework.

DATA ANALYSIS

This chapter analyses the above-mentioned data as well as literature review and public data to identify what actually changed the business model of the company. Changes could be many or few, depending on how all these data will affect the knowledge and the current Canvas framework.

To understand and better evaluate how IRRITEC S.p.A. need to re-adapt their business model, the Canvas framework will be analysed more in-depth. The topic will cover different sub-chapters, one for each of the nine blocks, divided in front-end and back-end. After that, there will be an explanation of a comparison of the results with the literature review to see if there is any congruence amongst the data. Moreover, the attention will be on the approach of Literature review, which takes into account how the pandemic is affecting the industry 4.0, and shows the answers to the research questions.

3.1 - FRONT-END

3.1.1 - VALUE PROPOSITION

The Value Proposition building block “*defines the bundle of product and services that create values for a specific Customer Segment*” (Osterwalder & Pigneur, 2010). IRRITEC S.p.A is based on a differentiation strategy based on sustainability and products they deliver.

Concerning the product, it is worth mentioning the production of drip wings in Siplast (today Irritec), which completes the product package necessary to start an irrigation system based on sustainability. Furthermore, thanks to the technology, the company is able to offer a blended service, both on site or online, that allows IRRITEC S.p.A. to achieve a great brand name reputation in the market.

Considering the previous Canvas framework, the company must change some aspects as, the Information Seminars. Due to the pandemic, seminars on site are no longer possible, but new technology allows moving on to the Online Information Seminars, in compliance with pandemic regulations, and without neglecting the goals of the company. Furthermore, The Time to Market Reduced in Subsidiary Countries cannot be respected because COVID-19 makes everything slower. And if the delays in March and April are taken into account, the Time to Market is increasing. IRRITEC S.p.A. also supports the Retailers that- due to safety restrictions- were not able to deliver products to the clients,

Therefore the company decided -where needed- to support the Retailer and meet the clients' individual needs.

3.1.2 - CUSTOMER SEGMENT

The Customer Segment building block “*defines the different group of people or organizations the company aims to reach or to serve*” (Osterwalder & Pigneur, 2010).

The company is involved in a one-to-one market. That means that IRRITEC S.p.A. develop customized products according to the customers' needs/preferences. The market is diversified due to the fact - as shown in the Canvas framework- that the company is handling with several kinds of customers.

Despite COVID-19, nothing has changed in the customer's segment.

3.1.3 - CUSTOMER RELATIONSHIP

The Customer Relationship building block “*describes the types of relationships the company establishes with a specific Customer Segment*” (Osterwalder & Pigneur, 2010).

They offer:

- **Personal and dedicate assistance:** the company respond to any type of customers' needs and specific representatives will focus on specific customers.
- **Co-creation:** The Company allows its customers to express useful evaluations.

Considering that block, the company was no longer able to take place in the Citizens Events due to COVID-19 restrictions. Therefore, the company must join online events that will increase their exposure to the public. It would be less costly for the company since they do not need to pay for flyers, transportations, stand, spot, etc.

3.1.4 - CHANNELS

The Channels building block “*describes how company communicates with and reaches its Customer Segments to deliver a Value Proposition*” (Osterwalder & Pigneur, 2010).

Thanks to the channels that IRRITEC S.p.A. is using they are able to reach their customers.

The channels block is appropriate in its current status. Nevertheless, some stores are being closed and this did not favour the sponsorship of the company. Since the company is also using very helpful online channels, this block does not need any improvement.

3.1.5 - REVENUE STREAMS

The Revenue Streams building block “*represents the cash a company generates from each customer segment*” (Osterwalder & Pigneur, 2010).

The revenue streams are customer value-based pricing, in fact the company bases a price on the quality of the value delivered to their customers. IRRITEC S.p.A. makes its revenue through both:

- **Direct product/service:** the company earns revenues just selling their products and services;
- **After-sales service:** the company earns revenue also through the maintenance of the products they sold.

However, the company is not always able to send their technicians on site. Therefore, they should improve their technologies so that all operations are carried out by smart technologies that control all the products they sell.

3.2 - BACK-END

3.2.1 - KEY RESOURCES

The Key Resources building block “*describes what are the most important asset required to make the business model to work*” (Osterwalder & Pigneur, 2010).

The sanitation plan on its whole must be considered as a key resource due to the pandemic. The company must get masks, hands gel, safety helmets, sanitation of all the locals, etc.

3.2.2 - KEY ACTIVITIES

The Key Activities building block “*describes what are the most important things a company must do to make its business model to work*” (Osterwalder & Pigneur, 2010).

Furthermore, it is important, for the company, that all the employees are healthy. Therefore, it is important to include an activity that helps to check their employees’ health both for the security of all staff and for the single employee.

3.2.3 - KEY PARTNERSHIP

The Key Partnership building block “*describes the network of suppliers and partners that make the business model work*” (Osterwalder & Pigneur, 2010).

Having partnerships is important because it helps to optimize the business model reducing the risk in a competitive market where there is a lot on uncertainty, and also helps to acquire resources needed for specific operations.

The partners of the company did not have any problems with their supply chain and they did not try to change their actual partners. IRRITEC continued to work well although - due to COVID-19- the company needed to delay some orders.

Considering that block, the company decided to do not implement or cancel partnership. They understand the problems related to the pandemic, but the partners are still doing a good job and they do not want to change. They just make some negotiations with Sanitation Companies in order to give to everyone major safety, getting both sanitation of the locals and all the materials to make their employees safe.

3.2.4 - COSTS

The Costs building block “*describes all the cost incurred to operate the company’s business model*” (Osterwalder & Pigneur, 2010).

The costs are value-driven, in fact, the company does not aim at minimizing their costs. Instead, they aim at giving customers quality products and quality services.

The company is shown to have increased its costs. Some of them will be just for a limited period of time while some others will always be inside the company.

The company will implement:

- sanitation and safety, trying to preserve both the health and safety of its employees and their families;
- COVID-19 insurance policy for all staff members.

The company will ensure, in a limited period of time:

- the presence of protective masks and helmets to the employees that continue to work on site;
- doubling the contribution for the working days;
- flexible working hours, paid extraordinary leave of up to 5 days for parents with school-age children;

- Decathlon into emergency masks for lung ventilators, in collaboration with the university of study of Messina according to the project shared by Isinnova. The company was able to produce the valves quickly and in large quantities.

DISCUSSION

This chapter is devoted to the research questions. All sub-research questions contain an answer that allow to develop a final answer for the main research question.

Considering the question: What changed in IRRITEC S.p.A due to COVID-19?

IRRITEC S.p.A. also went through a moment of uncertainty due to scenarios that were not easy to decipher. In such a difficult moment the company had to:

Monitor and increase the degree of social distancing in the workplace in order to guarantee the safety of its employees as much as possible, especially in the production facilities and adapt to the rules set by the government in order to open shops or keep them open;

Make what/if analyses to decide how to respond to continuing situations of great uncertainty;

Make use of remote management in view of the lockdown measure. The use of smart working tools made it possible to ensure continuity in all ordinary managerial activities (e.g., order management) and non-routine activities (e.g., project development);

Ensure Remote Operations, i.e., remote execution of operational activities.

Considering the question: How did the pandemic affect clients of IRRITEC S.p.A?

In order to stimulate sales, the company was forced to transform customer reception as a whole while keeping safety in the workplace as a priority. The company has ensured that interactions between customer and salesperson take place while respecting social distancing and wearing a mask. It has also implemented mobility tools for salespeople, which allow them to inform the customer anywhere on the sales floor without having to cross the shop to get a response and without sharing a tool between several operators.

It has also given the shop a new role, namely that of a pick-up or logistical marshalling point for finalising web orders. The company came to the aid of customers with the Blocked Prices campaign and allowed goods to be delivered to the end user if the retailer was unable to fulfil this obligation due to COVID-19 restrictions.

Ultimately, the coronavirus highlighted more than ever the importance of remaining agile in the industry and the adoption of unified commerce remains the key to adapting to every customer and every situation.

Considering the question: What are the required actions to re-adapt the business model to the new incoming needs of IRRITEC S.p.A.?

After analysing all the data, the business model has to be readjusted and therefore adjustments have to be made in some blocks of the Canvas framework:

- **Key Partners** has to be integrated by Sanitation Companies;
- **Key Activities** must be integrated by Employees Health Care;
- **Value Proposition** must be removed from Time to Market in Subsidiary Countries and integrated with Increase Design Service and Information Seminars Online;
- **Customer Relationships** should remove Citizens Events, Expo, Green City, Slow Food and integrate Online Events;
- **Cost Structure** must integrate Sanitation Safety and COVID-19 Insurance Policy;
- **Revenue Streams** must integrate Smart Technologies.

At this point it is possible to answer the main research question: Does IRRITEC S.p.A. have to re-invent their business model?

The answer is yes. From the analysed data and the answers to the sub-research questions, IRRITEC S.p.A. business model needs to be re-adapted in the aspects that are mentioned in the answers to the previous question.

Furthermore, it is also thanks to the Literature Review, that has been possible to reach to these conclusion and analysis, because it has been helpful for the understanding how the industry 4.0 works, how reacted to the Covid and explain the utility of the business model in the industry 4.0. Below can be find the re-think of the Canvas framework for IRRITEC S.p.A.

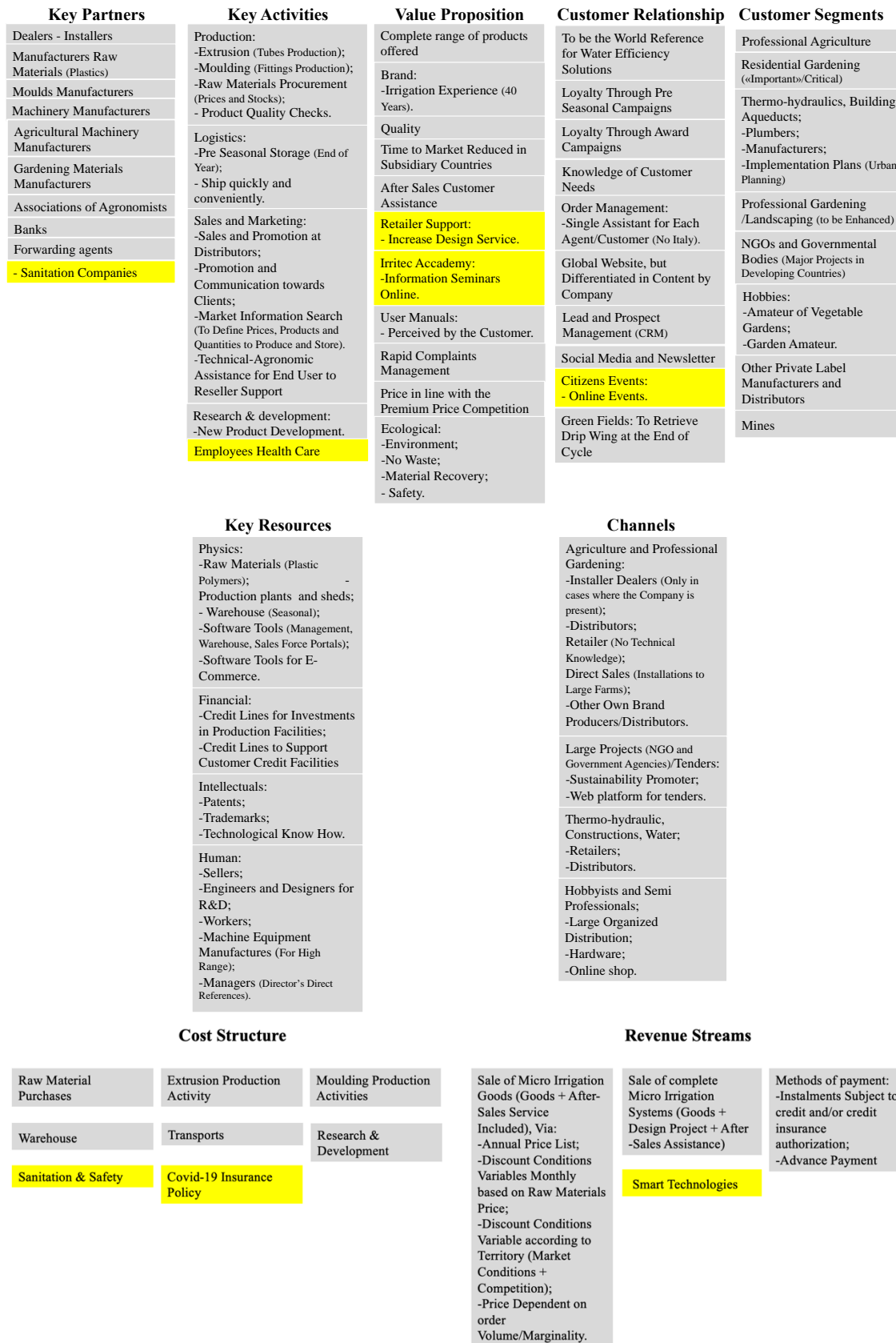


Figure 3 - Canvas During COVID-19

CONCLUSION

The objective of this research was to analyse the main impacts of COVID-19 in the industry 4.0, by referring to the case study of the company IRRITEC S.p.A, in order to respond to the main research question. That answer has been given in the discussion chapter. Furthermore, going back and reviewing the analysis of the different blocks in the Canvas, the only one that does not need to be modified is the Customer Segments, Channels and Key Resources blocks. For the rest of the blocks some change is needed, but at the same time many aspects are still good to continue the business without get problems from the pandemic. The technologies 4.0 have enabled the company to provide rapid responses to the emergencies introduced by a crisis such as the one we are currently experiencing and have, at the same time, enabled it to explore and validate new ways of doing business that will survive the emergency and give the company greater competitiveness. That study shows how helpful are the business model for a company. The most developed are their business model, the most the company makes high progress. IRRITEC S.p.A, thanks to a detailed study can exactly see, in a quick way what they should or need to change in their business to be more reactive to the COVID-19. The impact of the pandemic provides a scenario that is not at all futuristic, but a reality that is affecting the industrial world at different levels (Agrawal et Al., 2020).

All industries that previously used digital solutions have been favoured and have managed to weather this storm (Agrawal et Al., 2020).

Companies must adopt methodologies that help them to respond both adequately and quickly to the new COVID-19 standards. In order to avoid the spread of contagion and therefore reduce physical contact with other people to a minimum, companies need to activate the so-called Smart Working, a more modern vision of work based on the use of various tools such as PCs, Tablets and Smart Phones that can communicate more or less interactively on the network (Agrawal et Al., 2020). The worldwide humanitarian issues posed by the COVID-19 epidemic necessitate a new form of partnership to overcome (Agrawal et Al., 2020). Organizations have the chance to design a future with digital, resilient operations when they restart operations in the new normal (Agrawal et Al., 2020). Early achievements have demonstrated that firms may start small and expand rapidly if they commit to Industry 4.0 transformation in line with their business environment and strategic objectives and execute it utilizing a triple transformation strategy (Agrawal et Al., 2020).

APPENDIX

Table 10 - Questionnaire for the Operational Marketing Manager

Customer Segment	What are the customers for whom IRRITEC S.p.A. is creating value?
Value Proposition	What value is IRRITEC S.p.A. delivering to their customers' needs?
Channels	In which way the company reaches their customers?
Customer Relationship	What kind of relationship does the company establish with its customer?
Revenue Streams	How does the company profit from its customers?
Key Resources	What are the company's most important resources that lead to the finalization of value proposition?
Key Activities	What are the company's most important activities that lead to the finalization of value proposition?
Key Partnership	What are the key partners that are useful to deliver resources for reaching the value proposition goal?
Cost Structure	What are the costs incurred by the business model used by the company?

GLOSSARY

S.p.A.	Società per Azioni
ICT	Information and Communication Technologies
PVC	PoliVinilCloruro
CRM	Customer Relationship Management
CEO	Chief Executive Officer

REFERENCES

Afuah, A. (2004). *Business models: A strategic management approach*. McGraw-Hill/Irwin.

https://www.researchgate.net/publication/215915160_Business_Models_A_Strategic_Management_Approach

Agrawal, M. et Al. (2020). *Industry 4.0: Reimagining manufacturing operations after COVID-19*. McKinsey & Company.

<https://www.mckinsey.com/business-functions/operations/our-insights/industry-40-reimagining-manufacturing-operations-after-covid-19>

Alt, R. & Zimmermann, H. (2001). Preface: introduction to special section – Business Models. *Electronic Markets*.

Ansari, S. et Al. (2015). The disruptor's dilemma: Tivo and the U.S. television ecosystem. *Forthcoming in Strategic Management Journal*.

<https://www.repository.cam.ac.uk/bitstream/handle/1810/249178/Ansari,%20Garud,%200%26%20Kumaraswamy%202015%20Strategic%20Management%20Journal.pdf?sequence=3>

Arend, R. (2013). The business model: Present and future – beyond a skeumorph. *Strategic Organization*.

Awan, U. et Al. (2018). Governing Interfirm Relationships for Social Sustainability: The Relationship between Governance Mechanisms, Sustainable Collaboration, and Cultural Intelligence. *MDPI*.

<https://doi.org/10.3390/su10124473>

Baldwin, M. & Rose, P. (2009). Concept analysis as a research methodology. *Nurse Education Today*.

<https://doi.org/10.1016/J.NEDT.2009.03.009>

Bellman, R. et Al. (1957). On the Construction of a Multi-Stage, MultiPerson Business Game. *Operations Research*.

<https://www.rand.org/content/dam/rand/pubs/papers/2007/P1056.pdf>

Bigelow, L. & Barney, J. (2020). What are Business Models? *Working Paper*.

Bigelow, L. & Barney, J. (2021). What can Strategy Learn from the Business Model Approach? *Journal of Management Studies*.

<https://onlinelibrary.wiley.com/doi/full/10.1111/joms.12579>

Boons, F. & Lüdeke, F. (2013). Business models for sustainable innovation: state-of-the-art and steps towards a research agenda. *Journal of Cleaner Production*.

<https://doi.org/10.1016/J.JCLEPRO.2012.07.007>

Casadesus, R. & Ricart, J., (2011). How to design a winning business model. *Harvard Business*.

Christensen, C. et Al. (2015). What is disruptive innovation? *Harvard Business Review*.

https://www.innosight.com/wp-content/uploads/2018/01/Innosight_HBR_What-is-Disruptive-Innovation.pdf

Cottone, P. (2014). Literature Review. *Interaction And Culture Lab*.

<http://www.iclab.eu/2014/literature-review>

D'Atri, A. & Braccini, A. (2008). Il business model come punto di contatto tra tecnologia e organizzazione.

https://eprints.luiss.it/330/1/D'ATRI_2008.pdf

Dudovskiy, J. (2015). Research Approach. *Business Research Methodology*.

<https://research-methodology.net/research-methodology/research-approach/>

Evans, S. et Al. (2017). Business Model Innovation for Sustainability: Towards a Unified Perspective for Creation of Sustainable Business Models. *Business Strategy and the Environment*.

<https://doi.org/10.1002/bse.1939>

Ferranti, E. & Jaluzot, A. (2020). Using the Business Model Canvas to increase the impact of green infrastructure valuation tools. *Urban Forestry & Urban Greening*.

<https://doi.org/10.1016/J.UFUG.2020.126776>

Foss, N. & Saebi T. (2017). Fifteen years of research on business model innovation: How far have we come, and where should we go? *Journal of management*.

Girotra, K. & Netessine, S. (2014). Four paths to business model innovation. *Harvard Business Review*.

Huesig, S. et Al. (2014). The influence of regulation and disruptive potential on the entrants' motivation and ability within the context of a network industry. *Proceedings of PICMET '14 Conference: Portland International Center for Management of Engineering and Technology; Infrastructure and Service Integration*.

<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6921135>

Irritec (2019). Un global compact communication on progress 2019.

https://www.irritec.com/Documents/COP-2020/Irritec_2019_Communication_on_Progress.pdf

Irritec (2021). <https://www.irritec.it/>

Jerman, A. et Al. (2019). The Influence of Critical Factors on Business Model at a Smart Factory: A Case Study. *Business Systems Research*.

<https://hrcak.srce.hr/ojs/index.php/bsr/article/view/12636/6247>

Kopp, C. (2020). Business Models. *Investopedia*.

<https://www.investopedia.com/terms/b/businessmodel.asp>

Lanzolla, G. & Markidesb, C. (2021). A Business Model View of Strategy. *Journal of Management Studies*.

<https://doi.org/10.1111/joms.12580>

Lin, T. et Al. (2016), New Method for Industry 4.0 Machine Status Prediction - A Case Study with the Machine of a Spring Factory. *International Computer Symposium (ICS)*.

<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7858493>

Linz, C. (2020). How to transform your business model for a post-COVID future. *World Economic Forum*.

<https://www.weforum.org/agenda/2020/11/transform-business-model-post-covid-future/>

Maci, L. (2019). Che cos'è l'Industria 4.0 e perché è importante saperla affrontare. *Economyup*.

<https://www.economyup.it/innovazione/cos-e-l-industria-40-e-perche-e-importante-saperla-affrontare/>

Magretta, J. (2002). Why Business Models Matter. *Harvard Business Review*.

http://secure.expertsmind.com/attn_files/1746_Why%20Business%20Models%20Matter.pdf

Mahadevan, B. (2000). Business models for Internet-based e-commerce: An anatomy. *California Management*.

Monaco, F. (2019). What is a Business Model Canvas? *Merlin*. <https://merlin-ict.eu/what-is-a-business-model-canvas/>

Osterwalder, A. & Pigneur, Y. (2010). Business model generation: A handbook for visionaries, game changers, and challengers. *New Jersey: John Wiley & Sons, Inc.*

Ovans, A. (2015). What is a business model? *Harvard Business Review*.
<https://hbr.org/2015/01/what-is-a-business-model>

Porter, M. (1996). What is strategy? *Harvard Business Review*.

Porter, M. (2001). Strategy and the Internet. *Harvard Business Review*.

Redazione Diritto dell'Informatica (2019). Opportunità e rischi dell'Industria 4.0: le risposte istituzionali. *Tom's Hardware*.

<https://www.tomshw.it/altro/opportunita-e-rischi-dellindustria-4-0-le-risposte-istituzionali/>

Roblek, V. et Al. (2016). A Complex View of Industry 4.0. *Sage Open*.

Ruzza, D. (2017). La Content analysis: applicazione pratica e teorica.

<http://dspace.unive.it/bitstream/handle/10579/13174/843457-1214738.pdf?sequence=2>

Sirmon, D. et Al. (2007). Managing firm resources in dynamic environments to create value: Looking inside the black box. *Academy of Management Review*.

Teece, D. (2010). Business models, business strategy and innovation. *Long Range Planning*.

Wainstein, M. & Bumpus, A. (2016). Business models as drivers of the low carbon power system transition: a multi-level perspective. *Journal of Cleaner Production*.

<https://doi.org/10.1016/J.JCLEPRO.2016.02.095>

Wilson, J. (1971). Thinking with Concepts. *Cambridge University Press*.

https://books.google.se/books?hl=it&lr=&id=sgXIIEx_XD0C&oi=fnd&pg=PR7&ots=F3kIrb-

[F3kIrb-](https://books.google.se/books?hl=it&lr=&id=sgXIIEx_XD0C&oi=fnd&pg=PR7&ots=F3kIrb-)

[IE&sig=UiVqV4WWgL7ZJhwQ_r7073Ud3PM&redir_esc=y#v=onepage&q&f=false](https://books.google.se/books?hl=it&lr=&id=sgXIIEx_XD0C&oi=fnd&pg=PR7&ots=F3kIrb-IE&sig=UiVqV4WWgL7ZJhwQ_r7073Ud3PM&redir_esc=y#v=onepage&q&f=false)

Wirtz, B. et Al. (2016). Business Models: Origin, Development and Future Research Perspectives. *Long Range Planning*.

<https://doi.org/10.1016/J.LRP.2015.04.001>

Yang, M. et Al. (2017). Value uncaptured perspective for sustainable business model innovation. *Journal of Cleaner Production*.

<https://doi.org/10.1016/J.JCLEPRO.2016.07.102>

Zott, C. et Al. (2011). The business model: Recent developments and future research. *Journal of Management*.

Zott, C. & Amit, R. (2010). Business model design: An activity system perspective. *Long Range Planning*.

Zott, C. & Amit, R. (2013). The business model: A theoretically anchored robust construct for strategic analysis. *Strategic Organization*.