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Final Thesis

### **Riviera del Brenta footwear companies between tradition and innovation: the solution is beyond the product**

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*“Oggi abbiamo una strada per rovesciare questo stato di cose, non tornando alle fabbriche gigantesche di un tempo – con i loro eserciti di dipendenti – ma creando un nuovo tipo di economia manifatturiera più simile al web stesso: bottom-up, largamente distribuita e altamente imprenditoriale.” (Chris Anderson)*

# TABLE OF CONTENTS

<b>INTRODUCTION</b>	<b>6</b>
<b>CHAPTER 1: The future of manufacturing</b>	<b>8</b>
1.1 The Fourth Industrial Revolution: context and implications	8
<i>1.1.a Autonomous Robots</i> .....	12
<i>1.1.b Cybersecurity</i> .....	12
<i>1.1.c Augmented reality</i> .....	13
<i>1.1.d Internet of Things</i> .....	13
<i>1.1.e System Integration</i> .....	14
<i>1.1.f Simulation</i> .....	14
<i>1.1.g Big Data Analytics</i> .....	14
<i>1.1.h Additive manufacturing</i> .....	15
<i>1.1.i Cloud Computing</i> .....	15
1.1.2 Implications of Industry 4.0	16
1.1.3 Industry 4.0: new policies	21
1.2 Digital manufacturing: a new vision of manufacturing	24
1.2.1 New subjects dominate the scene: Digital craftsmen	30
1.2.2 FabLab: promoters of the spread of digital technologies	32
<b>CHAPTER 2: Digital manufacturing in Italian SMEs</b>	<b>34</b>
1.1 Italian manufacturing sector: overview	34
1.1.2 Italian industrial districts: a successful model for the rebirth of manufacturing	41
1.2 Italy of digital innovations	47
1.3 Digital Innovation Hub, Competence Centres and Contamination Lab: an Italian way to spread new know-how and digital technologies	53
1.3.1 Digital Innovation Hub	54
1.3.2 Competence Centres	56
<b>CHAPTER 3: The Italian footwear sector and the Riviera del Brenta district</b>	<b>59</b>
1.1 The Italian footwear sector: overview and innovation	59
1.2 The Riviera del Brenta district: between tradition and the future	67
1.2.1 Politecnico Calzaturiero: a bulwark for the development of the district	71
<b>CHAPTER 4: CASE STUDIES</b>	<b>78</b>
1.0 Methodology	78
2.0 Brentan entrepreneurs and their reaction to 4.0	80

2.1 Paoul srl	83
2.2 Del Brenta srl	93
2.3 Calzaturificio Baldan 88	103
3.0 Digital transformation in the Riviera del Brenta: a merge between tradition and innovation beyond product and processes	111
3.1. Enabling factors for the digital transformation	112
3.1.1 <i>Respect of product and production processes</i> .....	113
3.1.2 <i>Work and training</i> .....	115
3.2 Advantages of digital transformation	116
3.2.1 <i>Integration between organizational processes</i> .....	117
3.2.2 <i>Interconnections</i> .....	118
3.2.2 <i>Productivity and efficiency</i> .....	119
<b>CONCLUSION</b>	<b>123</b>
<b>APPENDIX A</b>	<b>126</b>
Del Brenta Interview	128
Paoul interview	132
Calzaturificio Baldan 88 interview	139
<b>APPENDIX B</b>	<b>143</b>
<b>REFERENCES</b>	<b>149</b>
<b>WEBSITES</b>	<b>153</b>
<b>ACKNOWLEDGEMENT</b>	<b>156</b>

# LIST OF FIGURES

## CHAPTER 1

Figure 1: The four Industrial Revolutions	10
Figure 2: Innovation Index of European countries	11
Figure 3: Enabling technologies	12
Figure 4: The Third Industrial Revolution	17
Figure 5: Impact of new technologies on companies' value chain	19
Figure 6: Industry 4.0 Readiness Index	23
Figure 7: Production volumes versus costs: Traditional manufacturing versus 3D printing	25
Figure 8: The Long Tail	27

## CHAPTER 2

Figure 9: Countries share of world manufacturing output	35
Figure 10: Geographical areas of destination of Italian exports	37
Figure 11: Geographical area of origin of Italian imports	38
Figure 12: Subdivision by category of Italian companies	39
Figure 13: Map of Italian industrial districts by sector	43
Figure 14: Share of district firms that adopt 4.0 technologies by macro-territorial division (%)	44
Figure 15: Percentage of companies that adopt Industry 4.0 technologies by distinct business sector by district and non-district companies	45
Figure 16: Share of adoption of Industry 4.0 technologies (%)	48
Figure 17: Division of the different type of companies of the report (%)	49
Figure 18: Geographical location of Italian Digital Innovation Hub	55
Figure 19: Geographical location of Italian Competence Centres	56

## CHAPTER 3

Figure 20: Trade Balance -Value 2008-2009 (millions of euros)	61
Figure 21: Footwear producing regions in 2018	62
Figure 22: The Italian footwear industry 2017/2018-Highlights	63
Figure 23: Most desired categories in online shopping	65

Figure 24: Shares of the Riviera del Brenta production on the total shoes production of Veneto and of Italy	69
Figure 25: Total sales value of shoes (in millions of euro)	70
Figure 26: Logo of Politecnico Calzaturiero	72
Figure 27: Digital realization of a pair of shoes	76

## CHAPTER 4

Figure 35: Phase of dance shoes production process	83
Figure 36: Testimonials of Paoul srl	84
Figure 37: Paoul's production plant	85
Figure 38: Infographic about the functioning of EnProMa project	86
Figure 39: EnProMa basic module for the management of maintenance processes	87
Figure 40: EnProMa basic module for the management of maintenance processes	87
Figure 41: Revenues Paoul srl (2016-2018)	88
Figure 42: Paoul srl EBITDA (2016-2018)	89
Figure 43: Paoul srl e-commerce page web	92
Figure 28: Phase of heels production process	93
Figure 29: Relation between tradition and innovation	95
Figure 30: Spark Board operation	96
Figure 31: Representation of Webex App	97
Figure 32: Revenues Del Brenta srl (2016-2019)	98
Figure 33: Del Brenta srl EBITDA (2016-2019)	98
Figure 34: Del Brenta srl web page	100
Figure 44: Baldan 88 own brand	104
Figure 45: Infographic about the functioning of EnProMa project	105
Figure 46: EnProMa basic module for the management of maintenance processes	106
Figure 47: Revenues Calzaturificio Baldan 88 (2016-2018)	107
Figure 48: Calzaturificio Baldan 88 EBITDA (2016-2018)	107
Figure 49: Example of an electronic former	110
Figure 50: Enabling factors for the digital transformation	113
Figure 51: Companies' advantages after their digital transformation	117
Figure 52: Companies' turnover (2016-2018)	121

# INTRODUCTION

If we talk about Made in Italy what comes to our mind? The most immediate answer is the association with fashion, food, and automotive, that is, all those sectors in which our country's artisanal production excels, and whose products are appreciated worldwide. Who doesn't know the great Italian brands like Ferragamo, Prada, Gucci, or the famous products of the Italian culinary tradition? And above all, who has never dreamed of speeding along the streets on a Ferrari or Lamborghini?

However, nowadays, the Italian production excellence cannot remain indifferent to the Fourth Industrial Revolution which has led to the development of new technologies that are spreading like wildfire in many sectors of the economy.

There is talk of a *disruptive* digital transformation since it is affecting man's way of acting and living. It doesn't simply manifest as a change in production methods or in the resources we used because of the introduction of enabling technologies but, it requires a rethinking of companies' ways of doing business, of producing, and of managing processes. Furthermore, digital transformation modifies roles and responsibilities of people who work within organizations.

In light of this scenario, given the importance of Italian manufacturing production, appreciated worldwide for its style, customization, uniqueness, and high quality, it is interesting to wonder if our companies will be able to make the most of the opportunities created by digital transformation, or if they continue to stay in their comfort zone running the risk of losing their competitive advantage earned to date.

Definitely, the combination between know-how, tradition, and new technologies, would help to solve some issues of craftsmanship, arose due to the use of modern production techniques in the last few years, and to create new successful opportunities for Made in Italy products.

This thesis, therefore, deals with digital transformation and its consequences on Italian manufacturing production, focusing, in particular, on the Riviera del Brenta footwear district.

In the first chapter the Fourth Industrial Revolution and related enabling technologies were analysed with a focus on their implications, and on new national plans issued by

governments, including the Italian one, to encourage the development of Industry 4.0. The thesis continues with an in-depth analysis of the phenomenon of digital manufacturing and of the role of digital manufacturers, the new subjects that dominate the current productive landscape.

In the second chapter, assuming that the Italian industrial fabric is composed primarily by manufacturing SMEs, the main objective is to understand if new technologies will bring advantages to these organizations, even though the recent economic crisis has played a major role in delaying their efforts to innovate. An in depth analysis will be carried out on new initiatives that are being developed at the educational level to promote knowledge of new technologies, and to encourage a new approach to the world of work, especially among youngsters.

In the third chapter the focus will be shifted to the Italian footwear sector. In particular, I will concentrate on the Riviera del Brenta district, and on *Politecnico Calzaturiero*, flagship of the district footwear tradition for its closeness with companies, and for its offer of training, innovation & research projects to workers and organizations. The section also includes an interview with Mauro Tesaro, Director of Politecnico Calzaturiero, to validate the relevance of digital transformation for the district.

The last chapter is dedicated to the analysis of three Riviera del Brenta organizations' case histories, respectively *Del Brenta srl*, *Paoul srl*, and *Calzaturificio Baldan 88*.

The objective is to highlight how a different approach to digital transformation, compared to that commonly adopted within the district, has benefited companies, and has allowed them to lay the foundations for the creation of an "Italian Smart Factory". Organizations have been able to take advantage of advanced technological solutions, respectively Cisco Webex Teams and EnProMa, by exploiting corporate interconnections to integrate different business processes, and obtain a clear improvement of production performance. In this Italian version of the connected factory, the integration between the virtual and the physical world is on the agenda, so that, products remain as faithful as possible to Italian tradition and culture, in respect of the wealth of knowledge that organizations cannot afford to sacrifice in favour of technology.



# **CHAPTER 1: The future of manufacturing**

## **1.1 The Fourth Industrial Revolution: context and implications**

We are aware that the world, nowadays, is experiencing a process of change. This is not a novelty because it has always changed, and it will do so regularly even in the future. Looking at the past, we can infer how man has lived in historical periods characterized by phases of profound transformation alternating with periods of stalemate, in which he has witnessed the consequences of these changes.

Because of this, historians have identified two events that have led to important mutations, compared to the past, having consequences for millions of people, nurturing urbanization and improving living standards: the First and the Second Industrial Revolution.

The first industrial revolution started in Great Britain at the end of the 18<sup>th</sup> century, leading to the mechanization of activities, that were manual until that time, thanks to the use of water and the invention of the steam engine. There was also a change in the type of energy sources with the adoption of coal, coke and steam.

The other important revolution took place between the end of the 19<sup>th</sup> century and the beginning of the 20<sup>th</sup> in United States and Europe, thanks to the discovery of new energy sources like oil and electricity, the superiority in the scientific field, and the use of new transportation and communication systems that made people closer and more connected. The most important change was the rational and scientific use of workers in factories thanks to the application of the “Principle of Scientific Management” which aimed to lower the costs of work, to reduce production times sharply, and to increase productivity. The Second Industrial Revolution was identified as the era of mass production and of the assembly line.

During the second half of the 20<sup>th</sup> century, however, we witnessed the advent of Information Technology (IT). This epoch is considered by many the third industrial revolution, a sort of forerunner of the changes we are experiencing today. It has characterized three main sectors: automation, electronics and informatics. The emblems

were the birth of the first personal computer and the development of Internet, that have represented the starting point for a continuous and rapid technological development. The third industrial revolution has created the so called “Information society” (D. Bell, 2007), in which the world of information, thanks also to Internet, has become increasingly important.

The advent of Internet has opened up a whole new scenario, laying the foundations for the transition from an analogical to a digital world.

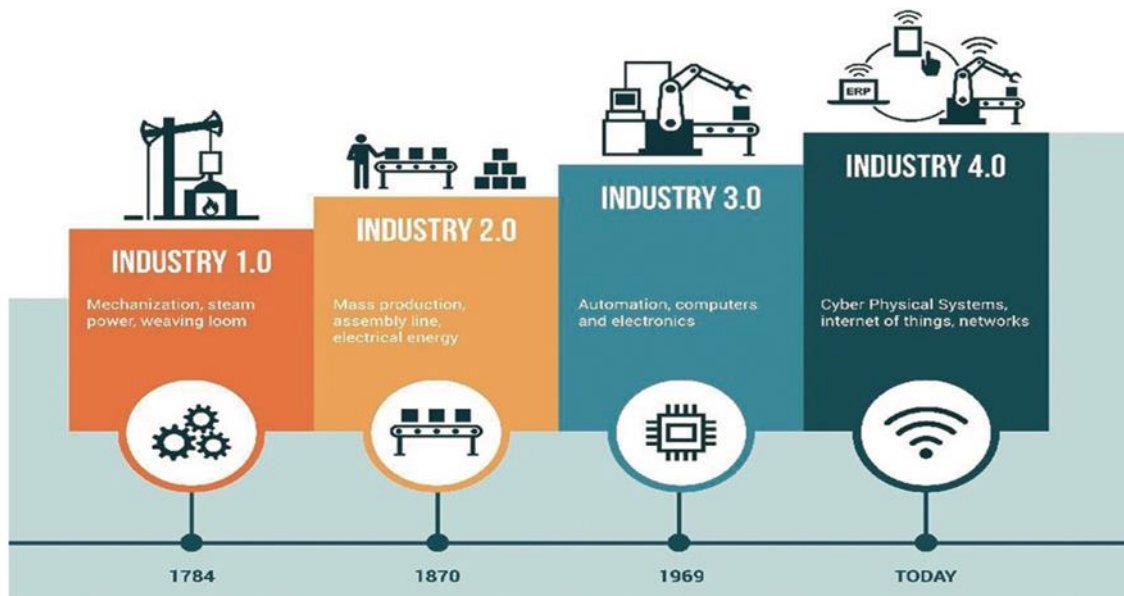
In the last few years, in fact, a new revolution has started: we are experiencing a digital transformation that has brought changes, associated with innovation in the field of digital technology, in all the aspects of society and of the economy. We talk about the fourth industrial revolution or Industry 4.0. Unlike the other revolutions, the fourth doesn’t have a precise period of time or year to which its beginning can be traced because it is still in progress, and the potentials of its changes hasn’t yet be fully exploited, since technological solutions continue to grow exponentially.

Looking at the existing literature, we can see how some authors define this phase as the third industrial revolution, as can be seen from the article of The Economist, while others, like Henning Kagermann<sup>1</sup>, named the current period as Industry 4.0 era. In this thesis the latter interpretation will be considered.

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<sup>1</sup> Henning Kagermann is a German physicist and businessman. He is one of the main proponents of the concept of Industry 4.0.

**Figure 1: The four Industrial Revolutions**



Source: [www.medium.com](http://www.medium.com)

The expression Fourth Industrial Revolution was used, for the first time in 2011, in the name of a German initiative called *Zukunftsprojekt Industrie 4.0* by the German Engineering federation. The working group had presented the project on 8 April 2013 at the Hannover Fair through the diffusion of the final report, that contained forecasts of the investments necessary for the development of infrastructures, of energy systems, of companies, and of research institutions. The goal was to modernize the German production system, and to make the manufacturing production competitive again at a global level. The German government has accepted the challenge thrown by the plan, and has decided to institutionalize it with the aim of digitizing the manufacturing industry. Subsequently, other European governments understood the importance of the phenomenon, and have started to launch many initiatives or programs to promote technological development. As it can be seen from the graph below that shows the Innovation Index of different European countries, we can see how some of these have recorded very high values by moving towards Industry 4.0.

**Figure 2: Innovation Index of European countries**



Source: *The European House-Ambrosetti elaboration of data from the European Commission 2015 on <https://st.ilsole24ore.com/art/impresa-e-territori/2016-07-06/industria-40-chiave-crescita-155047.shtml?uuid=AD8sHyo>*

The paradigm Industry 4.0, to date, refers to tendency of companies and research centres to incorporate Cyber-physical systems (CPS) and Internet of things (IoT) in different ecosystems, in order to lead to an optimization of product, processes and services, and to influence social and business life (Hartmann, Halecker, 2015). Cyber-physical systems are used to process and translate data from the physical world to the virtual ones and vice versa.

Undoubtedly Industry 4.0 provides a wide range of changes for companies worldwide which can be summarized in technological adjustment, flexibility, constant information flows and interconnections.

To manage these transformations it was necessary to implement enabling technologies. The Boston Consulting Group in a study called *Industry 4.0: The Future of Productivity and Growth in Manufacturing Industries* has identified nine typologies of technologies that if properly used and combined, could allow the evolution of organizations toward a new model of factory.<sup>2</sup>

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<sup>2</sup>Kupper D., *Embracing Industry 4.0 and Rediscovering Growth* on [www.bcg.com](http://www.bcg.com)

**Figure 3: Enabling technologies**



*Source: www.atlas-at.com*

### ***1.1.a Autonomous Robots***

Autonomous robots are advanced and interconnected production systems that allow flexibility of performances. The adoption of robots has changed the way companies organize their production and realize goods: they could interact with one another, carry out repetitive tasks autonomously, and work hand in hand with humans in their daily activities. Nowadays, in fact, there are also collaborative robots and cobots in the market that have given birth to new forms of human-machine interactions.

The advantages related to the adoption of autonomous robots are many: firstly an increase in the level of quality and productivity because they can perform tasks that humans aren't able to perform, secondly an increase in the level of efficiency thanks to a reduction of production time, costs and errors.

### ***1.1.b Cybersecurity***

Cybersecurity is the practice of protecting systems, networks, and programs from digital attacks.<sup>3</sup> Cybersecurity adoption is due to the increase of internal and external interconnections between different computer systems, and to the consequent information

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<sup>3</sup>[www.cisco.com](http://www.cisco.com)

and systems security issues. Since information has become sensitive, systems must be protected in such a way that they cannot be accessed from the outside during network operations, except with appropriate credentials like sophisticated identity and access management of machines and users.

### ***1.1.c Augmented reality***

Augmented reality consists in the use of vision systems, that could offer a series of services and information in real time to better guide humans in their daily activities, and to improve their decision making processes. This technology continues to use physical reality enriched with images and information that can be added by users through mobile devices or other wearable technologies. Augmented reality is a powerful tool that is currently used to support production processes because it allows, for example, to facilitate any decision relating to production like the selection of materials or of the spare parts.

### ***1.1.d Internet of Things***

Internet of Things (IoT) allows the connection of devices through embedded systems, so that people can communicate and interact with one another or with objects, systems and environments. *The European Research Cluster on the Internet of Things*, in 2011, defined IoT as “A dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual things have identities, physical attributes, virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network”.<sup>4</sup> IoT has started to be used in different sectors of the economy because at a company level allows an almost total connection of the factory and of the production systems, with advantages from the point of view of production efficiency and of management flexibility.

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<sup>4</sup> Vermesan O., Friess P., *Internet of Things-From Research and Innovation to Market Deployment*, River Published, Denmark, 2011

### ***1.1.e System Integration***

System integration includes both horizontal and vertical integrations. The adoption of interconnected technologies, able to create open systems with the share of data and information in real time, and to create efficient automated chains capable of reduce inventory costs and times thanks to a better activities' coordination, could allow the digitization and integration along the value chain. This means that all the business areas in a company, the companies themselves, their suppliers, their partners and their customers are more integrated, connected and cohesive thanks to the existence of these strong linkages.

### ***1.1.f Simulation***

Simulation between connected machines could be used to leverage real time data, and to create 3D simulations of product lines or of the physical world. Companies could have the possibility to test the hypothetical products, to improve the ideation phase, to increase product quality, and to optimize industrial processes. With simulations, data is also used in real time in order to reflect the material reality in a virtual model, which would allow to test and optimize the machines of the production process in the real world. As a consequence, it will be possible to make corrections in the production of a particular product without facing high costs, and to reduce machine setup times.

### ***1.1.g Big Data Analytics***

Nowadays, every object and service produce data. Big Data Analytics it is used on one hand to manage and process the large volume of data generated by the use of new technologies, and, on the other hand, to make predictive analysis of problems that could derive from industrial processes by calculating the probabilities of failure. In addition, Big Data allow the development of on demand production systems that give immediate answers to customers. The possibility of obtaining information in the process of analysis of a wide amount of data is guaranteed by data mining, that uses algorithms and techniques to identify associations or patterns of data to make the information readily available and usable in the decision making process.

### ***1.1.h Additive manufacturing***

Additive manufacturing consists in the adoption of 3D printers for the production of solid and complex elements for a finished product in a record time, and at competitive costs. The use of 3D printer allow companies to eliminate the tools and moulds creation phase, to test products rapidly with a consequent net reduction of investments, and to work directly with the 3D model. The three dimensional prototypes are created thanks to the use of CAD (computer aided design) software, scanners, or photogrammetry software. This technique enables mass customization because allow to produce small series of customized products of great quality and design with a reduction of the wastes. Additive manufacturing has been used in many industrial fields as, for example, aerospace for the production of vehicle parts to reduce risks and maximize production capacity, and in the biomedical sector for the realization of sanitary components that must be in contact or even inside the human body.

### ***1.1.i Cloud Computing***

Cloud Computing is an open by design IT infostructure based on the use of software and storage, like external data analysis services, to increase information sharing and applications between sites and companies through Internet. The Cloud also includes techniques for managing vast amount of data through open systems. The main advantages of this technology are flexibility, wide geographic coverage and accessibility. However, one of the main problem related to Cloud computing is the issue of security.<sup>5</sup>

A significant contribution on these new technologies was given by McKinsey in the report *Disruptive technologies: Advances that will transform life, business, and the global economy*. The report estimates the expected economic impact, subsequently to the practical implementation, of these technologies sector by sector. The result is that by 2025 is estimated that they will have an impact of between 14 and 33 trillion of dollars.

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<sup>5</sup> Gerbert P., Lorenz M., Rößmann M., Waldner M., Justus J., Engel P., Harnisch M., *Industry 4.0: The Future of Productivity and Growth in Manufacturing Industries*, April 2015



However, some of the new technologies haven't been developed in recent years, but they were already in use since the early 2000. Their great diffusion, nowadays, is due to a process of maturation and adaptation thanks to the boost in computer power, and the reduction of their costs . For example, 3D printing was patented for the first time in 1980 by Charles Hull, and it took about 25-30 years to reach the full mastery of the instrument thanks also to new materials moulding techniques.

The massive digitalization is one of the most important change related to the adoption and diffusion of new technologies. In fact, the *Global Digital 2018* report has highlighted how on a population of 7.593 billion of people, Internet connection is guaranteed to 4.021 billion of people. This data underlines how, to date, more than half of the world population, precisely the 53%, is online. It can be said that Internet has become part of our daily life and has influenced our habits which, consequently, are evolving and changing rapidly.<sup>6</sup> We are at a point in our lives where more things or objects are connected to Internet than people (Evans, 2011). By 2020, in fact, it is expected that there will be more than 50 billion of objects with Internet connection.

### **1.1.2 Implications of Industry 4.0**

The advent of Industry 4.0 has undoubtedly led to changes in the world economy; some certainly represent challenges others represent risks. New technologies are increasingly blurring the limits between the real and the virtual world at an extraordinary speed.

We talk about a democratic and transversal revolution: the possible applications seem to be able to range in all sectors regardless of companies size. For this reason, companies must found new sources of value and of competitive advantage.

We are witnessing the birth of Smart Factory or Factory 4.0. Factories, in the near future, due to a widespread use of digitalization, of automation of processes and products, and of technologies, that dialogue with each other within a multitude of exchanges of information and data, will transform themselves. The “All Connected” creates new ways of interaction: there would be a circuit of intangible functions, such as design, research, modelling, communication, and marketing, fully connected and integrated with

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<sup>6</sup> <https://digitalreport.wearesocial.com/> Global Digital Report 2018, Hootsuite

production processes. In addition, the new work organization often won't require a physical presence in the workplace: some phases of the design process could be carried out remotely, through information sharing, thanks to the use of Cloud platforms.

The first to talk about this change was *The Economist* on 21 April 2012, dedicating an article to the theme of the new revolution, the third in its opinion, and to the digital progress. The connected image, that is the cover of the printed version, is emblematic and describe the theme of the article perfectly. It portrays an individual sitting at a desk, in a domestic environment, while typing on a keyboard connected to a machine.

**Figure 4: The Third Industrial Revolution**



Source: <https://www.economist.com/printedition/2012-04-21>

The machinery has the appearance of a factory, but the dimensions of a common computer: from this miniature-factory come out objects and finished products. The interpretation of the message launched by the cover suggests that today we are at the dawn of a new revolution that will involve all the sectors and new connections between the digital world and production processes.

We are witnessing a transformation: from the Fordist factory, characterized by mass production of standardized product and by consumers' renunciation of any type of personalization in the face of affordable prices, to new factories, focused mainly on mass customization, in which consumers no longer buy for quantity but for communicating and

expressing their identity. The concept of “beauty” will become fundamental to make a difference, while mass and large quantities production will lose value (Bassetti, 2013). New processes, intelligent software, innovative materials and new technologies are converging, and, thanks to these, the costs of producing small lots in great variety are gradually decreasing.

As the previous revolutions, also the Fourth will be “disruptive” since, as the article reports “the revolution will affect not only how things are made, but where”.<sup>7</sup> This because during the 1990s and the early 2000s there was a tendency to offshore some phases of the production processes to countries where there were lower labour costs and lower wages. Today offshored organizations have started to bring back their plants to original countries to be closer to the headquarters and, especially, to the final customers, so as that to respond more quickly to their needs, and to cooperate closely with product designers.

We talk, therefore, of a growth in terms of productivity, of competitiveness and of resource efficiency.

Undoubtedly, the implementation of a Smart Factory brings immediate benefits for companies such as: shorter times of production and delivery, improved flexibility thanks to machines’ ability to be reconfigured in short time intervals to adapt to different work environments and production setups, result oriented productivity due to the possibility to prevent possible malfunctions, improved product quality with the use of stronger, more durable materials, and reduction of error rates.<sup>8</sup> It will be no longer necessary to make a product starting from separate components that, later, are assembled together; it might be enough to draw a model on a computer and print it with 3D printer that makes objects adding material layer by layer. In this way a great variety of customized products could be produced in the same time by the same production facility.

At the same time, automation and virtual modelling of processes increase speed of production and of delivery, with a consequent reduction of time period between the realization and the consignment of products.

Smart Factory also revolutionizes man’s work within the companies: labourers are required a conscious participation in the production process of which they must know the

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<sup>7</sup> [www.theeconomist.it](http://www.theeconomist.it)

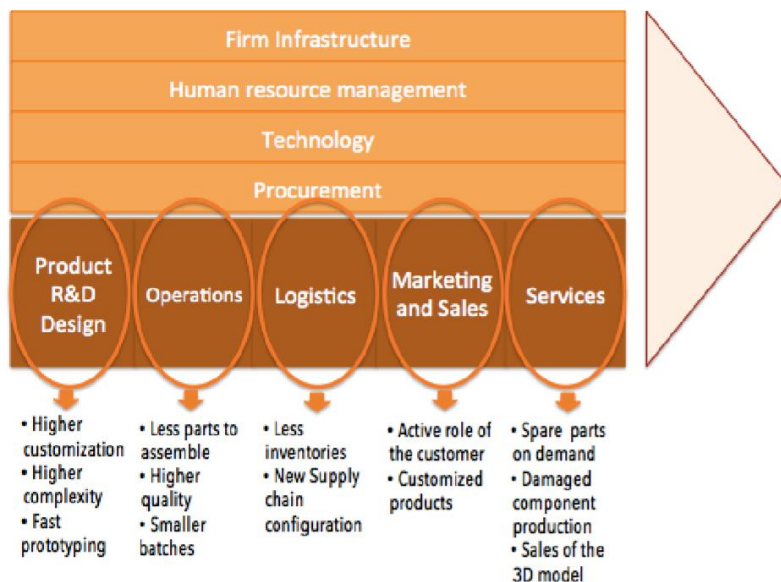
<sup>8</sup> Ufficio Rapporti con l’Unione Europea “Digitalizzazione dell’industria europea-Cogliere appieno i vantaggi di un mercato unico digitale”, Bruxelles 2016

innovative machines functioning, and must have an effective control. Employees will be facilitated in their tasks thanks to the use of collaborative robots and human-machine interfaces, that will enhance their executive capacity. In this new context the so called soft skills are becoming increasingly important: workers, no longer having to deal with certain processes, can spend their time improving their ability to coordinate, to communicate, and to solve problems.

Another important consequence of the fourth industrial revolution is an increase in the level of customer satisfaction. The web, in fact, has also allowed companies to aggregate customers' demands from all over the world and to satisfy the demand of personalized goods in distant countries thanks to e-commerce platforms. Companies, pursuing this strategy, are able to increase their competitiveness and break through new market segments.

All these changes will undermine the traditional value chain.<sup>9</sup> The underlying image represents all the changes generated by the digital transformation at an organizational level.

**Figure 5: Impact of new technologies on companies' value chain**



*Source: Research and Innovation for Smart Enterprises. University of Brescia*

<sup>9</sup> FILCTEM in Lombardia, Industria 4.0, Scenari di competitività e di occupazione per le imprese del sistema industriale, Milano Giugno 2017

However, positive consequences shouldn't exempt us from taking into considerations the criticalities that the fourth revolution has brought.

Many companies lack the awareness or even the means to adopt Industry 4.0 technologies, and, for this reason, they will consequently fall behind. It is no coincidence that, in recent years, we have witnessed the bankruptcies, and the consequent closure of a large number of businesses.

The intensive use of increasingly intelligent and autonomous machines has a considerable impact on the world of work. It is, therefore, natural to question what will be the role of all the unskilled or semi-skilled workers that prevail in our society.

The opinions on this topic are contrasting: while there are studies which affirm that the introduction of robotization and automation will determine a reduction of the employment rate between 30% and 35% because jobs will be replaced by robots governed by sophisticated algorithms; on the other side, most scholars agree that we will witness the birth of other professions such as developers, ICT consultants, digital transformation specialists, big data specialist, e-commerce e social media specialists and cybersecurity officer.<sup>10</sup> It is created, therefore, a sort of trade-off between humans and machines.

In fact, the World Economic Forum, in the 2018 report, has highlighted how we will witness the creation of 133 million new jobs within 2022 but, simultaneously, the disappearance of 75 million of existing jobs replaced by new machines.<sup>11</sup>

Although there is a demand for specialists in the field of Industry 4.0, the problem is represented by the lack of training of workers. Training becomes, then, the main issue that should be solved; there is the need to adopt systemic policies capable of guaranteeing an adequate level of education, as more and more people will have to work side by side with technologies.

Another negative consequence is the high dependence of companies on the digital world: a minimum error or oversight has a disastrous effect on their businesses. For example we can talk about cybersecurity and hacking. In a digitalized world, where also companies adopt the state of "Always Connected", the enabling technologies like Big Data, IoT and Cloud have intensified the chances of a cyber-attack by cyber criminals to the huge

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<sup>10</sup> FILCTEM in Lombardia, Industria 4.0, Scenari di competitività e di occupazione per le imprese del sistema industriale, Milano, giugno 2017

<sup>11</sup> World Economic Forum in collaboration with Accenture: Industrial Internet of Things: Unleashing the potential of connected products and service, January 2015

corporate databases. The attacks could have devastating consequences for organizations since hackers could steal information, data and know-how that are fundamental to companies' strategies, easily bypassing privacy and identification systems. According to the British website *The Register*, 918 data violations have been reported in 2017.<sup>12</sup>

### **1.1.3 Industry 4.0: new policies**

As mentioned above, after the German initiative, all the other countries have started to move towards 4.0 programs.

The European Union in 2010 has proposed a ten year strategy called "Europe 2020" made up of 5 objectives, included that of innovation, with the aim to defend the European competitiveness, and to improve the economic situation of every country.

At the level of the individual states, among the most important initiatives, are placed the English one called "Catapult" to promote the manufacturing sector, and the French initiative called "Industrie du Future" based on a public-private partnership to innovate French industries. Also other European countries like Denmark, Austria, Belgium and Netherlands gave life to their programs.<sup>13</sup>

At this point one may ask if Italy has followed in the footsteps of other European countries.

Italy, after years of total darkness characterized by a decline of growth and development perspectives, has been able to get out of the crisis. Although data shows a slower economic recovery than that of other European countries the state of play is favourable and encouraging for the development of Industry 4.0.

Precisely for this reason, the Chamber of Deputies in September 2016 has drawn up a plan, presented by the Italian minister for the economic development Carlo Calenda and by the Prime Minister of the Italian Government Matteo Renzi, called *Piano Nazionale Impresa 4.0*, containing a series of measures and policies, grouped in 9 fundamental points, for the development of Industry 4.0 in both Italian multinationals and SMEs.

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<sup>12</sup> [www.forbes.it](http://www.forbes.it)

<sup>13</sup> <https://www.agendadigitale.eu/infrastrutture/gli-europei-di-industry-40-germania-batte-italia/>

The plan has started in 2017 with an allocation of over 18 billion of euros and have a duration of 3 years, that is from 2017 to 2020.<sup>14</sup>

One of the main objectives is the growth of private investments in R&D with a focus on new digital technologies. Italian industries must be able to understand the changes, to respond by adopting processes of continuous technological innovation to gain a competitive advantage over competitor, and to reposition themselves on the market.

However, the report of the Ministry of Economic Development about the diffusion of Industry 4.0 in Italy, has highlighted the lack of preparation of Italian companies. In fact, between October 2017 and February 2018, on a sample of 23.700 Italian companies, the 87% was still traditional because didn't use Industry 4.0 technologies or didn't want to adopt them in the future. The remaining part was moving slowly towards the transformation into Industry 4.0.<sup>15</sup>

The results highlighted the gap between small and big companies. In fact, the investigation shows how the 75% of big companies already use technologies typical of Industry 4.0, while two out of three SMEs don't have undertaken the digitalization of their processes.

Analysing the spread of digitalization in the current year, two years after the presentation of the Plan, it can be seen how the situation has improved slightly, but how the percentages of adoption have remained low anyway. A consolidated and often truthful commonplace speaks of Italy as a country where it is difficult to spread and promote the use of new technologies. We are latecomers. (Micelli, 2016).

The Readiness Index, an index created by Roland Berger<sup>16</sup>, highlights the Italian situation. In general, the index is used to distinguish European countries that are ready for the Fourth Industrial Revolution from those that have difficulties in facing it.

In the graph the vertical axis represents the extent of Industry 4.0 Readiness, and the horizontal axis represents the share of manufacturing.

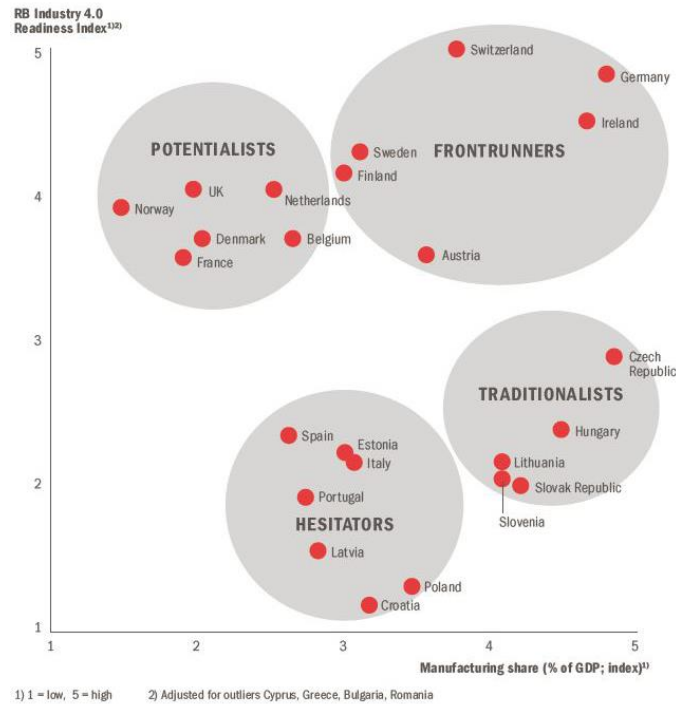
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<sup>14</sup> Scaramuzzi V., Casale M., Tirelli M., Italia 4.0: siamo pronti? Il percepito degli executive in merito agli impatti economici, tecnologici e sociali delle nuove tecnologie, Deloitte, 2018 on [www.deloitte.com](http://www.deloitte.com)

<sup>15</sup> Saini V., La rivoluzione 4.0 è iniziata, ma sta aumentando il divario tra Nord e Sud, 2018 on [www.glistatigenerali.com](http://www.glistatigenerali.com)

<sup>16</sup> Roland Berger GmbH is a German strategic and business consulting company. It offers solutions and specific consultations to companies that face transformation and reorganization processes.

**Figure 6: Industry 4.0 Readiness Index**



*Source: Roland Berger Strategy Consultants-Readiness Index 2014*

The index considers the degree of sophistication of the production processes, the degree of automation, the level of innovation of the workforce and their attitude towards innovation, grouping them in a category called “Industrial Excellence”. It also take into consideration the value added, industry openness, innovation network and Internet sophistication grouping them in the “Value Network” category.

Countries are divided in 4 categories: Potentialists, Frontrunners, Traditionalists and Hesitators.

Looking at the chart, it can be seen how Italy is in the Hesitators category. The Hesitators are all those countries that have to develop the manufacturing sector and their attitude towards digitalization and new technologies. Their delay in the adoption of new technologies and their conversion to digital manufacturing is usually due to financial problems.

Considering other categories: Potentialists are those countries in which manufacturing has been regressed in the past, but they approach it with an innovative attitude in order to find the right way to demonstrate their potential; Frontrunners are those countries that are known for their high manufacturing share and their highly innovative and forward looking



companies; and, finally, Traditionalists are those countries, located especially in the Eastern Europe, in which manufacturing share is high enough but there aren't developed technologies or innovative production methods, and the readiness to innovate is absent or very scarce.<sup>17</sup>

## **1.2 Digital manufacturing: a new vision of manufacturing**

The interest in Industry 4.0 was born in an economic context that was still suffering the consequences of the economic and financial crisis of the 2008. Despite the industrial sector has continued to be the driver of innovation in many countries, the crisis has undermined its growth, exports, and productivity, highlighting its fragility.

At the same time, the crisis and the high unemployment level have put to the centre of attention of economic policies the fundamental role of manufacturing in promoting economic development. The manufacturing sector, in fact, has been the main driving force of the economic growth of developed countries for a long time. Furthermore, new digital technologies can be applied to the production of objects: from this moment we start talking about Digital Manufacturing.

The expression Digital manufacturing was used for the first time in the United States, given the need to think about the world of work and innovation in different ways.

United States, a country characterized by the existence of the myth of the man that is capable of winning in every situation, has been able to transform this ideology into a "Do it yourself" culture focused, above all, on technology, and fomented by the desire to oppose large corporations. In 2012, in fact, the Smart Manufacturing Leadership Coalition (SMLC) was created to support collaborations between manufacturing companies, research institutes and universities, in the development of standards, platforms and shared infrastructures for the adoption of Smart Manufacturing.

Subsequently, the phenomenon has started to spread like wildfire also in Asia and Europe investing the world manufacturing sector.

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<sup>17</sup> Nagy J., Industry 4.0: How to assess the readiness of firms, Some Recent Research form Economics and Business Studies, Corvinus University of Budapest

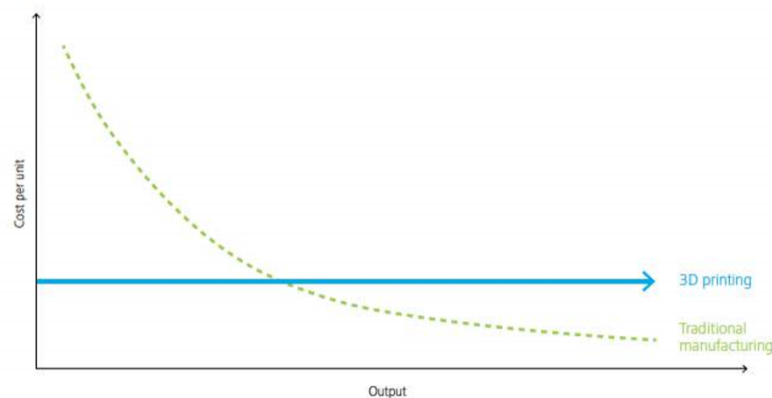
*The Economist*, in the 2012 article, has talked about the transformations caused by Digital Manufacturing at the production level.<sup>18</sup> We witness a rediscovery of the role of manufacturing: from last bastion of analogical world, to a digital, widespread and personalized phenomenon. The article reports how, unlike the other industrial revolutions, nowadays it is noted a reduction of the boundary line between manufacturing and services, and how, as mentioned in the previous paragraph, there is a complete transformation of the traditional factory.

New technologies act as a multiplier, allowing us to quickly create prototypes and to quickly transform ideas into matter; they don't replace the role and the experience of men but amplify their knowledge and production possibilities in terms of design of the products.

Undoubtedly additive manufacturing patronise: 3D printing has an impact on the design phase allowing to materialise concepts and ideas in an immediate and clear way. In addition, new materials, characterized by superior durability and strength, such as carbon fibre or polymers can be used in the realization of products.

It is important to consider the production costs associated with this technique: as the graph illustrates, the cost of printing a unit in 3D remains constant as the quantity increase.

**Figure 7: Production volumes versus costs: Traditional manufacturing versus 3D printing**



*Source: Disruptive Manufacturing. The Effect of 3D printing, Deloitte*

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<sup>18</sup> [www.theeconomist.com](http://www.theeconomist.com)

It can, therefore, be inferred looking at the graph that 3D printing is convenient if we want to meet the requests of watchful and demanding customers, who aren't satisfied with a product that is exactly the same of the others. In fact, small production in lots means lower costs. Products through 3D printing techniques can be made for the customer and on the customer.

However Digital Manufacturing, unlike what the collective imagination thinks, it's not just 3D printing; in fact, there are other technologies that play a role of equal importance, although extensively widespread, such as CNC machines and laser cutter.

CNC is a specialized and versatile form of Soft Automation whose application cover various fields. It follows a predetermined sequence of operations, at the established necessary speed, to make a product with a specified shape and size, according to predictable results; in the event that there is the need to make a different product, it is only necessary to reprogram the machine.

The second technology, the laser cutter is characterized by the use of a laser, driven by a computer, that cuts a surface. Its functioning requires a sheet of material to be spread on a perforated table inside the laser cabin; after the closure of the lid of the machine, a CAD file is loaded into the software that controls the laser position and the laser is turned on. For some processes laser cutter is considered one of the best solutions because the accuracy is very high, but, at the same time, it may not be the most effective solution.

To date, these two technologies, once used only for industrial applications or for the realization of prototypes, are used to make extremely personalized products also by small companies, laboratories and workshops.

An important contribution on Digital Manufacturing was provided by Neil Gershenfeld, professor of Massachusetts Institute of Technology and director of Centre for Bits and Atoms. "A new digital revolution is coming, this time in fabrication" cites the author in his essay *How to make almost anything. The digital Fabrication Revolution*<sup>19</sup>. The novelty is represented by digital fabrication: the physical world could be programmed, and this will obviously entail a transformation of the typical production processes. The author claims that this phenomenon will permit individuals to create products in any place and at any time, taking an active part since the first stages of implementation. The

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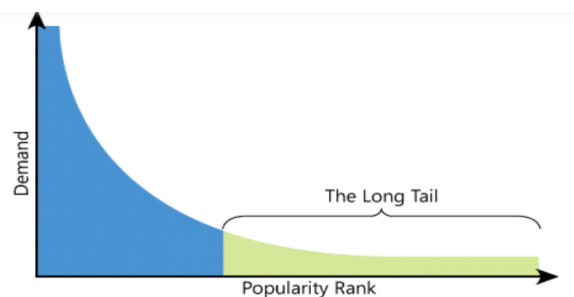
<sup>19</sup> Gershenfeld, N., How to Make Almost Anything. The Digital Fabrication Revolution. Foreign Affairs, November/December 2012, Volume 91, Number 6

fundamental role will be performed by new processes, tools and technologies controlled directly by computers. Neil Gershenfeld gave life in 1998 to a university lab called *How to make (almost) anything* for the experimentation on new materials and technologies. The interest for products made by the students during the laboratory, and for the development opportunities that could have been created by making this structure available to entrepreneurs, inventors and professors, induced the National Science Foundation to invest in Gershenfeld idea. Thus, the first Fab Lab was born.

Neil Gershenfeld wasn't the only one to consider this period of change as a real phase of revolution.

Also Chris Anderson, an American journalist and essayist, has expressed his opinion on digital manufacturing and this new era of transformations. The journalist asserts that there is much more market in customization than in standardization, this means that in the global market there are many more sales of customized products than of standardized ones. Anderson identifies this new trend as the "long tail" paradigm. As shown in the graph, the manufacture of the future doesn't consist in producing a few products in high quantities, represented by the blue area, but by the ability to produce and commercialized ever higher ranges of items whose demand is reduced, that is represented by the green area.

**Figure 8: The Long Tail**



*Source: Rise. Research & Innovation for Smart Enterprises*

In a 2010 article, entitled *In the Next Industrial Revolution Atoms are the New Bits* Chris Anderson talked about manufacturing saying that "The tools of factory production, from electronics assembly to 3D printing, are now available to individuals, in batches as small as a single unit". For the author every garage is a potential micro-factory, every citizen a

potential micro-entrepreneur.<sup>20</sup> For Anderson, the revolution introduced by digital technologies couldn't be considered complete in the two-dimensional nature of the screen, instead it could be considered complete in the transition from bit to atom, from information to matter.

Anderson takes real cases as examples to confirm his thesis like, for example, Local Motors a small American company that designs and produces completely customizable cars for customers, using the web to purchase components from innovative companies, and to dialogue with designers, technicians, and communities of end customers wherever they are.

The transformation period that we are experiencing will bring many companies, similar to Local Motors, to the fore. New digital manufacturers, thanks to their ability to combine craftsmanship and technological avant-gardes, although at the head of small entities, can aspire to become known worldwide with the web.

These new technologies considerably widen the audience of those who want to move from the conception and design phase of a product to its material realization (at least in its prototype dimension (Micelli, 2014). In this way all those who think they have a brilliant idea and want to turn it into reality are favoured.

With regard to this, today there is the possibility of starting the production of smaller and cheaper machines that can also be purchased directly by the final customer.<sup>21</sup>

In the current context Digital Manufacturing represents not only the natural evolution of production methods, but an efficient model to refer to, so that manufacturing becomes stronger and takes new life.

Since the number of definitions of this new phenomenon is high, there is the need to find a unique one that describes this vast system linked to several technologies.

A definition of Digital manufacturing is supplied by PWC and Confartigianato Imprese: "Digital Manufacturing well expresses the renewal of the manufacturing system using digital and 3D printing technologies, which are used in an integrated way for product innovation, for the experimentation, for prototyping and for the production of goods,

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<sup>20</sup> Anderson C., In the Next Industrial Revolution Atoms are the new Bits, Wired, 2018

<sup>21</sup> Micelli S., La rivoluzione del digital manufacturing e la sfida per l'Italia, 2014

allowing moreover the optimization of manufacture processes, marketing and distribution in a virtual environment”.<sup>22</sup>

Digital manufacturing represents today one of the realities with the highest potential in the digital machines market, with an organizational impact that create new business models for companies, and with the opportunity to develop innovative solutions.

In fact, it is no longer understood as a phenomenon aimed solely at improving a company’s processes and products, but as a phenomenon that completely revolutionizes the entire corporate organization: all the economic sectors could be subjected to more or less significant changes. However, it should be specified that digital manufacturing will never completely replace traditional manufacturing, which will continue to exist by serving the same market as always; certain objects will inevitably continue to be produced with the logic of mass production.

The potential for changes is immense: with regard to production it offers the possibility to design and produce new objects thanks to innovative processes, that develop through market dynamics, stimulated by a demand that continuously transform. The timings related to product design thanks to special software are reduced, simulation tools allow to reach an optimal definition of the object before it is produced, and wastes are minimized. The result is a satisfied customer willing to acquire a unique object, the cost of which is sustainable and affordable.

It is said that manufacturing is changing from mass production to a custom type of production, that allows the creation on a small scale of highly personalized products for each individual customer: from Taylorism to tailormade (Bassetti, 2013). Since not all customers have the disposable income to purchase new products, but, at the same time, aren’t willing to settle for standard ones, many companies have specialized in the offer of customizations at not too high costs.

Obviously digital manufacturing, by revolutionizing the whole organizational context of companies, has brought changes also in terms of the distribution channels used by companies, the use of e-commerce and web-based platform is increasing, and in terms of the subjects that are involved in the production processes.

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<sup>22</sup> PWC, Confartigianato Imprese, Digital Manufacturing. Cogliere l’opportunità del Rinascimento Digitale, 2015

Nowadays, in fact, digital has already generated impressive transformations because has created an ecosystem in which technologies, solutions, knowledge and relations between individuals, customers and producers are interrelated and evolve rapidly<sup>23</sup>(Micelli, 2016).

### **1.2.1 New subjects dominate the scene: Digital craftsmen**

In the previous paragraph there was evidence of how new technologies will have an impact on the manufacturing world by changing the production scenario. As far as new technologies are considered the revolutionary element of the moment, a fundamental role must surely be attributed to the subjects that dominate the change. But who are these subjects? The answer is simple: we talk about digital craftsmen.

Both in Europe and in the United States we are witnessing a revaluation of craftsmanship: brilliant young people decide to devote their energies to entrepreneurial projects that revive and develop trades that were considered obsolete until a few years ago (Micelli, 2016). We talk about a group that gather the initiative and rediscover the desire to do, proposing a new idea of innovation and creativity with a boost from the bottom, according to a bottom-up logic.

In the past, craftsmen needed years of study to understand how to work the material; today, on the contrary, they use digital tools like 3D printers, cutters, open source hardware and software optimally; and are capable, if they have a particular need for something, to create it themselves or to actively contribute to its realization. They have the conviction of being the protagonists of a new model of innovation that has all the credentials to change the future scenarios.

New craftsmen are strongly linked both to a set of typical values of the traditional workshop, such as manual skills, creativity, love for their art, knowledge of techniques and materials, and to the web, that constitutes a fertile environment for the circulation of ideas thanks to the infinite network of connections that users establish between themselves.

Two different roads take shape: artisans can decide to use their inventiveness to propose technological solutions in areas of the economy unrelated to innovations until then, or

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<sup>23</sup> Manfredi P., L'economia del su misura. Artigiani, innovazione digitale, Marsilio Editori, Venezia 2016

they can aim to relaunch sectors and consolidated production techniques within new technological scenarios.

In both cases traditional manufacturing techniques are shuffled to create innovative products in terms of style, design or functionality, making traditional techniques an expressive tool for new forms of art. Technology is understood as an extension of craftsman's hands.

Giorgio Merletti, the president of Confartigianato, with regard to this, has said that "Doing things well, respecting the rules of tailor-made, of personalization, of attention to details, remain values that make us appreciate all over the world. We must continue to express these values with new tools".<sup>24</sup>

The distinctive feature is, undoubtedly, the use of the web as a backbone of businesses for both commercial and relational activities, which until about a decade ago were peculiarities of the most innovative companies, and not of the artisans of the workshop who barely had an Internet connection.

Sharing has become the basis of new digital craftsmen strategies. The sharing of works via Internet enables to reach an ever larger group of customers, as specified above, and also allows to build collaborative relationships with clients and other digital craftsmen through the sharing of resources, tools and materials. This ability to interact in an innovative way with different cultures from those that characterized the domestic market, contribute to products and processes innovation.

Sharing can also be understood in relation to the birth of communities in which new artisans design and produce in virtual and physical common spaces, sharing the same interests and working with digital tools.

The success of new digital craftsmen is also due to the new consumer that, by now, is dominating the scene. As analysed above, this active consumer, who intends to participate in the production process, is becoming more and more demanding and requires ever more variety than the models commonly offered by the market.

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<sup>24</sup> [www. https://www.agendadigitale.eu/industry-4-0/artigianato-digitale-ecco-la-via-al-nuovo-rinascimento-manifatturiero-italiano/](https://www.agendadigitale.eu/industry-4-0/artigianato-digitale-ecco-la-via-al-nuovo-rinascimento-manifatturiero-italiano/)



### 1.2.2 FabLab: promoters of the spread of digital technologies

A phenomenon closely linked to the birth of new digital artisans is the creation of FabLab, an abbreviation of fabrication laboratory. Defined as a small workshop that offers personalized digital manufacturing services, a FabLab is able to churn out prototypes, or small series of customized and high quality products at lower costs compared to the traditional industry.

The first to talk about FabLab, as mentioned above, was Neil Gershenfeld at the end of his course *How to make (almost) anything* at Centre for Bits and Atoms (CBA), a structure of MIT. Due to the success and popularity of the course Gershenfeld and the CBA inaugurated the first FabLab in 2002 at South End Technology Centre of Boston. The author describes this laboratory in this way: “depending on how we want to interpret it, a laboratory for manufacturing or simply a fabulous laboratory [...], a FabLab is a set of machines and components available on the market held together by cards and software that we have developed”.<sup>25</sup>

The opening of the first FabLab has certainly had unexpected consequences for Gershenfeld: in a short period of time the model started to be replicated not only in the United States, but also all around the world. The FabLab concept is strongly linked to the philosophy at the base of the maker movement: self-production and collaboration have become the keywords.

These types of laboratories are a hybrid between a R&D laboratory, a production workshop and an artisan workshop. In fact, FabLabs were also created with an educational function, namely that of spreading digital culture by providing all the necessary knowledge and technologies. To prove this, inside the laboratories tools, technologies and instruments are available like 3D printers and CNC machines. Certainly the most used type of technology is 3D printing, since it is the symbol of this new digital revolution and, moreover, it has a lower cost compared to other technologies.

The objective of FabLab is to create a global network: experts in various fields interact with all those who decide to participate, since it is a physical space freely accessible to all. The categories of stakeholders are different: you may find students, companies, entrepreneurs or also citizens who are interested in digital technologies.

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<sup>25</sup> <http://www.makerslab.it/i-fablab/>

Participants can design with special programs, and print 3D objects in different materials using their creativity to be able to transform ideas into concrete reality. Every single laboratory has the duty to share his achievements and his creations with the FabLab network, and also within the network.

FabLab, therefore, appears as a meeting place for people with heterogeneous educations like traditional craftsmen, designers, computer scientists, which turn out to be complementary to conceive innovative projects, and also a place of technical training.

These fabrication laboratories have become increasingly important, so much that, at the end of 2018 there were more than 1600 FabLabs in the world. Among these 1600 FabLabs 164 are located in Italy; this number is significant because it highlights Italy's approach to digital manufacturing.

## CHAPTER 2: Digital manufacturing in Italian SMEs

### 1.1 Italian manufacturing sector: overview

In the previous chapter we discussed how the advent of the fourth industrial revolution is deeply revolutionizing the worldwide economic scenario. Digital manufacturing and the related changes in the production methods, thanks to the introduction of new techniques that distort normal paradigms, and the relationship with a new and demanding customer have also been discussed.

The most affected sectors were production and manufacturing: that is why Italy cannot remain indifferent. The history of Italian economy, indeed, is strongly linked to the manufacturing sector and to its transformations; the need to put it at the centre of a development plan for Italy appears clear. Suffice it to say that, between 2015 and 2018, Italy has started its economic recovery, that has caused an average annual increase of +1,1% of GDP. One of the determinants of the new economic improvement has been exactly manufacturing.

The Italian economic system today is characterized by two different trends: part of the economy works internationally and follows the latest innovations; the other part remains nationally rooted and refuses any kind of modernization of its businesses.

For this reason, there are contrasting views regarding the state of the economy. On one side “there are those who said that Italy is a country without a future”<sup>26</sup>, since the growing international competition will see as protagonists other countries, relegating it to a marginal position.

On the other side, there are illustrious professors, economists, theorists who question themselves on the veracity of this technological backwardness. As the research *I.T.A.L.I.A.* reports, the “All Connected” era has determined an increase in the spread of fake news, real or alleged, so much so that even Italy has paid the price mainly due to the lack of awareness. Indeed, very often good news concerning the economy and the results

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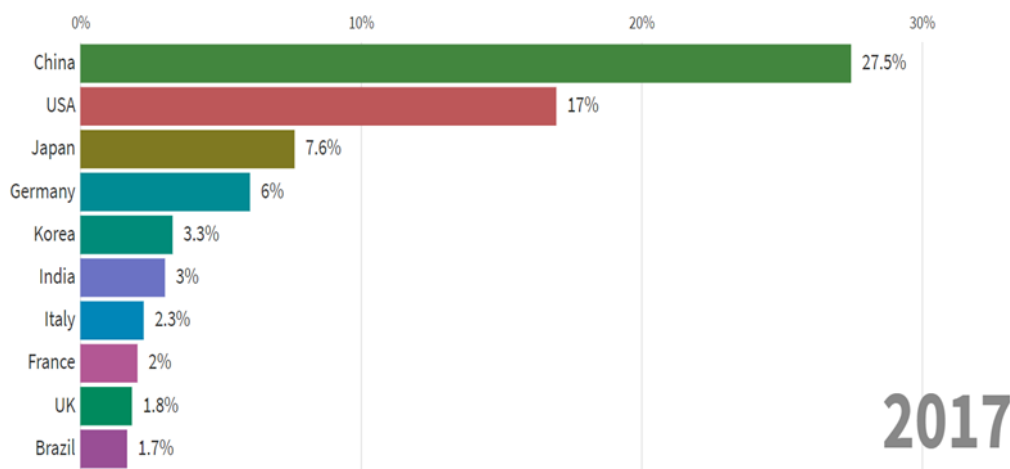
<sup>26</sup> Fortis M., Realacci E., Sangalli C., I.T.A.L.I.A. Geografie del nuovo Made in Italy, Quaderni di Symbola, 2019 su [www.symbola.net](http://www.symbola.net)

achieved at an international level aren't known or are altered by prejudice or by the use of inadequate evaluation methods. To demonstrate this, despite the common perception Italy is a superpower in many fields and especially in manufacturing.

The aesthetic, technical scientific tradition and know-how incorporated by products enable Italian companies to compete at an international level. Italy has been able to maintain its position in the World's Top 10 Manufacturers for over 30 years due to the quality of its products.

In 2017, Italy was ranked at the seventh position in the classification of *World Top 10 Countries by Share of World Factory Output* listed by the United Nations.<sup>27</sup> The leadership position was occupied by China that lead the ranking with a percentage of 27.5%, while United States was ranked at the second place with a percentage of 17%. Italy wasn't the first European country for share of manufacturing production since Germany was ranked fourth after Japan.

**Figure 9: Countries share of world manufacturing output**



Source: United Nations Data on <https://agrancel.com/746-worlds-top-ten-manufacturing-nations-1970-2017/>

Chinese supremacy highlights how China has been able to emerge as the main manufacturing nerve centre at a global level thanks to financial and economic operations. Our Made in Italy is threatened by this great Chinese competitiveness: our competitive advantage, that enables to enjoy great awareness and strong international recognition,

<sup>27</sup> Perry M., World Top 10 Manufacturers, 2019

risks being damaged. There is little to say, a large proportion of customers prefer to pay lower prices for products, that accurately reproduce the Italian ones, offered by Asian competitors.

In the current year, Italy with 106.9 billion of dollars of surplus is among the top 5 countries in the world for manufacturing activities, behind China, Germany, South Korea and Japan.<sup>28</sup>

At European level, Italian manufacturing in the two year period 2017-2018 was second only to Germany, that is its benchmark, with an added value of 263.4 billion euros, and abundantly ahead of France whose added value was of 232,1 billion of euros, of England and of Spain that respectively had an added value of 213,5 and 152,7 billion of euros.<sup>29</sup> Reasoning in these terms, it cannot be said that our country is dead or lacking innovative capacity.

Italian manufacturing has achieved the competitive repositioning in its typical areas of specialization thanks to the constant upgrading of its offer. Taking into consideration the four traditional sectors of Made in Italy, it is possible to see what their impact is on the whole manufacturing sector.

The Italian fashion system that includes textile, clothing, footwear and leather goods, represents the 10.6% of the manufacturing sector and employs around 500 thousand employees that represent the 13% of the total number of employees of Italian manufacturing. The fashion sector has about 222.000 companies in Italy.

Food industry in Italy counts around 56.750 companies of which 53.360 in food and 3.390 in drinks and represents the 7.76% of the manufacturing sector. In 2018 it has counted more than 386.000 employees.

Furniture companies have been experiencing a steady growth trend since 2017 thanks, above all, to sales in non-European markets, especially to China and United States. The furniture industry, therefore, maintains a leading role in the Italian economy representing 8.1% of total manufacturing. The sector counts about 18.000 companies that employ over 130.000 employees.

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<sup>28</sup> Fortis M., Realacci E., Sangalli C., I.T.A.L.I.A. Geografie del nuovo Made in Italy, Quaderni di Symbola, 2019 su [www.symbola.net](http://www.symbola.net)

<sup>29</sup> Fortis M., Realacci E., Sangalli C., I.T.A.L.I.A. Geografie del nuovo Made in Italy, Quaderni di Symbola, 2019

The last is represented by automation-mechanical. The mechanical sector counts 73.658 companies and 291.522 employees, and accounts for 61.7% of the mechanical engineering companies and for the 20.8% of the sector's employees.

Next to these, the electronics and pharmaceutical ones are confirmed best performer in 2018.

Italy occupies the eight position in the list of the leading exporting countries in the world in the first four months of 2019, with a relative market share of 2.8. Manufacturing export, to date, represents about the 32% of Italian GDP.

From a continental perspective, almost the 67.9% of Italian exports in the first months of 2019 was delivered to other European countries especially Germany for 12.7% of the total and France for the 10.7%; while the 13.7% was delivered to Asia, that is considered the most prolific new market for doing business, even if the market share of Italy in China is limited. The percentage of Italian exports to United States is of 10.2, while exports to Africa, Latin America and Australia are very low.

**Figure 10: Geographical areas of destination of Italian exports**

<i>Peso percentuale su totale export Italia</i>				
<b>Europa</b>	<b>66,4</b>	<b>66,8</b>	<b>67,7</b>	<b>67,5</b>
Unione Europea a 28	55,7	56,3	57,1	56,8
di cui UEM a 19	40,8	41,1	41,8	41,3
Paesi europei non UE	10,6	10,5	10,7	10,8
<b>Africa</b>	<b>3,9</b>	<b>3,9</b>	<b>3,7</b>	<b>3,5</b>
Africa settentrionale	2,7	2,7	2,5	2,3
Altri paesi africani	1,1	1,2	1,2	1,1
<b>America</b>	<b>13,1</b>	<b>13,2</b>	<b>12,8</b>	<b>13,2</b>
America settentrionale	9,9	10,1	9,7	10,3
America centro meridionale	3,2	3,1	3,1	2,9
<b>Asia</b>	<b>14,8</b>	<b>14,1</b>	<b>13,9</b>	<b>13,8</b>
Medio Oriente	4,5	3,9	3,9	3,6
Asia centrale	1,4	1,6	1,5	1,5
Asia orientale	8,9	8,6	8,5	8,7
<b>Oceania e altri territori</b>	<b>1,9</b>	<b>2,0</b>	<b>1,9</b>	<b>2,0</b>

*Source: Elaborations of ISTAT data by the Economic Observatory*

From the sectoral point of view, manufacturing has seen changes over the years, exhibiting a reshaping of the more traditional Made in Italy productions like textile, clothing and furniture, whose weight on exports has slightly reduced. In fact, in May 2019, the largest contribution to Italian exports came from the pharmaceutical industry,

which represents the 49.8% of exports, from food and beverage, that has set a historical record with a positive increase of 9.4% compared to 2018, and from fashion that has registered an increase of 8.4%.

Italian manufacturing, in fact, occupies the fourth position at a global level in terms of product diversification behind China, United States and Japan. For this reason, Italy can take advantage of greater flexibility and can adapt its production of customized goods to the needs of different national markets and customers.

As regard imports, Italy, occupies the thirteenth position in 2019 with a market share of 2.5. In the first four months of 2019, the 69.2% of Italy's total imports were purchased from other European countries, among which the main are Germany for 16.6% and France for 8.8%; while the 18.4% was imported from Asia, especially from China that represents the 7.3% of imports. United States account only for a small percentage 4.3%, while from Africa, Latin America and Australia imports are almost non-existent or in very small percentage.<sup>30</sup>

From a sectoral point of view, the most imported products are vehicles in a percentage of 7.9%, chemical products in a percentage of 6.3%, and crude oil for the 5.8%.

**Figure 11: Geographical area of origin of Italian imports**

<i>Peso percentuale su totale import Italia</i>				
<b>Europa</b>	<b>70,0</b>	<b>68,9</b>	<b>69,4</b>	<b>69,0</b>
Unione Europea a 28	60,2	59,0	59,3	58,8
di cui UEM a 19	47,7	46,9	47,2	46,8
Paesi europei non UE	9,8	9,9	10,1	10,2
<b>Africa</b>	<b>4,6</b>	<b>5,2</b>	<b>5,0</b>	<b>5,1</b>
Africa settentrionale	3,2	3,7	3,6	3,3
Altri paesi africani	1,4	1,5	1,4	1,7
<b>America</b>	<b>6,4</b>	<b>6,3</b>	<b>6,3</b>	<b>6,7</b>
America settentrionale	4,1	4,1	4,1	4,4
America centro meridionale	2,3	2,2	2,2	2,3
<b>Asia</b>	<b>18,5</b>	<b>19,1</b>	<b>18,8</b>	<b>18,7</b>
Medio Oriente	4,7	5,2	4,9	4,0
Asia centrale	2,3	2,3	2,4	2,4
Asia orientale	11,5	11,6	11,5	12,3
<b>Oceania e altri territori</b>	<b>0,5</b>	<b>0,5</b>	<b>0,5</b>	<b>0,5</b>

*Source: Elaborations of ISTAT data by the Economic Observatory*

<sup>30</sup> Ministero dello Sviluppo Economico, Statistiche import Export, luglio 2019 on [www.mise.gov.it](http://www.mise.gov.it)

Despite the international economic framework in 2018, characterized by United States' trade policy based on the adoption of protectionist measures, by Brexit, and by the Chinese economic downturn, that are causing a consequent slowdown of the economic activities of the euro area and also of Italy, the manufacturing sector has continued to represent a driving force for Italian economy, so much that the Italian balance of trade closed 2018 largely in surplus with 38.9 billion of euros.<sup>31</sup>

A peculiarity of the Italian production system is a great fragmentation caused by the presence of numerous micro, small and medium size, usually family run businesses, that are the cornerstone of our productive system.

SMEs in Italy take many forms and can have different sizes; nowadays, furthermore, they could build economic, financial and operational relationships with other companies creating complex entities that, however, differ from large companies.

For this reason, there is the need to make a distinction in order to be able to distinguish SMEs from all the other typologies of existing companies in the Italian territory.

SMEs size, by the European Commission through the *Commission Recommendation of 2003*, falls within given number of employees and financial limits that are turnover and balance sheet total. Despite the existence of unitary parameters for all the countries of the European Union, the parameters for defining SMEs vary by countries.

Taking Italy as a reference, a company can be considered a SMEs if it owns 250 or less employees. On the basis of this number, the *Cerved Report in 2018*, has drawn up the guidelines to analyse the different types of companies.

**Figure 12: Subdivision by category of Italian companies**

CATEGORIA	DIPENDENTI	FATTURATO	ATTIVO
Grande impresa	≥ 250	oppure > € 50 mln	e >43 € mln
Media impresa	< 250	e ≤ 50 mln	oppure ≤ 43 mln
Piccola impresa	< 50	e ≤ 10 mln	oppure ≤ 10 mln
Microimpresa	< 10	e ≤ 2 mln	oppure ≤ 2 mln

*Source: Cerved Report, 2018*

<sup>31</sup> Fortis M., Realacci E., Sangalli C., I.T.A.L.I.A. Geografie del nuovo Made in Italy, Quaderni di Symbola, 2019



As can be seen from the table, medium size enterprises are those with less than 250 employees and a turnover minor of or equal to 50 million of euros, and small enterprises have a number of employees inferior of 50 and a turnover minor of or equal to 10 million of euros. To conclude the list, micro-enterprise have less than 10 work units and a turnover minor of or equal to 2 million of euros.<sup>32</sup>

Italian SMEs represented the 99% of the total Italian entrepreneurial fabric. The number of SMEs has growth also thanks to a large increase of the number of micro-enterprises.

In fact, micro, small and medium size enterprises constitute the basis of Italian economy generating 471.1 billion of euros of value added.<sup>33</sup> Without forgetting that Italy is the first country in Europe for number of small and medium manufacturing enterprises, before France and Germany.<sup>34</sup>

This data is the result of the recovery after years of decline: between 2015 and 2017 , in fact, SMEs have increased their employment rate and their value added.

A characteristic of Italian SMEs is that they have remained strongly rooted to the territory; only a limited number of companies, often the large ones and those guided by the need to move closer to distant markets, has relocated or opened new plants in other countries. This strategic choice of many SMEs has led to the development of a cultural and territorial sensitivity that is extremely difficult to imitate and that has ensured the fortune of the Italian economy for many years. It can be said that Italy isn't a taillight in Europe but the spearhead of the economic system.

Eurostat statistics, updated to 2016, provide data that highlights how, in the European export ranking, Italian SMEs are at the fourth place with 160 billion of euros, behind the large German companies that generate 667.6 billion of euros, the large French ones with 236.3 billion of euros and the large English companies that generates 166.3 billion of euros.

The sectors in which Italian SMEs dominates in 2018 were respectively automation-mechanical that has generated 84 million of euros, fashion that has determined 29 million of euros, furniture that has generated 13 million of euros and, finally, food and beverage

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<sup>32</sup> Angelino A, Balda F., Emiliani D., Negri F., Romano G., Sampoli L., Schivardi F., Rapporto Cerved PMI 2018, 2018

<sup>33</sup>Il Sole 24 Ore, PMI quanto conta in Italia il 92% delle aziende attive sul territorio, Luglio 2019 on <https://www.infodata.ilsole24ore.com/2019/07/10/40229/>

<sup>34</sup>Data from the 2019 Eurostat Report on Fondazione Nord Est, Rapporto Fondazione Nordest 2019. Il pentagono dello sviluppo, 2019

that has determined 11 million of euros.<sup>35</sup> Automation is, therefore, the sector that has given the greatest contribution to Italian economy between 2018 and the first months of 2019.

### **1.1.2 Italian industrial districts: a successful model for the rebirth of manufacturing**

Undoubtedly, the relaunch of Italian manufacturing sector passes through industrial districts and their regions of belonging. “The affirmation of industrial districts coincided with the rediscovery of the territory as a competitiveness factor”.<sup>36</sup>

The first to talk about industrial districts was Alfred Marshall, an English economist, in the fourth book of *Principle of Economics* (1890). Marshall intended to define a separate socio economic territory, in which companies, operating in the same sector, succeed to increase local economy thanks to close cooperation and coordination. However, the author hasn't give a real definition, but has limited itself to considering district as consequence of the English industrial organization, in which the term was used to indicate a generic geographic area where similar industrial or professional activities were grouped. Limiting, therefore, Marshall to conceptualize the districts, their actual definition has remained without an author until Giacomo Becattini has proposed a new interpretation of it in his studies regarding Italian industrial districts.<sup>37</sup>

Becattini defines industrial districts as a social territorial entity characterized by the active presence of both a community of people and a population of firms in one historical and confined area (Becattini, 1990). The geographic limitation of the district has ensured that every territorial community develops a homogeneous system of values and views that has led to a transmission of knowledge and skills. The intense work specialization and division among the companies of the different districts leads to the creation of relations of cooperation between the latter, and to the creation of network based structures.<sup>38</sup>

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<sup>35</sup> Fortis M., Realacci E., Sangalli C., I.T.A.L.I.A. Geografie del nuovo Made in Italy, Quaderni di Symbola, 2019

<sup>36</sup> Corò G., Micelli S., I distretti industrial come sistemi locali dell'innovazione: imprese leader e nuovi vantaggi competitivi dell'industria italiana, *Economia Italiana*, 2007

<sup>37</sup> Sforzi F., Rethinking the industrial districts: 35 years later, *Investigaciones Regionales-Journal of Regional Research*, 2015

<sup>38</sup> Chiarvesio M., Di Maria E., Micelli S., From local network of SMEs to virtual districts? Evidence from recent trends in Italy, *Science Direct*, 2004

Italy has always been characterized by the existence of numerous industrial districts that have represented a winning industrial model for many years. The district experience has brought to light how the immense patrimony of knowledge and techniques created over the centuries is an extremely important factor in order to be able to compete at a global level.

Districts have represented and still represent examples of real marketplace, that have built their success on the idea of economic network and of geographical community.

After the Second World War, in fact, the Italian productive fabric has begun to develop more and more in areas with high production specialization, in which small or very small enterprises grew closely, linked by collaboration relationships, characterized by very great skills, and specialized in one or more phases of the production process. Moreover, these local systems, being unique and not easy replicable, have allowed Italy to distinguish itself from other countries.

Currently, there are about 200 manufacturing districts in Italy, which differ from each other in their production peculiarities and geographical location, and that represent around a quarter of the Italian productive system in terms of employees and local production units.

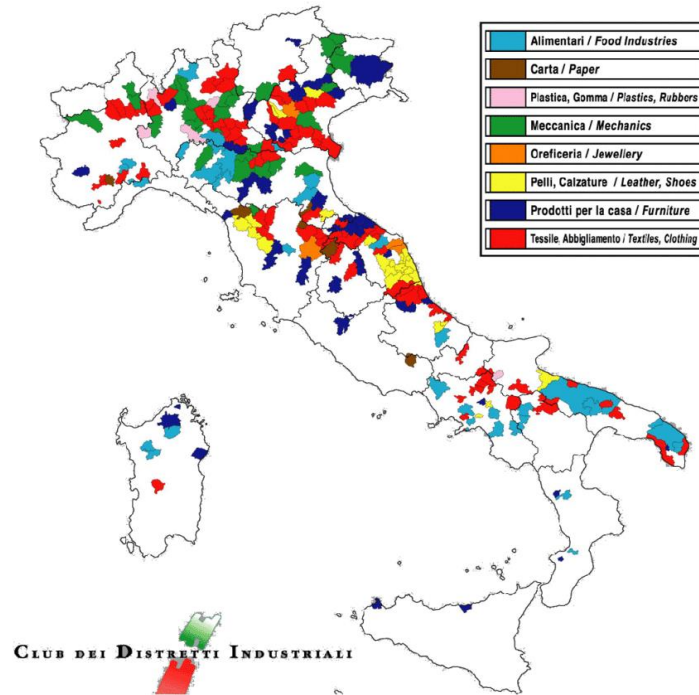
Of these, more than half are occupied in the typical productions of Made in Italy. Regarding the geographical location, districts arose in all the regions, even if the winning quadrilateral, as can be seen from the map below, is formed by four regions of Northern Italy, that is, Veneto, Lombardy, Piedmont and Emilia Romagna. In these regions there are around 122 thousand companies which represent the 80% of the total number of Italian SMEs.<sup>39</sup>

The quadrilateral is driving the Italian economy since it constitute almost all of the economic and employment recovery in Italy. Only Veneto and Lombardy account for 40.4% of Italian industrial districts, and represent the 60.4% of manufacturing employment. In these territories production is mainly specialized in fashion, food and beverage, furniture and automation.

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<sup>39</sup> Caporali A., Sabatini M., Ungaro F., Angelino A., Emiliani D., Romano G., Rapporto PMI. Centro-Nord 2019, Confindustria, Cerved, 2019

**Figure 13: Map of Italian industrial districts by sector**



Source: [www.researchgate.net](http://www.researchgate.net)

In the last few years, local SMEs have started to face the consequences of several event that have certainly led to losses in terms of the number of companies operating in the market and of employment: the aftermath of the crisis of 2008, the introduction of the European currency, and the international competitiveness.

To date, Italian districts have to deal with the new challenges created by the fourth industrial revolution, and the consequent introduction of new technologies in production processes. From robotics to 3D printing: the concepts of atelier and of creativity, which recall the activity of the classic district companies, renewed themselves by coming together with the digital world.

There is a need to transform, since Industry 4.0 technologies can favour the companies of the districts, and allow these local productive systems to reconfigure their business models to form networks to compete at an international level. Moreover, they make it possible to strengthen districts' ability to manage the traditional supply chain relationships more efficiently.

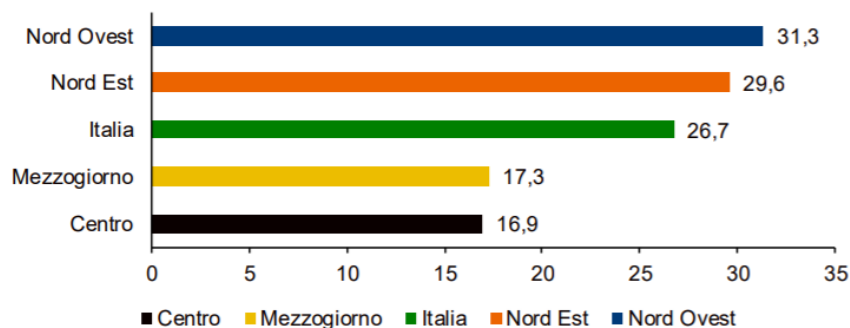
To be able to meet the requests of an increasingly demanding consumer, districts companies must be able to develop a particular willingness to listen and a high culture of

service (Bettiol, 2016); at the same time, they must count on a qualified network of suppliers who can be consulted at the time of product creation. In this respect, Italian districts, to achieve these objectives, stand out for their ability to create large and differentiated supply chains of specialized companies.

Tradition and resilience on one hand, change and metamorphosis on the other: this is the actual portrait of Italian industrial districts. The local diversity, in this increasingly global world, takes on more and more meaning, as it is connected to the uniqueness of a specific social and cultural context.<sup>40</sup>

According to the report drawn up by Intesa Sanpaolo in 2018, in the context of industrial districts, the adoption of Industry 4.0 technologies is observed approximately on one company out of four (26.3%), but with very variable percentages considering sector by sector.<sup>41</sup> Generally the different percentages are a function of the degree of technological intensity of the sector. District areas in which there is a greater push to the adoption of new technologies turn out to be the most dynamic.

**Figure 14: Share of district firms that adopt 4.0 technologies by macro-territorial division (%)**



*Source: elaborations of Intesa SanPaolo on four monthly internal survey October 2018*

At a territorial level, as it can be seen from the graph, the share of district companies, that adopt 4.0 technologies, is greater in northern Italy with a percentage of 31.3 in the North-West, and a little lower percentage of 29.6 in the North-East.

<sup>40</sup> Bettiol M., *Raccontare il Made in Italy. Un nuovo legame tra cultura e manifattura*, Marsilio Editori, 2016

<sup>41</sup>Intesa Sanpaolo, *Economia e finanza dei distretti industriali. Rapporto annuale-n11*, Direzione studi e ricerche, 2018

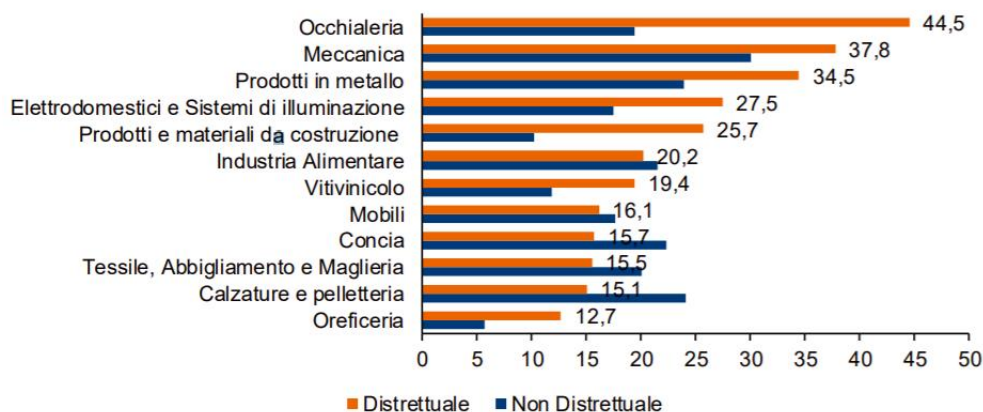
If you compare companies belonging to the districts with others not belonging to but operating in the same sector, it can be seen how the percentage of district companies that have introduced digital innovations is 2.7 points higher than the percentage of companies that don't belong to the district.

The actual industrial districts are characterized by being the result of a mixture between the characteristics of the traditional industrial sector focused on the typical Made in Italy productions, and those of the technological centres characterized by a high degree of innovation and use of new technologies.

It can be said that not for all the district firms, given the great heterogeneity of production and structures, there is a real interest in change. The most closed and rooted district realities are the ones that usually show little enthusiasm and caution towards new solutions proposed by digital manufacturing.

The graph below shows the level of adoption of Industry 4.0 technologies by typology of district.

**Figure 15: Percentage of companies that adopt Industry 4.0 technologies by distinct business sector by district and non-district companies**



*Source: Elaborations of Intesa SanPaolo on four monthly internal survey October 2018*

The digital revolution is changing radically the way to produce, distribute and sell of district territories, offering them different development opportunities thanks to an increase in the number of producers of 4.0 machines, to the diffusion of e-commerce platforms, to the availability of easily accessible databases containing data on companies and on the markets, and to the presence of research intensive ICT centres involved in the

processes of technology transfer to the districts. These changes, undoubtedly, allow local production systems to compete globally.

Veneto region, for example, having more than 17 industrial districts, is considered the beating heart of Italian economy, and the focal point of Italian manufacturing. The main strength of the Venetian economy is the variety of specializations. We must never lose sight of the extraordinary value of this heritage of knowledge, skills, and productive experiences that has accumulated over time and whose continuous recombination by companies provides the material for market innovations (Corò, 2018). Veneto companies to face the challenges of Industry 4.0 are adopting very transversal and different solutions. Another striking example is represented by Lombardy, a region in which more than 100 thousand manufacturing companies, belonging to different industrial districts, operate. Lombardic companies have ventured into innovation both in terms of product, especially in the last few years, and of processes given their recent propensity for innovation, and especially for the digital world. A further positive indicator is the number of innovative manufacturing startups, as one fifth of the national total is based in Lombardy, and of SMEs operating in crucial sectors for Industry 4.0. Milan is the fulcrum of the Lombardic economy; the best talents of a nation of 60 million people pass, sooner or later, through Milan, and Italy remains a source of unique opportunities and skills (Bicocchi Pichi, 2018).

Regardless of the region the most significant change for districts concerns the need to move from “replicative knowledge” to “generative knowledge”<sup>42</sup>: this change is about both people that already works inside the companies, and young people who must be trained and will be trained at Universities, Technical Institutions and high schools.

Indeed, the sectors characterized by excellent digital skills are those with high technological content like aerospace, automotive, and electronics, while the other sectors, especially the more traditional ones, are scarce with regard to excellent digital skills.

The main problem to solve for the districts is the lack of an entrepreneurial culture, and of the will of a collective investment capable of retaining and attracting world class talents on the territory.

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<sup>42</sup> Mosconi F., I distretti Industriali alla prova della nuova sfida tecnologica: un'introduzione, Industria 4.0/5, 2016

## 1.2 Italy of digital innovations

At this point, it is natural to ask if Italy is really ready to face the changes brought by the fourth industrial revolution.

The Italian debate on the impact of digital technologies is fairly recent; as analysed above, in fact, the Piano Industria 4.0 was started only in 2016, and the existing literature, regarding Industry 4.0 phenomenon, was developed around that year.

Nevertheless, Digital has become a stable and fundamental dimension of the Italian economy and production system (Manfredi, 2017). A phenomenon that until recently was a trait of big multinationals, today has become widespread throughout the national territory.

To demonstrate this, among the 16 record holder factories for Industry 4.0, two are Italian, and one of them is a SME. Rold is a 100% Italian company, with a turnover of 43 million of euros, that falls into the category of the medium enterprises. Rold has been able to systematically apply digital manufacturing technologies to improve productivity and quality in the context of a small enterprise.<sup>43</sup> This Italian company is classified together with great world multinationals like Johnson & Johnson, BMW, Siemens and Foxconn. The example given demonstrates that the use of new technologies is also possible with limited investments.

But has it always been like this? If one considers the results of the *Second Industry 4.0 Report in Italian SMEs*, compiled by the Digital Manufacturing Laboratory of Padua University, one can closely observe the attitude of Italian small and medium companies toward Industry 4.0 technologies.

The research focused on a sample of 1020 companies, forming part of a population of 7293 selected manufacturing companies, operating in the typical sectors of Made in Italy, namely home-furnishing, mechanics and fashion. In particular we talk about rubber-plastic, electronic devices, lighting, vehicles, furniture, jewellery, sporting goods, glasses, clothing and textile. All the interviewed companies had a turnover bigger than 1 million by 2015.

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<sup>43</sup> World Economic Forum, Fourth Industrial Revolution. Beacons of Technology and Innovation in Manufacturing, McKinsey & Company, 2019

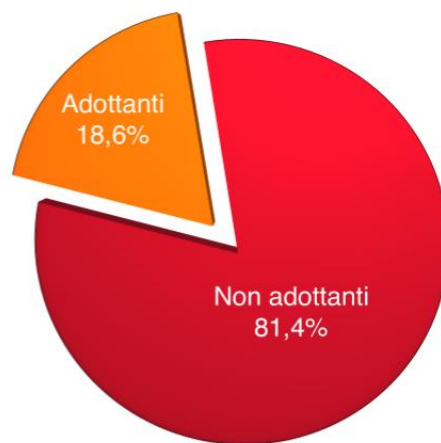


The geographical area of reference includes the regions of northern Italy, Piedmont, Lombardy, Veneto, and Emilia Romagna, which we have seen as the fulcrum of the new economic recovery of Italy.

The analysis of the results for the period from May to December 2017, has highlighted how only the 18.6% of the sample was oriented towards new technologies, and how these companies, most times, are micro, small and medium enterprises, with percentages respectively of 21.6%, 41.6% and 22.6%.

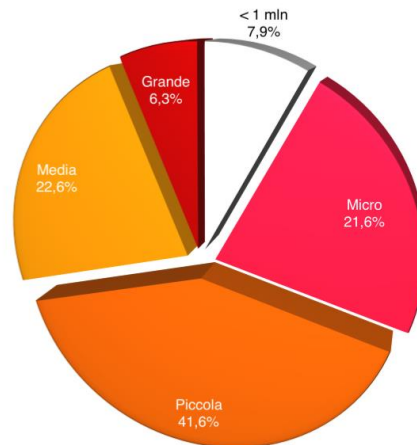
The most used technologies were robotics for production, additive manufacturing, that is 3D printing, 3D scanner and laser cutting for the design of products, and Big Data Analysis for corporate management.

**Figure 16: Share of adoption of Industry 4.0 technologies (%)**



*Source: Slide of Digital Manufacturing Laboratory-2017*

**Figure 17: Division of the different type of companies of the report (%)**



*Source: Slide of Digital Manufacturing Laboratory-2017*

Emblematic is the fact that the analysis shows that most companies have concentrated on the adoption of only one, 38.4%, or if at all of two technologies, 36.2%. Undoubtedly the adoption of a typology of technology rather than another depends on the sector of belonging, and on the strategy. The common element to the different technologies is that they are adopted, in most cases, to produce customized and tailor made products.

The reasons for this choice are the will to improve the service for an increasingly demanding customer, and to increase the efficiency. Moreover, companies have moved in this direction due to the need to improve production processes: digital production, sure enough, allows to transform digital files into real objects.

The achieved results show that we aren't just talking about a purchase of technologies because for the 72.5% of the adopters it was necessary to customize the hardware, software or to make an integration with the existing management software.

In terms of effects, companies mainly report three results obtained with the use of these technologies: increase in internal efficiency 60%, increase in the level of productivity 54% thanks to a growth in products' value in terms of customization, and an increase of customer services 53%. Moreover, investments in technologies or projects 4.0 have increased companies' innovative capacity.

However, the 81.4% of the interviewed companies didn't adopt these technologies claiming as main reasons the incompatibility of the latter with their businesses based

entirely on manual work 65.9%, and the fact that they are small artisan companies 21.7%.<sup>44</sup> It can be said that the real opportunities aren't grabbed.

It is precisely these cultural strategic motivations that are the reasons behind the current debate in Italy about Industry 4.0 technologies.

On the one hand, in fact, it is believed that the implicit protagonist of Industry 4.0 is the large enterprise, on the basis of the example provided by other countries in which big companies that have chosen to bet on digital have become the leaders of the market. On the other side, Italy has dispelled this myth by assigning the role of protagonist to small and medium enterprises.

According to Carlo Robiglio, the national president of Confindustria Piccola Industria, our SMEs are extraordinarily vital, and represent the backbone of the Italian productive fabric.<sup>45</sup>

As Confindustria report on Italian industry highlights, Italian SMEs, despite their size, are the companies with the highest adoption rate of Industry 4.0 technologies on the total of Italian companies. The number of national small digital companies, in fact, is growing at a dizzying pace: in the last three years craft enterprises that have converted to Industry 4.0 have grown, so that, in 2018 there were 877 digital SMEs, an increase of 35% compared to 2017.<sup>46</sup> The majority of these companies are located in Northern Italy.

However, the potential number of innovative SMEs for Italy could be around 18.000 companies; a very high number that generates great expectations for the Italian economy. The consulting company Deloitte in a more recent study, than the one of Digital Manufacturing Laboratory, called *Italia 4.0: siamo pronti?*, highlights how the 32% of Italian SMEs recognize that investing in Industry 4.0 technologies is essential.<sup>47</sup> The same percentage claims to possess the solid foundations necessary to support the development of new technological solutions.

This 32%, although it isn't such a high percentage, has been able to find non-standard strategies to interpret the market, and to evolve together with the ever increasing need for

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<sup>44</sup> Laboratorio Manifattura Digitale, Secondo Rapporto Industria 4.0 nelle PMI Italiane, Università degli Studi di Padova, Indagine 2017 (Rilascio aprile 2018)

<sup>45</sup> Greco F., Necessarie le sinergie tra PMI e multinazionali, Il Sole 24 Ore, Giugno 2019 on [www.https://www.ilsole24ore.com/art/necessarie-sinergie-pmi-e-multinazionali-ACBDR9T](https://www.ilsole24ore.com/art/necessarie-sinergie-pmi-e-multinazionali-ACBDR9T)

<sup>46</sup> Centro Studi Confindustria, Dove va l'industria italiana, Rapporto 2019

<sup>47</sup> Deloitte, Italia 4.0: siamo pronti? Il percepito degli executive in merito agli impatti economici, tecnologici e sociali delle nuove tecnologie, 2018

technological companies in the current world. Certain sectors have already metabolized the use of innovative machineries for manufacturing processes obtaining a 30% revenue growth, and a 33% increase in the “go to market” speed, that is the launch and the strengthening of new products or services.

It can, therefore, be said that small is a limit? In today’s debate there are those who maintain that company dimensions are important, so much that they judge SMEs’ dimensions as a stop to investments in 4.0 technologies. However data and the majority of experts’ opinions prove the contrary, stressing that the problem isn’t the dimensional one, but rather concerns companies’ strategies.

“The true dividing line isn’t represented by the size of the companies, but by the ability to quickly innovate by looking at the market; digitization is done by excellent companies, even small and medium size ones, and in the area we have many SMEs market leaders in their sectors”. (Boccia, 2019)

Digital transformation in Italy is no longer only a matter of technology, but also a matter of culture and of dimension. We are a country made of differences, standardizing goes against our nature, and harm us. It is therefore necessary to innovate the diversity of territories and of provinces (Manfredi, 2019).

Consequently, if we considers the typical sectors of Made in Italy, the so-called 4Fs, the contribution of automation has started to become preponderant and fundamental. From the meeting between new technologies and Made in Italy sectors we see the birth of original forms of expression of creativity, know-how and beauty.

Surely every sector of Made in Italy prefers a specific typology of technology that contributes to determine the value of its production, but despite this, technology doesn’t replace the value of human resources within companies, rather it enhances it.

Keep up with digital transformation presumes the comprehension of how reality connects to a world in which value is generated by processes that aren’t directly observable.

It can be said that an Italian path to digital manufacturing is taking shape: an intersection of humanism, digital and product customization that allows our country to find an Italian way to answer to the challenges created by Industry 4.0 and digitalization to the new global economic context. The prospect that is revealed is enormous: there is the need to put together in an innovative and efficient way this new digital revolution with the artisan know-how and products personalization.

Undoubtedly, this new combination requires a redefinition of competencies, and sometimes the creation of new jobs, as seen in the previous chapter.

The challenge for Italy is to bring the Italian tradition of personalization into the future and into the world thanks to a watchful use of digital technologies (Manfredi, 2016).

New technologies must be at service of hands intelligence: they must be at the service of manufacturing traditions and know-how. For Italy, therefore, we speak of a new, original and different model to promote digital manufacturing, above all with respect to the strategies of the major international players.

Manufacturing digitization is creating a new production paradigm in which competition is played on various aspects. Competition in markets no longer concerns only the product or the production process, and it also affects the brand less and less, the competition is now played on aspects such as craftsmanship, design, customization, authenticity and services. (Bettiol, 2015) These paradigms are perfectly contaminable with the factors that have characterized the success of Italian SMEs.

Consequently entrepreneurs must strategically focus on the relationship between the potential of innovation and artisan value. From the integration between the physical world, founded on know-how, manual skills, knowledge of techniques and materials, passion and love's for creations, and the digital world, that allows to overcome some technical limits, new opportunities for manufacturing companies are opened such as, for example, the creation of new trade routes, the offer of new typologies of products, the ability to respond to consumer requests for authenticity, in search of a diversity that can't be homologated, and an increase in the speed of expansion.<sup>48</sup>

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<sup>48</sup> Manfredi P., *L'economia del su misura. Artigiani, innovazione digitale*, Marsilio Editori, Venezia 2016

### **1.3 Digital Innovation Hub, Competence Centres and Contamination Lab: an Italian way to spread new know-how and digital technologies**

We have seen how Italian SMEs, especially the manufacturing ones that operate in the key sectors of Made in Italy, are starting to move towards new technologies and the Smart Factory model.

As specified above, Industry 4.0 technologies have caused changes also at the level of human capital, very often unprepared to face their challenges and to make the best use of them. Therefore, the need to act both at the educational level and at the level of the companies themselves was created. Today, for doing business, head, hands and heart are no longer enough; it is necessary to have accurate knowledge of technologies in order not to remain isolated in shops in a continuous race towards production and survival, losing important opportunities. In addition, while in the past people used to show their skills to the world, but to keep the tricks of the trade hidden, today things have completely change because network, coworking and common creative are the new keywords.

So it is, therefore, natural to wonder what the Italian response to the need for a new skilled workforce was, and to the need to spread the knowledge of these new technologies to make them more accessible.

The experiences in other European regions have proved that, to have the necessary knowledge to educate and train the workforce and the youth, it is fundamental to create a strategic alliance between companies and the education system.

For this reason, Italy has begun to mobilize to create close interactions between research and companies, education and work, and innovation and territories. There is a need to spread the new culture based on a mixture of traditional techniques and crafts, and new technologies. In fact, the majority of both professional and young people, who lack technical skills, express the need to acquire them, and to go one step further.

It is, in fact, necessary to be aware of the potentialities of Industry 4.0 and of the technologies related to digital manufacturing. In this way workers and entrepreneurs will be able to understand for what reasons Industry 4.0 can be useful to their business, and to find a first signal for building a concrete path of innovation.

With the Piano Nazionale Industria 4.0, the Italian government has allocated funding aimed at creating a series of territorial laboratories, capable of producing a network of connections between schools, Universities and companies operating in the territory.

This new ecosystem is based on the combined and complementary effect of two directives implemented through the Piano Nazionale Industria 4.0 and financed by MISE: Digital Innovation Hub and Competence Centres.

### **1.3.1 Digital Innovation Hub**

Digital Innovation Hubs (DIH) appear to be the real gateway for companies in the world of Industry 4.0 since they offer guidance and training services, as well as strategies related to new technologies. To date, developing and training digital skills in the company is the business card of SMEs.<sup>49</sup>

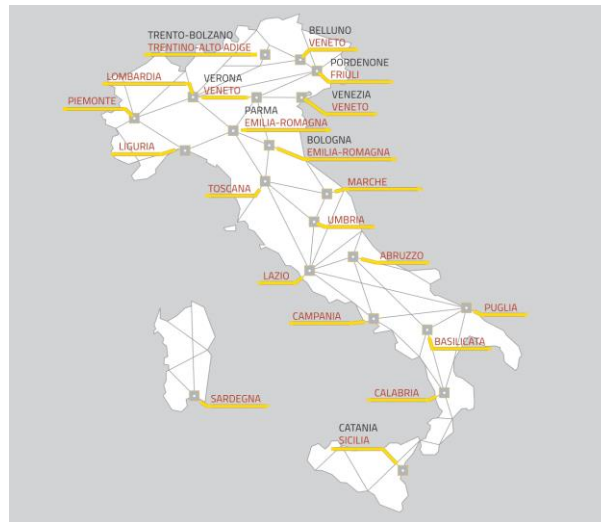
Digital Innovation Hubs provide companies with services to focus better on their businesses, allowing them to access to the latest knowledge, skills and technologies to test and experiment digital innovations related to their products, processes, and business models. The importance of the role that DIH can play, not only in bridging the world of business, education and innovation, but also as promoters of an ecosystem of territorial innovation, is increasingly being understood.

As a confirmation of this the purpose of DIH, according to Confindustria, consists in creating a network of territorial innovation actors made up of Universities, Competence Centres, FabLabs, Research Centres, Small and Medium enterprises, Technological Centres, Districts, Start Up incubators, local authorities and Industrial players.

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<sup>49</sup> FILCTEM in Lombardia, Industria 4.0, Scenari di competitività e di occupazione per le imprese del sistema industriale, Milano, giugno 2017

**Figure 18: Geographical location of Italian Digital Innovation Hub**



*Source: <http://preparatialfuturo.confindustria.it/digital-innovation-hub-litalia-4-0/>*

Looking at the map, made by Confindustria at the end of 2018, 21 Digital Innovation Hubs prove to be active. Regions characterized by an elevated number of Digital Innovation Hubs are Lombardy, Veneto and Friuli Venezia Giulia. The North, in fact, boasts high level schools and universities, and also a productive fabric abundant of excellences.

Confartigianato welcomed with enthusiasm the challenge launched by the Government to create DIH, and to actively guide companies in a digital transformation path that starts from Industry 4.0 and ends up involving every aspect and activity of small companies.<sup>50</sup> “The success of DIH is closely linked to their ability to perform the function of 'mentor and technology broker' for businesses, and thus support their transformation” (Confindustria, 2018). Furthermore, Digital Innovation Hubs will have to help companies in identifying Industry 4.0 technologies which are more suitable to their objectives, and to promote divulgation and information actions on Industry 4.0 paradigm and technological trends.

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<sup>50</sup> Paolo Manfredi speech available on the article *Innovazione: Digital Innovation Hub per le aziende 4.0* on [www. http://www.confartigianato.rn.it/it/news/705/INNOVAZIONE:-DIGITAL-INNOVATION-HUB-PER-LE-AZIE....html](http://www.confartigianato.rn.it/it/news/705/INNOVAZIONE:-DIGITAL-INNOVATION-HUB-PER-LE-AZIE....html)

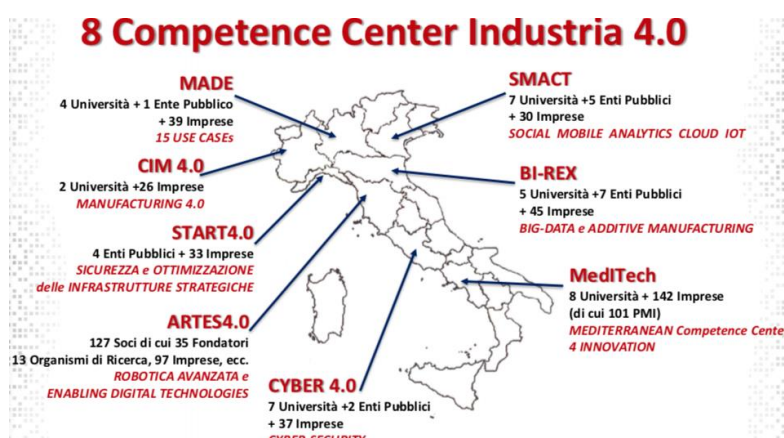


### 1.3.2 Competence Centres

Competence Centres are innovation poles set up in the form of public-private partnerships by at least one research organization and one or more companies, whose main activities are training, requalification of workers, and realization of new production processes with new machines.<sup>51</sup> We talk about centres that are linked to universities, private players, public and private research centres and startups.

The objective of Competence Centres is to provide technological advisory especially to SMEs, whatever their level of maturity with respect to 4.0, encouraging experimentation, and the production of new technologies, training young people through lessons in classroom or with direct experiences in companies, and increasing workers' skills through education 4.0.

Figure 19: Geographical location of Italian Competence Centres



Source: <https://www.industriaitaliana.it/dove-vogliono-arrivare-i-competence-center/>

Our country's response to the creation of these centres has been more than positive, proving how they could be perceived as pole around which Italian SMEs could develop their Industry 4.0 technologies. To date, Italy boasts 8 Competence Centres, most of which located in northern Italy, as we can see from the picture above, that count on partnerships with important university centres.

<sup>51</sup> FILCTEM in Lombardia, Industria 4.0, Scenari di competitività e di occupazione per le imprese del sistema industriale, Milano, giugno 2017

To mention is SMACT, acronym of Social, Mobile, Analytics, Cloud e Internet of Things, the competence centre of Triveneto, which has the objective of favouring technological transfer, and research enterprise collaboration in Industry 4.0 technologies. It includes eight Triveneto's Universities (Padua, Verona, Ca' Foscari, Iuav, Trento, Bolzano, Udine and Sissa of Trieste), two research institutes, that is the National Institute of Nuclear Physics and the Bruno Kessler Foundation, the Chamber of Commerce of Padua, and, finally, twenty-nine private companies.<sup>52</sup>

It seems that our industrial districts have decided to bet and invest in Competence Centres. The existing eight, in fact, are born on a concept of specialization that, in many cases, coincides with a physical proximity of the different actors involved. Moreover, each Competence Centre is naturally very tied to the specificities of the territory.

The creation of Competence Centres is focused on the enhancement of universities' and companies' skills, and on the investment in virtuous training courses capable of giving life to new knowledge and abilities. It is a matter of enhancing craftsmanship of the entrepreneurial fabric, thanks to the use of digital technologies provided by big players, and made available to SMEs by universities (Spadoni, 2017).

Remaining in the educational field, Competence Centres will realize demonstrative production lines thanks to the use of new technologies, and will develop some case studies to test the contents of the courses with participants.

The interconnections between universities and companies, between public and private, between education and Industry 4.0 skills, can give life to a place in which manufacturing and research connect.

Alongside these initiatives, in 2017 the Ministry of Education, University and Research (MIUR) has launched a project with the aim of involving many Italian universities in the creation of physical and virtual places of contamination between knowledge, skills and experiences, called Contamination Labs, open to students, entrepreneurs and experts in different fields.<sup>53</sup>

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<sup>52</sup> Smact, 7 milioni al Competence Centre del Triveneto. Direttore Andrea Tellarini, 2019 on <https://www.venetoeconomia.it/2019/05/smact-competence-center-tellarini/>

<sup>53</sup> FILCTEM in Lombardia, Industria 4.0, Scenari di competitività e di occupazione per le imprese del sistema industriale, Milano, giugno 2017

This project stems from the need of qualified human capital, capable of understanding and managing technologies, by the time increasingly central in our lives. In Italy today we look at the diffusion of technical culture and at the construction of a cooperative relationship with companies with different attention (Micelli,2016).

To give life to innovation, it seems that Italy has found the precise solution, that is, the contamination of ideas. The objective of Contamination Lab, in fact, is to increase the entrepreneurial skills of today's youth, transforming the training experience into a real field experience based on interdisciplinary education, on "doing", and on experimenting. These laboratories, moreover, are configured as real meeting space for the actors of innovation: experts, entrepreneurs, managers and technicians operate side by side with the youth, launching innovative and ambitious challenges to the latter that have to find a creative solution.

Undoubtedly a win-win relationship is created, since even the entrepreneurs, during the course of laboratories, can learn new knowledge or adopt some of the proposals, that emerge during the laboratories, within their business realities.

To date, there are 19 Contamination Labs in Italy, located in different regions.<sup>54</sup>

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<sup>54</sup> [www. http://clabitalia.it/contamination-lab](http://clabitalia.it/contamination-lab)

## **CHAPTER 3: The Italian footwear sector and the Riviera del Brenta district**

In the previous chapters it has been talked about Industry 4.0, and its implications in terms of new technologies, opportunities, and manufacturing. The focus was also put on the possibilities of Italian manufacturing companies to face the challenge of change, and to rethink themselves in an innovative way, combining traditional craftsmanship, know-how and cutting edge technologies.

The objective of this chapter is to identify if the principles of digital manufacturing can also be adopted in the Italian footwear sector, with a focus on the Riviera del Brenta footwear district. It will be investigated to identify the possible innovations, and the professional needs that underlie the development of new intelligent footwear factories.

### **1.1 The Italian footwear sector: overview and innovation**

The fashion system in Italy can be a guarantee of excellence and quality beyond compare. Italian fashion, over the years, has been able to offer a production made up of carefully selected materials, and to communicate the meaning of fashion, highlighting what makes a luxury product a top level article. This because people are becoming increasingly focused on design, and fashion is influencing purchasing decisions more than functionality or necessity

Among the leading sector of the fashion system, the footwear sector is one of the most profitable, although in the last fifteen years it has experienced a reshaping in terms of employees, companies and production volumes.

A preliminary review of the whole Italian footwear market allow to obtain some considerations that could be useful to understand future trends within the industry.

The footwear sector represents an important economic branch for the Italian economy, since it has been able to evolve, and to remain competitive in the global market, despite the foreign competition that can count on lower labour costs. It is made up of large

companies, many of which are known all over the world, and small craft enterprises, which are able to create small works of art taking advantage of creativity and manual skills.

This success is due to generations of intuitive entrepreneurs, in some cases even visionaries, who have made the Italian shoe a unique product at an international level, aiming more and more on top of the range. Italian shoes, in fact, are appreciated all over the world for the quality of materials, for the processing techniques, for the continuous search of creative solutions that meet the tastes of the end users, and for the capabilities of workers supported by technologically and stylistically avantgarde training schools.

Made in Italy is a distinctive hallmark that attests the quality and the reliability of a shoe at an international level (Scarparo, 2019).

The success is guaranteed by the typical structure of the sector located in a supply chain context, consisting of a system of subcontracting of raw materials, accessories, components, producers of machines, modellers and stylists. These characteristics have made that the Italian footwear sector is the first producer of shoes at European level, and the tenth for number of pairs in the world with 191 million pairs produced per year.<sup>55</sup>

To date, the national competitiveness of the sector is measured especially on the foreign market because Italy is confirmed to be the eight exporting country in the world, since the 85% of its production is sell abroad. Exports represent a strategic dimension that significantly contributes to the development of the sector. However, looking at the graph below, it can be seen that destination countries have changed in 2018.

The main Community markets, to which 2 out of 3 shoes are sold, have reduced their exports volumes of 6.6% except for Germany and UK, while extra UE countries, like United States, China and South Korea, have registered a 4.9% increase in value, showing an increase of 2.5% in quantity.<sup>56</sup> On an extra UE level, Russia is the country that has registered a decrease of 13.1% in quantity and of 11% in value.

The most exported shoe type is the leather one for 71.3%, 10 times more than the Chinese counterpart, and rubber follows for 9.8%.

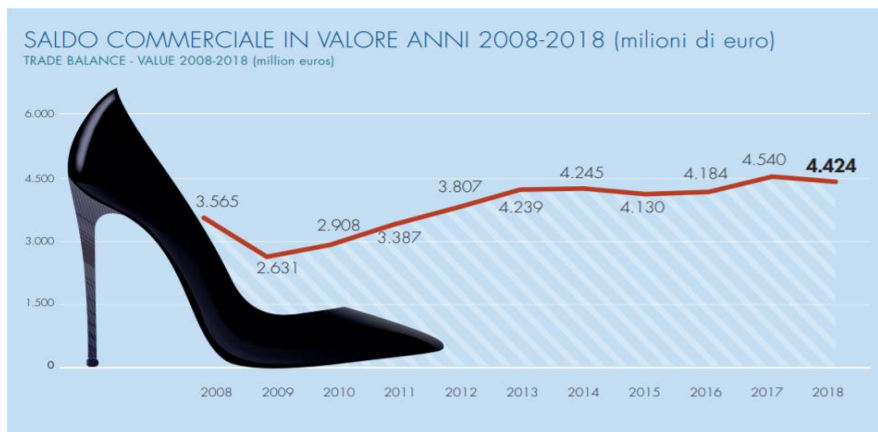
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<sup>55</sup> 2018 Data, WorldFootwearYearBook available on <http://www.assocalaturifici.it/ancimain/doc.html?id=19305>

<sup>56</sup> Assocalzaturifici, Il settore calzaturiero italiano 2018. Tabella di sintesi e commento, Confindustria Moda based on Assocalzaturifici, L'industria calzaturiera italiana. Lineamenti principali 2018. Schede statistiche, Confindustria Moda, 2018

In 2018 the sector had around 4505 companies that occupy 75.680 workers, an active trade balance of 4.424, and a total annual turnover of around 14.3 billion of euros.

**Figure 20: Trade Balance -Value 2008-2009 (millions of euros)**



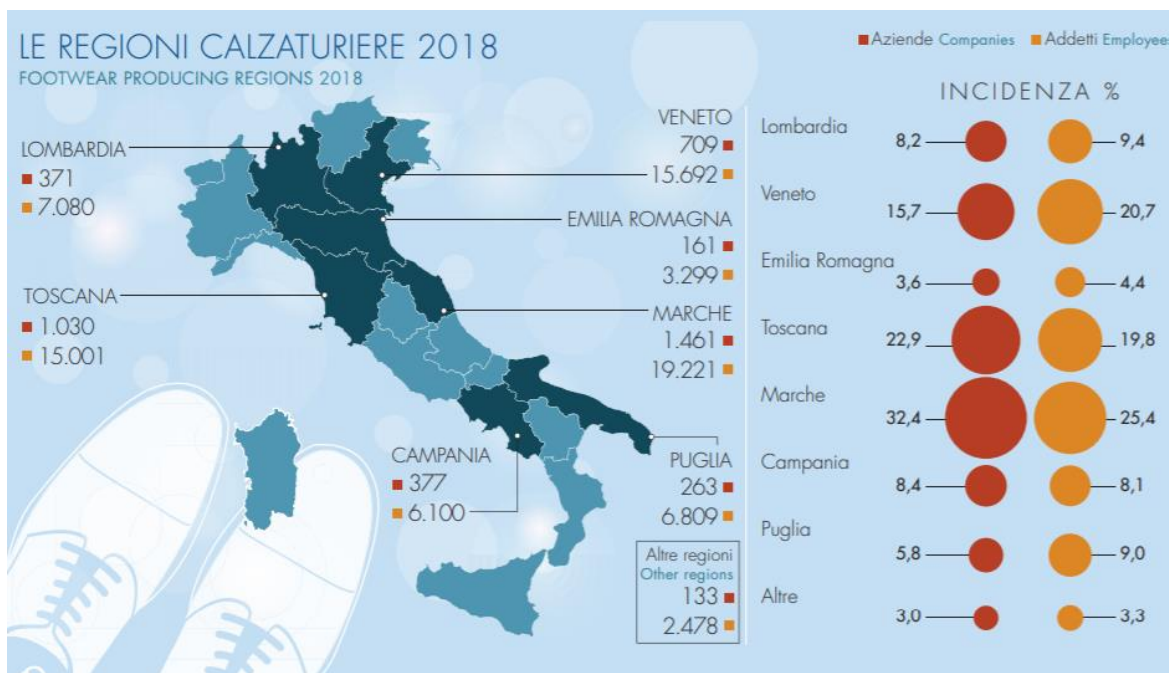
*Source: ISTAT data processed by Confindustria Moda*

It is a system composed mainly of small and medium enterprises, generally located within territorial districts, in which all the production is managed by specialized companies, that arrange themselves in production niches placed in the different processing phases along the supply chain. The different districts have been able to put together their experiences to create a modern and network-based work organization. This represents the winning strategy of the footwear manufacture of our country: “a specialized system that works on smaller volumes to concentrate its action on the final product”.<sup>57</sup>

Footwear districts still represent the cornerstone of Italian shoes production, and, for this reason, production is strongly localized in some regions. The regions of reference, as it can be seen from the graph below, are Veneto with the Riviera del Brenta district, Marche with the districts of Fermo and Macerata, Tuscany, Lombardy, Emilia Romagna with the San Mauro Pascoli district, Campania and Puglia. Most companies are concentrated in the first three, so much that they produce two-thirds of our country’s shoe exports: Veneto accounts for the 27.5% of national exports, Marche accounts for the 13.9%, and Tuscany accounts for the 21.5%.

<sup>57</sup> Bettarini U., Di Giacomo M., Tartaglione C., Fabbriche intelligenti. Un approfondimento su innovazioni e fabbisogni professionali che sottendono allo sviluppo della fabbrica 4.0 calzaturiera, ARES 2.0, 2016

**Figure 21: Footwear producing regions in 2018**



*Source: Confindustria Moda estimates for Assocalzaturifici*

We can find different typologies of companies operating within the sector: those that have adopted the status of suppliers, especially for luxury brands, thanks to business to business relationships, or those that have specialized also in the autonomous management of the entire production processes by creating their own brand.

Made in Italy production in 2018 has realized 184.3 million of pairs, with a value close to 7.9 billion of euros. Production varies from high-end luxury shoes for women, typical of the Riviera del Brenta district, to men's shoes, main product of the Marche district, or sneakers, prospering in the Montebelluna district.

The table below contains the main data concerning the Italian footwear industry both in 2017 and 2018, with the relative percentage change obtained from the analysis of the differences in the results of the two years.

**Figure 22: The Italian footwear industry 2017/2018-Highlights**

DESCRIZIONE Description		2017	2018	VARIAZIONE % Variation %
<b>Aziende</b> Companies		4.708	4.505	-4,3
<b>Addetti</b> Employees		76.600	75.680	-1,2
<b>PRODUZIONE</b> Production	paia (milioni) / pairs (millions)	190,7	184,3	-3,3
	valore (milioni Euro) / value (million €)	7.797,56	7.861,24	+0,8
<b>EXPORT</b>	paia (milioni) / pairs (millions)	211,1	203,2	-3,7
	valore (milioni Euro) / value (million €)	9.195,55	9.585,40	+4,2
<b>IMPORT</b>	paia (milioni) / pairs (millions)	333,9	336,1	+0,7
	valore (milioni Euro) / value (million €)	4.655,14	5.161,36	+10,9
<b>Saldo commerciale</b> Trade balance	paia (milioni) / pairs (millions)	-122,8	-132,9	-8,2
	valore (milioni Euro) / value (million €)	4.540,40	4.424,05	-2,6
<b>Produzione per l'interno</b> Production for domestic consumption	paia (milioni) / pairs (millions)	28,1	27,4	-2,3
	valore (milioni Euro) / value (million €)	1.121,76	1.106,02	-1,4
<b>Consumi interni</b> Domestic consumption	paia (milioni) / pairs (millions)	194,5	193,6	-0,5
	valore (milioni Euro) / value (million €)	3.629,87	3.627,69	-0,1
<b>Export/Produzione %</b> Exports/Production %	paia / pairs	85,3	85,1	-0,2
	valore / value	85,6	85,9	+0,4
<b>Import/Consumi %</b> Imports/Consumption %	paia / pairs	85,6	85,8	+0,3
	valore / value	69,1	69,5	+0,6

Source: ISTAT, SITA RICERCA. Confindustria moda estimates for Assocalzaturifici

Looking at the table, it can be seen how in 2018 there has been a slowdown of 3.3% of the production level, due to the difficulties of foreign markets, and the stagnation of Italian families' consumption levels. However, although been heading downward, numbers remain positive, especially for exports that have generated a value of 9.6 billion of euros.

The divergence between the decrease in quantity and the increase in value confirms the excellence of high range Italian production recognized by foreign buyers, but, on the other hand, underlines the decisive role played by the major international luxury brands.

In light of these results, the challenge of Italian companies is to feed their business with a focus on processes and products innovation, that are considered the two main elements that allow to remain on the market, in order to back out of foreign competition.

The solution seems to be represented by the adoption of Industry 4.0 technologies since the footwear sector, although being manual intensive, has proved capable to understand changes, and to respond through the introduction of innovations. The Smart Factory challenge becomes fundamental to take on, for a sector in which tradition still plays a decisive role.



The need to reorganize processes in a more efficient logic, to adopt a technological apparatus, that allows a more efficient production oriented to an increase of the quality and of customization for the end user or for semi-finished customers, and to rethink man-machine relationship in an integrative way is evident.

Undoubtedly, artisan tradition must not be completely abandoned in favour of digital, but it must be integrated with the latter to obtain production line in which creative talent and know-how are manifested in the ability to drive innovative operations carries out by robotic systems and digital-guided machineries. This because artisan creativity still plays today a fundamental role in the footwear sector, so that it is the priority to maintain and pass it on to young generations.

Technological innovation in the footwear sector is a 360° revolution, that ranges from design and prototyping to production and marketing.

To date, the sector appears very interested in the implementation of advanced manufacturing systems. The entire design can be realized with 3D printers to accelerate the production of the moulds necessary for the fabrication of heels, soles and other components. At the same time, CAM2 system, a type of laser scanner, permit to scan prototypes and finished objects, and to reproduce them on a three dimensional scale on the computer. CAM2 (Computer Aided Manufacturing) and CAD (Computer Aided Drafting) systems are used for the integrated and modular design of the various shoe's components. The result is a high precision product, flexible to the needs of the moment, and easily customizable according to customers' tastes; in addition lower production costs are obtained.

However, the majority of footwear companies already has these technologies, that, consequently, are starting to be considered dated. There is the need to adopt more advanced technological solutions to be more performing than competitors.

Robotics for the most repetitive and standardized phases, IoT technologies and Cloud Computing, for the improvement of the entire company's organization, and Augmented Reality represent the new addressee of footwear sector's investments. Thanks to IoT it is also possible to achieve a complete and integrated vision of the whole supply chain. Augmented reality, in addition, offers a lot of new opportunities for this industry; for example, to better involve the consumers, footwear companies are developing specialized

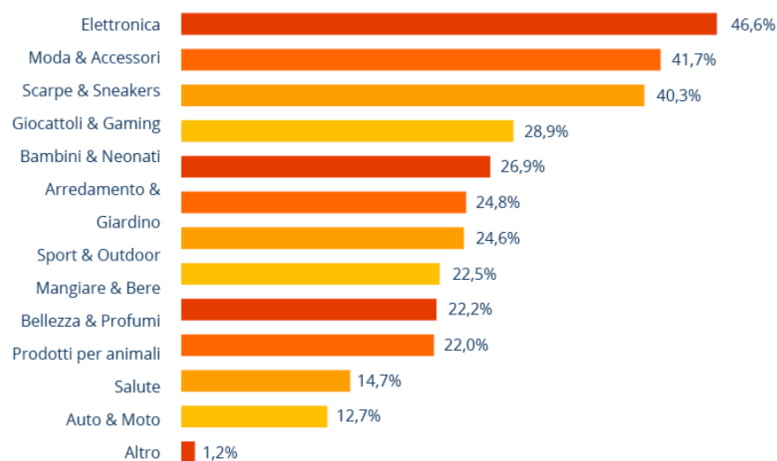
applications that allow them to see directly how the shoes, that they want to buy, will fit on their feet, thanks to a simple scan.

Some steps forward are also being made in the field of materials innovation as, for example, the use of derivative of the plant-based family kind of leather instead of animal parts, the use of nanotechnology to decrease the environmental impact of industrial processes, and the adoption of synthetic materials that are the new polymers in the footwear industry.

This new business idea will surely lead to positive results, since “it requires people to make a constant effort in terms of creativity and problem solving skills: a process of upskilling that could lead to the creation of a shoe that is increasingly distinguishable from standardized products, as human creativity, helped by precision technological tools, is placed at the centre of the entire production process”.<sup>58</sup>

Undoubtedly in the era of Internet hyper connection becomes fundamental also for footwear companies. To prove this, shoes, as it can be seen from the graph, are among the most desired online product categories by the Italian population for 40.3%, after electronic material and fashion and accessories.

**Figure 23: Most desired categories in online shopping**



*Source: Annual report of Idealo on Italian e-commerce (2019)*

<sup>58</sup> Bettarini U., Di Giacomo M., Tartaglione C., Fabbriche intelligenti. Un approfondimento su innovazioni e fabbisogni professionali che sottendono allo sviluppo della fabbrica 4.0 calzaturiera, ARES 2.0, 2016

Innovation, therefore, must also accompany with the evolution of distribution models to guarantee greater speed, compared to the times required for placing products on the market, and to offer a greater variety of shoes.

For this reason, in addition to having their own website, and being present in the most important social networks, some companies have started to use the web to open up to new sales channels. As disclosed in the previous chapters, the online world has many advantages, especially in a context in which the consumer is becoming more and more demanding. First of all, we talk about an efficient customer care that presumes an accessibility guaranteed 24 hours a day and 7 days a week, and offers a wide selection with precise and detailed information for every product. In addition, the use of online sales channels or e-commerce platforms breaks down geographical barriers, allowing consumers to receive products anywhere.

However, the footwear entrepreneurial fabric, to deal with these changes, must develop an internal culture, as well as investing in new technologies. “Technologies are there, and they are even more cheaper and easier to use, the problem is the industrial culture, that can’t be bought at the market” reports an article of the Sole 24 Ore.<sup>59</sup> Companies must gain awareness of which type of technologies or processes can be in line with their business model, and then decide which relative specialist knowledge introduce or modify. We are witnessing a process of job enrichment regarding which work’s characteristics are modified. Consequently, there will be a growing demand of specialized technicians, who have advanced computer skills, know how to use technologies, and are able to solve any problem that may arise during the production; of designers with skills in the three dimensional field, and of marketing specialists able to manage new sales and communication channels.

The gaze is turned especially to young people, for whom the sector offers enormous potential thanks to the presence, on the national soil, of few but certainly very efficient Technical Institutes or specialized schools.

The look at the future, at new technologies and at young people to be trained it is found again at MICAM, the international exhibition, organized by Assocalzaturifici, dedicated to the world of footwear, which is held twice a year at Fiera Milano. MICAM represents

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<sup>59</sup> Bettarini U., Di Giacomo M., Tartaglione C., Fabbriche intelligenti. Un approfondimento su innovazioni e fabbisogni professionali che sottendono allo sviluppo della fabbrica 4.0 calzaturiera, ARES 2.0, 2016

the reference point for all those who work in the footwear sector. With more than 1000 exhibitors between Italian and foreigners, the event celebrates the history of shoe but, at the same time, looks to the future.

Gathering many excellent companies, MICAM appears as an avantgarde incubator. During the exhibition entrepreneurs, customers, experts in the field, suppliers, and young people come in contact with new creative ideas, start-ups that propose innovative solutions, new values for the sector and original communication channels.

One of the districts that is moving in this direction, thanks to an innovation process that sees the involvement of companies, institutions, and education is the Riviera del Brenta district, which will be the subject of the next paragraph, and of the subsequent analysis of individual footwear companies to demonstrate the purpose of the thesis.

## **1.2 The Riviera del Brenta district: between tradition and the future**

Between the provinces of Padua and Venice is situated the Footwear District of the Riviera del Brenta.

The district plunges its roots in the 13<sup>th</sup> century with venetian Caligheri, craftsmen specialized in the production of shoes that have founded their guild in Venice in 1268; but the birth of the first Italian industrialized footwear plant dates back to 1898 thanks to Giovanni Luigi Voltan, who founded the namesake shoe factory Voltan. On the basis of the experiences acquired in United States' footwear industries, the mechanization of some phases of the production process allowed Voltan to reduce costs, and to create its own network of suppliers and customers that allowed him to outperform the competition.

The Voltan shoe factory played the role of a real school, collecting and spread through factories' work experiences and modern knowledge capable of giving a boost to local development. Consequently imitation processes have become popular, and have led to the creation of new companies that gave life to the first industrialized footwear complex in Italy.

In the new millennium the district had to face some challenges, including globalization, that has revolutionized the entire sector, and the economic and financial crisis of 2008, so much that only since 2014 it has been able to recover pre crisis level.

So since 1898 an ancient trade has become a modern industry, where the know-how still has the artisan value of knowing how to do, of being able to combine passion and experience, taste and imagination with efficiency, technology and results.

To date, the Riviera is specialized in the production of high quality women's shoes for 95%, even for the most prestigious brands of international haute couture, that, attracted by the quality, elegance, and refinement of products, have found in this area the ideal terrain for the realization of new stylistic ideas. Moreover, the realized shoes are used in the majority of runway shows during the fashion weeks.

Production, therefore, takes place in industrial facilities, but, at the same time, it is the result of craft processes since each individual shoe can be manipulated on average 180-210 times during the production process.

Companies to maintain a high brand awareness, and to interact with international consumers, exhibit their products by participating in trade fairs such as the aforementioned MICAM, or Pitti, Mido and Lineapelle.

The district relies relatively little on international delocalisation and is a net exporter of intermediate inputs. Exports represent the 70% of total production. The main target markets are France, Germany, U.S. and recently also Russia, China and Arab countries.

If we analyse the current structure of the district we can see that it is composed of three types of companies: subcontractors, companies that produce with their own brand, and companies that collaborate and work for fashion brands.

There are few shoe factories which were able to develop their internal structure, and to establish themselves with their own brand, like Voltan, Ballin, Baldan, Renè Caovilla, even if they have to face high costs. Others have become subcontractors to perform well and upgrade more in terms of product and processes. However, the majority of companies operates in Business to Business relations with big fashion brands like Chanel, Prada, Dior, Celine, Fendi, Givenchy, Stella McCartney and Yves Saint Laurent, which demand maximum reliability from them to satisfy high quality parameters. The stylist thinks, imagines and creates the design of the shoe to be made, while companies' technicians realize physic prototypes.

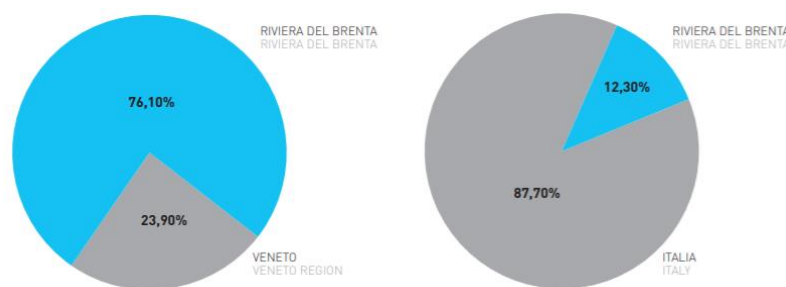
Moreover, the giants of world luxury have decided to put down their roots investing in the construction of production facilities. The decision of the fashion brands to rely on the companies of the district has made them grow in terms of product quality and

organization. An example is the LVMH group, which is present in the district with its own company, and maintains relationships with nearby companies.

The district is made up of 132 active shoe factories, able to follow the entire production cycle, and 421 micro businesses divided into accessory manufacturing companies, shoe designers, and trading ones. Next to large shoe factories there are small craft enterprises that have positioned themselves in an even more niche market segment, making shoes in small volumes and sometimes in unique pieces.

All the enterprises represent the 76.1% of the total shoe companies of the Veneto region, and the 12.3% of the Italian ones.<sup>60</sup> As a result of this, the number of pairs produced represents the 30.1% of the total production in Veneto, and the 10.9% of the Italian one.

**Figure 24: Shares of the Riviera del Brenta production on the total shoes production of Veneto and of Italy**



*Source: Statistics of the Riviera del Brenta district realized by A.C.Ri.B., 2018*

As regards the field of employment, the number of occupied personnel in Riviera del Brenta represents the 67.2% of all shoe workers in the Veneto region, and 17.6% of all Italian shoe workers.

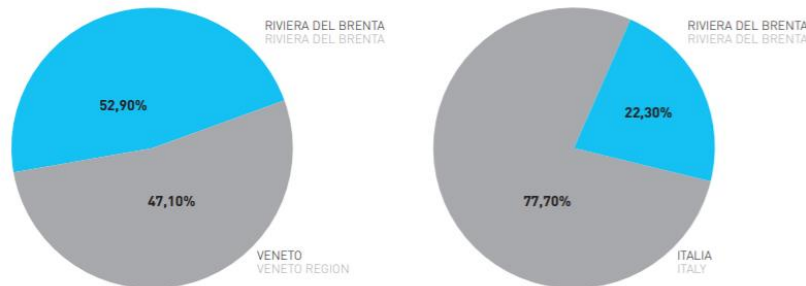
It can be said that the success of the district is due to two fundamental elements, that is, the presence of a complete and integrated supply chain that allows to respond rapidly to market needs, and a sensitivity to style, tastes, design, craftsmanship and to details. For this reason, the total sales value of the Riviera represents 52.9% of the turnover of the Veneto region, and 22.3% of the Italian one.<sup>61</sup>

<sup>60</sup> [www. http://www.acrib.it/1\\_4.asp?sec=1&anno=2018](http://www.acrib.it/1_4.asp?sec=1&anno=2018) Statistical data on the Riviera del Brenta district

<sup>61</sup> [www. http://www.acrib.it/1\\_4.asp?sec=1&anno=2018](http://www.acrib.it/1_4.asp?sec=1&anno=2018) Statistical data on the Riviera del Brenta district

In response to this data, Roberto Marcato, the Venetian Counsellor for Economic Development, defines the district as “A true excellence, not only entrepreneurial, which contributes concretely to the positive image of Veneto region at an international level”.<sup>62</sup>

**Figure 25: Total sales value of shoes (in millions of euro)**



*Source: Statistics of the Riviera del Brenta district realized by A.C.Ri.B., 2018*

Like the Italian footwear sector, also the Riviera del Brenta district has been affected by profound changes, such as the new industrial revolution, and by a series of critical issues, such as, for example, the growing competition from Romania, China, and India in which production costs are lower.

“In past years brands came almost exclusively in Italy to have their shoes made by footwear companies while, in recent times, there have been other countries that have seen their turnover, and the prestige of their brands drop in a considerable way and, as a consequence, have started to compete in the market selling shoes at a lower price” said Mauro Tescaro, the director of the Politecnico Calzaturiero.<sup>63</sup>

The companies of the district, in order to maintain their competitive advantage and to keep up with the times, have signed in 2017 the District Operating Plant<sup>64</sup>, with which they undertook to improve their services and productions through research and experimentation of innovative technologies and methods, and to redevelop the design, production and logistic processes. Another key point of the plan concerns human capital

<sup>62</sup> Magazine Timer. Il Nordest che corre, Distretto Calzaturiero Riviera del Brenta. Marcato: “Soddisfazione per successo economico”, 2019 on [www.https://timermagazine.press/2019/07/11/distretto-calzaturiero-riviera-del-brenta-marcato-soddisfazione-per-successo-economico/](https://timermagazine.press/2019/07/11/distretto-calzaturiero-riviera-del-brenta-marcato-soddisfazione-per-successo-economico/)

<sup>63</sup> Personal Interview with the Director of the Politecnico Mauro Tescaro on 18 July 2019

<sup>64</sup> The Operational Plan 2017-2020 was started with the aim of building a platform of research activities that stimulate the collaboration between universities and companies, and the multidisciplinary confrontation on design, processes, technologies, products in the Fashion and Home System sectors.

that, due to the generational change, is likely to neglect a cultural and technical heritage formed in long years of history. Therefore, there is the need to promote a new entrepreneurship, and to support the transmission of manufacturing skills. New generations, in short, are called to combine manufacturing tradition and digitalization, development and sustainability. To date, the future success of the Riviera del Brenta could be to combine innovative services with great craft skills (Tescaro, 2019).

The fundamental reasons for this were the need to strength the position in the Veneto region through the innovation of materials and the automation of internal processes, and the need to encourage the creation of new companies, also through the strategic repositioning of existing ones, gaining new knowledge in the field of design and ICT (information and communication technology).

The interest in innovation and new technologies has also been shown by A.C.Ri.B. (Associazione Calzaturifici Riviera del Brenta), an association founded in 1961 by entrepreneurs and representatives of the sector, that connects all the companies operating in the district, ensures an easy organization, and allows the sharing of problems between companies.

Although, therefore, many district companies are moving towards high technological content solutions, the artisan component remains strong and differentiates the shoe of the Riviera from all the other ones.

The participants to the District Operating Plants, to achieve these objectives, have started a collaboration with the Politecnico Calzaturiero an important research and development, educational and innovative centre of the sector, as will be analysed in the next paragraph.

### **1.2.1 Politecnico Calzaturiero: a bulwark for the development of the district**

When it comes to the Riviera del Brenta footwear district, the Politecnico Calzaturiero can't be ignored.

Politecnico Calzaturiero was founded in 2001 on the initiative of Associazione Calzaturifici Riviera del Brenta (A.C.Ri.B.), of Associazione Nazionale Calzaturifici



Italiani, of the Bodies of Research and Innovation, and of the Financial Institutions of the Veneto Region.<sup>65</sup>

**Figure 26: Logo of Politecnico Calzaturiero**



*Source: [www.politecnicocalzaturiero.it](http://www.politecnicocalzaturiero.it)*

It focuses on 3 different typologies of activities: Education, Research & Innovation, that are the two main fields of action, and Services to a lesser extent. The last consist primarily in rapid prototyping, thanks to the existence of laboratories where new technologies are presented to companies, in the control of the quality of materials, that includes tests and certifications, and in the control of workplace's safety.

Politecnico Calzaturiero is considered the flagship of the Riviera del Brenta footwear tradition, firstly for its closeness with the companies of the district, and for its ability to respond to their needs with customized solutions; and, in second place, for entrepreneurs, that are usually also professor of the Politecnico, that actively participate in the planning of activities, thus resulting always informed in real time about new techniques, technologies and trends (Tescaro, personal interview 2019).

Politecnico is entrusted on one hand, with the task of preserving and evolving the extraordinary Made in Italy excellence, and, on the other hand, with the task of being the reference point for innovation thanks to the training of entrepreneurs and managers of the future.

As underlined in the previous chapter, in Italy we are witnessing the creation of physical and virtual spaces that permit the sharing of ideas, notions, and skills concerning new technologies to create formative experiences, sometimes even creative.

That is precisely why, as regard Education, the Director Mauro Tescaro expresses this view "the school form some generalist figures and we give them that specialization that

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<sup>65</sup> Personal Interview with the Director of the Politecnico Mauro Tescaro on 18 July 2019

allows people to know how to do things well done in their companies or in their future work; we transform interesting ideas that are developed by different Universities in projects that are useful for the sector”.

The educational offer is divided into 2 areas: the course dedicated to young people and the course dedicated to corporate training for employees and managers.

Undoubtedly, the main product is the “School of Design and Technique of Shoe”, founded in 1923, in which students, who have already completed their studies or are at least 18 years old, learn to work with an eye to the past and one to the future. The offer includes also corporate training on the basis of the needs of the individual companies. Young people can participate in medium or long term course, structured in 500 classroom hours and six months internship in one of the companies of the district.

There are about 300 young people trained at the Politecnico Calzaturiero each year, and the percentage of their entry into the labour market is very high. It has been estimated in 2018 that the 95% of the students are employed by the Riviera del Brenta district’s companies at the end of their studies. “Compare to the past where there was a limited number of young people willing to acquire these skills, the number has increased nowadays”.<sup>66</sup> For this reason, Politecnico has developed, in collaboration with Universities and International Research Institutes, different paths aimed at the formalization and transfer of craft skills and tacit knowledge.

Indeed, Politecnico Calzaturiero has been able to create consolidated relations, over years, with important design schools like the Parsons School of Design in New York, and with the Institut de la Mode in Paris, that is the most important fashion school in France. The creation of stable relations with important design schools is considered to lead to two different advantages: it could bring benefits to district companies, that every year collaborates with the school, and could allow students to get in touch with international stylists and designers in order to field test what they have learned during the teaching years.<sup>67</sup>

Furthermore, it offers continuous professional training for companies’ managers and technicians, allowing them to learn knowledge about process management, product and

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<sup>66</sup> Personal Interview with the Director of the Politecnico Mauro Tesaro on 18 July 2019

<sup>67</sup> Business Shoes Magazine n 24, 2018

process quality, marketing, latest technologies and innovations to always be at the forefront.

To date, “Politecnico Calzaturiero of the Riviera del Brenta wants to become something more: a technical and professional training centre at the service of the Italian fashion industry.[...] it can strive to become the “Polimoda” of the shoe” reports an article of the *la Nuova di Venezia e Mestre*.<sup>68</sup> For the realization of this project, a steering committee, formed by Confindustria national and local, Sistema Moda, Federmanager, Vincenzo Boccia number-one of Luiss, Confindustria Moda, and other important regional and national names and societies, is established for now. It is essentially a test, carried out in the world’s leading luxury shoe district, to realize a national operating model.

Among future projects there is that of expanding the educational offer, already the spearhead of the district, to become “the backbone of technical-professional training for the fashion system”.<sup>69</sup>

As regard the other fundamental activity of the Politecnico that is Research and Innovation, the primary objective of the society is to support the development of the Veneto footwear district through the use of new methods of production and of new technologies.

The research activities are, first of all, focused on the promotion of Made in Italy products and their quality; at the same time, Politecnico is committed to the development of innovative channels to study and communicate with the increasingly demanding market, thanks to the use of advanced web based tools.

The society pursues 2 different typologies of projects: System Projects in which the Politecnico looks for promising innovations in Research centres, Universities and areas in which ideas are developed, and evaluates their feasibility to the footwear sector; and specific Corporate Projects made for the needs of the single companies.

Efficiency is required for both type of projects to keep up: the improvement of internal processes, companies reorganization, the adoption of more effective information systems and new technologies, are fundamental to ensure companies’ success. In fact, district enterprises are looking to communicate their ability of creating efficiency, and are also

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<sup>68</sup> Veneto Economia, Un Centro per il Made in Italy. Il Politecnico Calzaturiero prepara la svolta e chiama i Big, *La Nuova di Venezia e Mestre*, 2019

<sup>69</sup> Veneto Economia, Un Centro per il Made in Italy. Il Politecnico Calzaturiero prepara la svolta e chiama i Big, *La Nuova di Venezia e Mestre*, 2019

thinking how to communicate appealing and interesting contents and strategies regarding the importance of Made in Italy.

Politecnico Calzaturiero, starting from 2007, has carried out different projects in the field of research and innovation. Among the most significant: the development, in collaboration with H-farm, of interactive display cases, two dimensional and three dimensional product configurators and a whole series of other interactive instruments for the management of the sample; and the investment between 2008 and 2012 for the realization of an automated plant equipped with three robot stations for making shoes. The aim was not to completely replace man, but to replace him in dangerous operations and repetitive tasks.

More recent is the RIR FACE DESIGN project, launched on 7 July 2017, about the traceability, certification and anticounterfeiting of the Riviera's shoes. The project, based on Industrial Research and Experimental Development, will last until May 2020 and concerns the "support for collaborative R&D activities for the development of new sustainable technologies, new products and services". This initiative is especially directed to companies whose main problems are the valorization of Made in Italy, of the well done and of the territory itself. The project presupposes a strict collaboration with Universities through participation in research laboratories, since it is believed that this interaction will allow the deepening of aspects related to the recognition and authenticity of Made in Italy, the application of new models of marketing, of communication, of service, of retail design, and the reduction of misalignments between companies in the supply chain. Traceability becomes a fundamental element if connected with Made in Italy, the territory and sustainability.

Politecnico Calzaturiero has also developed a cloud platform, that uses IoT systems for the detection of physical parameters remotely, to perform predictive maintenance of the machines used in shoe factories. The companies that have adhered to the project were supplied with dashboards to analyse the data of their own fleet. The name of the Project is EnProMa and, to date, the companies that have adopted the cloud platform are 15.<sup>70</sup>

As regard additive manufacturing, within the Politecnico there is a laboratory where there is the possibility to experiment with technologies related to rapid prototyping like 3D printers, laser cutter and CNC machines. In fact, one of its main missions, since 2001, is

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<sup>70</sup> [www.politecnicocalzaturiero.it](http://www.politecnicocalzaturiero.it)

the diffusion of CAD and 3D printing technologies among the companies of the district: to date, there is almost no company that doesn't adopt them because they have brought benefits in the design, and automatic models cutting phase. However, the few district companies, which don't own these machines, have the possibility to bring to the Politecnico's laboratory the file of the object to be created or an already made prototype to be replicated with a 3D scan, to modify it, and to print it in a specific material obtaining an exceptional level of aesthetics and design.

**Figure 27: Digital realization of a pair of shoes**



*Source: [www.politecnicocalzaturiero.it](http://www.politecnicocalzaturiero.it)*

Politecnico is experimenting also new methods for the realization of shoes like the 3D printing of the metal, it also wants to reduce printing times with the test of new printers able to cut down the times to produce heels, and to print completely customized shoes.

In the laboratory students, professors, and technicians have also tested nanotechnologies with the aim of developing projects with them, and verifying what impact nanotechnologies could have on companies' business processes. These experiments have led to a positive result with the enrichment of the ABS, a rigid and impact resistant material used for the molding of high and thin heels, with powders. Due to the success of the experiment, some companies have started to use this technique.

The availability of a Research and Innovation laboratory has allowed Politecnico Calzaturiero, since 2007, to make experiments with the aim of finding the technologies

that were more suitable for the footwear sector. The most promising technologies were chosen and companies have started to experiment with them.

For this reason, as Mauro Tesaro said, “we have created a FabLab when it wasn’t called FabLab, we wanted to be pioneers with regard to this”. In 2016 the Politecnico Calzaturiero was officially recognized as a FabLab, and was inserted into the network of the 18 FabLab financed by the Veneto Region, with the aim of enhancing the regional footwear sector, of promoting its growth and of encouraging the creation of new businesses. Laboratories are, therefore, held within the Politecnico with the possibility for participants to use different equipment like CAD software, 3D printings and 3D scanner. The FabLab organizes courses and seminars inviting both industry experts, to explain the functioning and applications of new technologies, and people who already use these technologies in their production activities.

Politecnico Calzaturiero also participates to research and technologies initiatives at national and international level on innovative systems, processes, products and materials. “At a national level Politecnico has launched some projects like the one in collaboration with CISAS, the Interdepartmental Spatial Centre of Padua, within the robotic section overseen by Professor Aldo Rossi, and the one based on the experimentation of innovative materials for the realization of shoes in collaboration with DPCM, the Department for Chemical Processes, managed by Professor Moretti. Among the others professional partnerships we can mention the collaboration with Professor Vladi Finotto of Ca’Foscari University on the enhancement of district companies’ products with a connection to the territory” said Mauro Tesaro.<sup>71</sup>

At an international level Politecnico has created consolidated partnerships with the major research and development centres in the footwear sectors in Spain, France, Portugal, Poland and Greece.

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<sup>71</sup> Personal Interview with the Director of the Politecnico Mauro Tesaro on 18 July 2019

## CHAPTER 4: CASE STUDIES

After having described, in the previous chapters, the changes brought about by Industry 4.0 technologies, the influence of the latter on manufacturing companies with a focus on the possibility of Italian SMEs to rethink themselves in an innovative way, and the Italian footwear sector, especially the Riviera del Brenta district, in this chapter three case studies regarding Italian SMEs will be presented.

### 1.0 Methodology

After carrying out a personal research activity, I have selected three companies belonging to the Riviera del Brenta footwear sector, that turn out to be in line with the topic of this thesis, that is, the digital transformation of district footwear organizations aimed at creating a connected factory in a sector characterized mainly by tradition and manual activity. In the choice of two of the three cases I was also advised by the Director of the Politecnico Calzaturiero Mauro Tescaro, who suggested me these companies among the biggest users of 4.0 technologies in the district.

Since the analysis focuses on three companies, the type of case study's design is that of a multiple case study, in order to make the research more robust, to predict similar results, and to come to a common conclusion (Yin, 2009)<sup>72</sup>.

The research started with the search for selected companies' contacts on their websites, and the sending of a formal email to ask for an interview, with a brief description of the thesis objective to increase the probability of response. The focused interview method was chosen because it allows to focus directly on the case study topic, and because it is insightful, since it provides perceived casual inferences. Moreover, interviews were conducted directly in companies' offices, thus creating the opportunity for the direct observation of what described by entrepreneurs. Direct observation is useful in providing additional information about the topic being studied (Yin, 2009).

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<sup>72</sup> Yin R.K., *Case Study Research. Design and Methods*, Applied Social Research Methods Series, Volume 5, Third Edition, Sage Publications, 2009

For each company, the owners or specialist figures in the field were interviewed directly by using a semi-structured qualitative questionnaire made up of thirteen questions divided into four thematic areas: Made in Italy area, Technology area, Human Capital area, and Strategic area.

The objective of the interview is to analyse the strategy and business model of each company in relation to new technologies, with a focus on processes innovation.

Each respondent had to answer to what typologies of technologies has adopted, whether product, processes or service; what were the motivations that have led to the adoption of these particular technologies; what were the results obtained; and what was the impact on human capital and business strategy in terms of relations with suppliers, customers and competitors.

This procedure has been followed to ensure that the three selected companies were analysed using a unique interpretation key.

Each interview was taped, recorded and then transcribed, so that you can capture all the possible information and data. Moreover, other data was obtained from companies' websites, articles, and companies' reports, to confirm and augment the evidence from the interviews.

To further support the objective of the research thesis, an interview was also made with the Director of the Politecnico Calzaturiero, fundamental centre for development and innovation of the Riviera del Brenta district, as explained in the previous chapter. Even in this case, a qualitative interview was made with the aim of investigating the role of the society in promoting innovation and the adoption of new technologies by district entrepreneurs.

At this point in the analysis it is, in fact, necessary to focus on real cases, to try to demonstrate what has been explained up to now through existing literature and data. As these demonstrate, even our country has started a new phase of transformation towards digital, even if there is still some brake, by a considerable percentage of companies, to adopt new technologies. Nevertheless organizations, even small or medium sized, that have invested in digital technologies have obtained advantages over their competitors.

The decision to adopt a qualitative research approach through a semi structured interview is particularly suited to the type of study carried out, by virtue of the fact that it appears to be the most appropriate research method. In fact, this methodology turns out to be the



most suitable when the investigator has to respond to “how” or “why” questions about a contemporary phenomenon within a real life context, having limited control over surrounding events (Yin, 2009).<sup>73</sup>

## **2.0 Brentan entrepreneurs and their reaction to 4.0**

As shown in previous chapters, digital change has had huge consequences worldwide, revolutionizing completely companies’ ways of doing business. Technology is used to add value to industry and craftsmanship: at this point almost every aspect of human life is digitized.

Digital revolution has affected also our country, deeply damaged by the aftermath of the economic and financial crisis, generating the need for a change. It seems difficult to accept this new reality: is necessary to dispel the myth of the workplace characterized only by automated machines and not by men, and is appropriate to abandon the idea of the artisan of the past, who works closed in his workshop.

Italian manufacturing SMEs started to see digital technologies as a possible solution to improve their performances and to outperform competitors. Thus arises the need to integrate them with craftsmanship to overcome some technical limitations of traditional work.

These transformations have interested also the world of fashion: organizations are changing their approach to the digital world to respond to the demand of ever more informed and selective customers.

One wonders if all the different branches of the fashion industry are prone to change.

In the footwear sector, object of analysis of the thesis, there are many organizations still linked to tradition and skeptical about new technologies, especially those specialized in the field of luxury shoes.

Among companies that have decided to open up to new technologies, the majority see the value in what it can touch, the product itself, and struggles to recognize the potentialities of all the intangible processes, that are necessary for an organization to survive.

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<sup>73</sup> Yin R.K., Case Study Research. Design and Methods, Applied Social Research Methods Series, Volume 5, Thrid Edition, Sage Publications, 2009

Innovation in footwear is manifesting, in most cases, in virtual prototyping thanks to 3D technology, in the use of robotics in production processes, and in the usage of innovative materials for the realization of products.

The analysis carried out throughout this chapter, outlines a framework of strategies and approaches to digital transformation different from those mentioned above. In fact, regardless of whether we speak of shoe factories or manufacturers of shoe's components, the considered entities believe in the power of advanced technological solutions thanks to their owners' pioneering vision.

Initially, Del Brenta and Paoul have decided to adopt , respectively Cisco Webex Teams and EnProMa, on an experimental basis. Recently, based on the results obtained, they have agreed to continue betting on these solutions in the near future. Calzaturificio Baldan 88, instead, is still in an experimental phase regarding the implementation of EnProMa. Notwithstanding the widespread tendency to consider Italy as a nation that is positioned behind the others regarding the adoption of Industry 4.0 technologies, these organizations demonstrate that our country is progressively starting to change.

It is interesting to note that in two of the three analysed companies the contact with the customer occurs in a B2C perspective through the web. The product is presented to customers on e-commerce platforms in order to create a digital showcase. In this way, the shoe, a symbol of Made in Italy quality, is connected with the digital world. This strategic move highlights the relationship that companies have established with digital: the connection between a new, virtual world, based on technology, and a world still tied to tradition, where the product is seen as the result of their continuous dialogue.

Organizations, in this way, have also obtained customer loyalty. In this new market context in which the consumer is highly fickle, the ability to create a lasting relationship by offering unique and innovative solutions, not easily imitated by competitors, has become fundamental.

Del Brenta has created its network of customers allowing stylists to connect in real time to remote modelling to communicate any changes in the heels making process and see them realized through the Spark Board. Paoul and Calzaturificio Baldan 88 have achieved customer loyalty in a less direct way through the use of EnProMa, thanks to which they satisfy customers' demand in much shorter times than competitors. Both have also took

advantage of the web to develop their e-commerce platforms through which they offer a wide range of their products to national and international customers.

Moreover, companies had a more or less evident increase in the level of productivity and efficiency, as will be explained in the next paragraph.

At this point, it is legitimate to ask oneself how entrepreneurs, usually heirs of their parents' techniques and tricks of the trade, have decided to take this different path transforming their business realities. In a few words, what has pushed them to think out of the box.

The collaboration with Politecnico Calzaturiero, the district's technological hub, has been fundamental since it has worked together with two of the three analysed organizations for the launch of EnProMa project. Moreover, it is equipped with a laboratory dedicated to the experimentation of new techniques, products, solutions, and machines which are, then, adopted on an experimental basis by district companies. Politecnico Calzaturiero, as specified in the previous chapter, plays also a fundamental role in the education of the future human capital that will be hired by organizations.

In the following paragraphs the analysed business cases will be presented in detail.

## 2.1 Paoul srl



### *Made in Italy Area*

Paoul srl was founded by Paolo Pizzocaro and his wife Maria Teresa in 1967 in Saonara, in the province of Padua. The company was initially a contractor because it carried out, on behalf of others, part of the process or the entire processing of shoes.

Subsequently, the owner, after the enrolment in a dance class, had noticed the presence on the market of British and American dance shoes, and the absence of Italian ones. For this reason, he has decided to create the first prototypes, by defining a small collection and few models with its own name, which achieve greater success.

**Figure 28: Phase of dance shoes production process**



*Source: [www.paoul.com](http://www.paoul.com)*

In the early 2000s the two daughters Cinzia and Katia Pizzocaro took over the company, by giving a new impetus to the wealth of knowledge in the “art of doing”. Quality, precision, passion and training are the four keywords that have always guided Paoul’s activity.

“This company carries out artisan activities, so this means that we use machineries to assist men, but men’ work is predominant” said Katia Pizzocaro, the marketing and

communication manager. At the same time, the company has always been oriented towards growth, and has been a supporter of the value of craftsmanship combined with creativity to realize innovative products.

In 2013 the company has started to perform the restyling of the brand, and has registered it at an international level. However, the results weren't immediately seen.

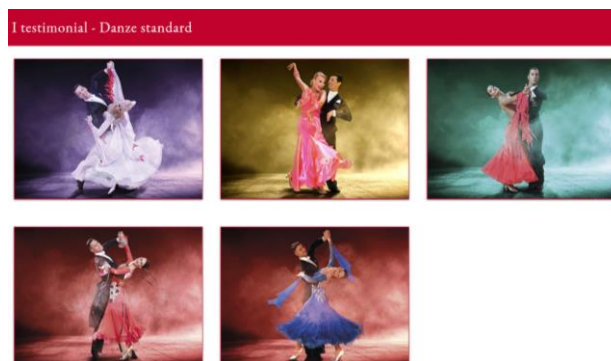
Paoul, to date, produces four product lines of which three with collection, and one that is defined "tailored" that consists of unique and non-reproducible products realized at customers' requests. The other three lines, instead, are the Dance one, that represents the 90% of the company's turnover, the Wedding & Gala line, dedicated to ceremonies and special events, and the Theatre line which is a line of historical shoes.

The main channel that Paoul srl uses to self-promoting is represented by competitions and events organized by national and international sport dance federations, in which there is the possibility to know a large number of people. The two events, that attract visitors from all over the world, and especially from Asia, are the one in Blackpool, England, organized by the VDC Federation, and the one in Stuttgart, Germany, organized by the VDSF Federation.

"The company has a worldwide orientation" claims Katia Pizzocarò. In fact, more than 50% of the organization's turnover comes from abroad: Europe is well covered, but also United States and Asia.

The main customers of Paoul are dancers of international renown, and national and international dance academies that make the product known all over the world.

**Figure 29: Testimonials of Paoul srl**



*Source: [www.paoul.com](http://www.paoul.com)*

To date, the organization has 25 employees, with an average age of 40, and a turnover of 1.220 million of euros in 2018.

### *Technologies Area*

The company even though very tied to tradition, in recent years has started to invest in new technologies.

In the production area CAD/CAM technology has been introduced, since it is fundamental to adopt technology in phases where man's work would be slightly penalizing compared to the precise machines' work. On the other hand, Katia Pizzocaro asserts that technology can't be applied to all the production phases because man's eye and the ability to create the product in a unique way can't be replaced.

At Paoul we talk about process innovation. "An efficient company is more performing and, therefore, the customer is able to understand why we keep the "word given" on delivery times. We differ because compared to competitors, what is known about Paoul is that it is a serious and precise company that does what it says" said Katia Pizzocaro.

**Figure 30: Paoul's production plant**



*Source: personal photography*

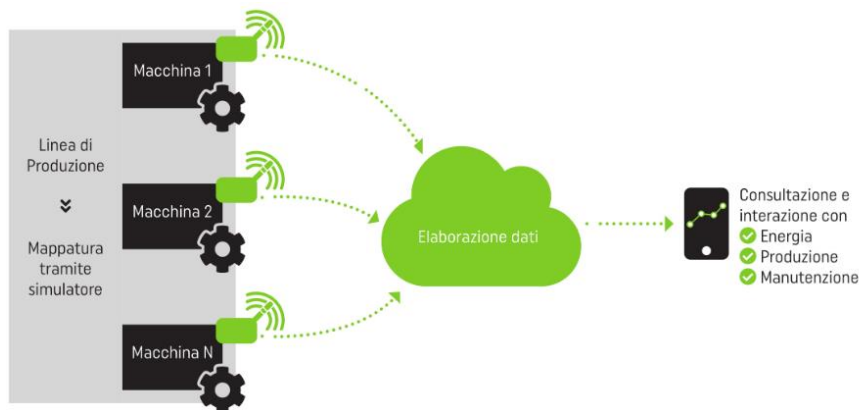
In fact, the company has started to manage processes through a software that allow to optimize processes in the best way, thanks to a fragmentation of customers' orders through a new programming organized by item. The objective is to have a larger number of quantities compared to the same article, which increases the level of product

differentiation. “We base everything on increasing efficiency and reducing processing times because our work, compared to a more ordinary and standardized one, is characterized for more than 60% by single units”.

Paoul is also known for the Integrated System HD&SW EnProMa (energy, production, maintenance), a project launched in collaboration with Politecnico Calzaturiero, which consists of a cloud software, tested on the company, for the monitoring and the improvement of performances in an Industry 4.0 perspective.

The project has received the support of Veneto Region for 50%, and cost around 216.000,00 euros.

**Figure 31: Infographic about the functioning of EnProMa project**

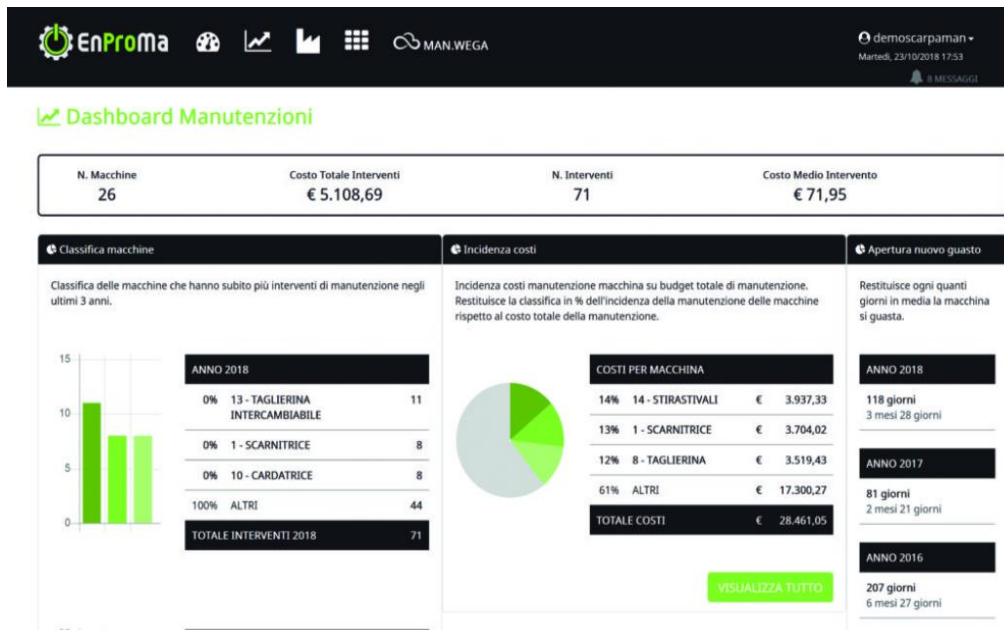


*Source: [www.enproma.it](http://www.enproma.it)*

The software was created mainly for machines that don't have the opportunity to send data. In fact, the biggest problem for a footwear company is represented by machines; a malfunction can be a burden on production.

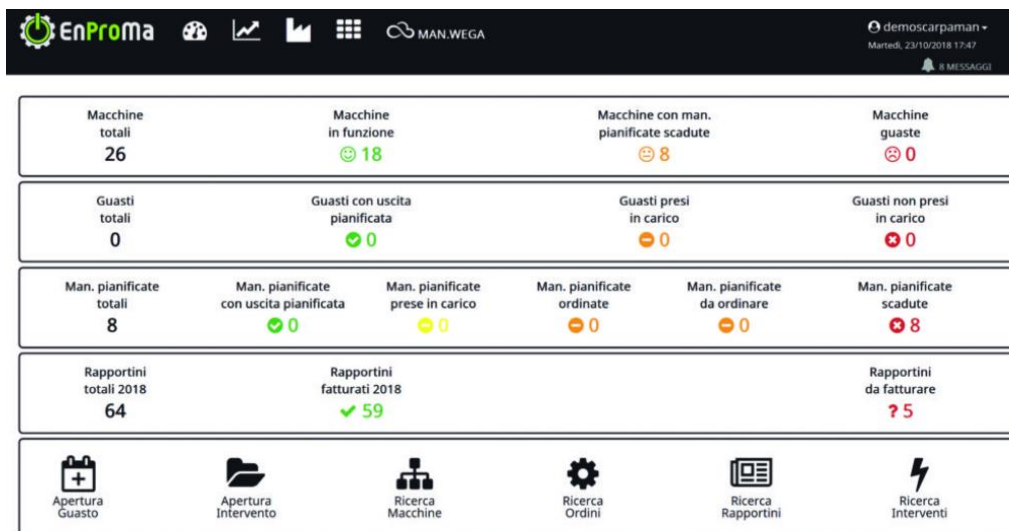
The main activities that Paoul can perform with it are: the use of an efficient notification system for the execution of the maintenance based on machineries' actual times of use; the monitoring and detection of malfunctions; the calculation of energy footprint for each shoe; the simulation of the production line to plan times and resources adequately and to optimize the production process; and the obtaining of significant data about production times every minutes. Moreover, the company has created a direct relationship with maintainers that remotely takes care of maintenance in real time.

Figure 32: EnProMa basic module for the management of maintenance processes



Source: [www.tecnicacalzaturiera.it](http://www.tecnicacalzaturiera.it)

Figure 33: EnProMa basic module for the management of maintenance processes



Source: [www.tecnicacalzaturiera.it](http://www.tecnicacalzaturiera.it)

The aspect of the project linked to Industry 4.0 is that the software uses interconnections, generated by the devices on the machines, for making the maintenance activities digital and for predicting the machineries' operations. Moreover, thanks to the use of PCs or tablets it allows to activate in real time calls, to acknowledge the maintenance company by the barcode, and to open and close interventions.



The results are a reduction of costs, a more efficient control of the fleet, and the possibility to make targeted interventions. The company can also automatically archive all the data, that the platform returns, in interactive dashboards. Moreover, Paoul has been able, by using EnProMa, to reduce drastically the error rate in the production of shoes almost around 0%.

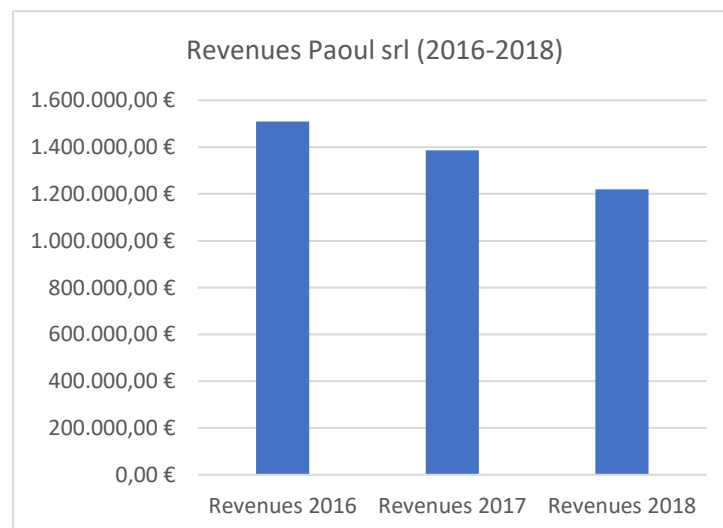
From the point of view of the product we can talk about little innovation. Paoul carries out studies together with its testimonials that reports, according to the evolution of the dance discipline, their requests for products that are best suited to movements.

“Our skills lies in applying the footwear techniques to the demands of the dancers in order to obtain product innovation. We also use the facilities we have close by, including Politecnico Calzaturiero, to do tests” said Katia Pizzocaro.

As regard all these innovations, including management software, are all made available to customers and to employees. In fact, information is shared on the company chat, where all the employees are inserted, so that if someone see something, has a comment to make, or is abroad for fairs or events can published the news in real time.

The whole activity of increasing processes has augmented brand loyalty, so that dealers, who make more than 65% of the company’s turnover, have decided to do businesses only with Paoul.

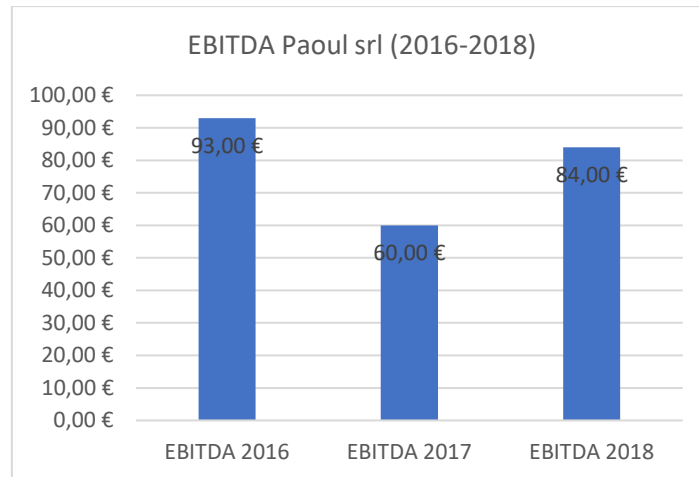
**Figure 34: Revenues Paoul srl (2016-2018)**



*Source: Personal Elaboration based on Cerved data*

However, revenues, as it can be seen from the graph above, have decreased from 2016 to 2018, mainly because the company, having a product already known and widely sold on the market, has focused predominantly on the implementation of innovative projects like EnProMa, and on the redefinition of its business model.

**Figure 35: Paoul srl EBITDA (2016-2018)**  
*Values in thousands of euros*



*Source: Personal Elaboration based on Cerved data*

Looking at the graph, it is observed how EBITDA, despite the decrease in revenues, has always been positive, so much to grow by 40% between 2017 and 2018, demonstrating that the commitment to EnProMa project, and the openness towards innovation proved to be a smart move for the company.

### *Human Capital Area*

Katia Pizzocaro reveals that in their work workers' mental flexibility, that makes process innovation possible, is at the first place. If the operator is rigid, he will inevitably block process innovation.

For this reason, education and training are very important aspects for Paoul. The company resort to internal training, since information is extrapolated from outside and, then, introduced within the organization. Paoul for more than a year and a half has collaborated with a work psychologist who, on the basis of the ongoing changes, has worked to redefine company's mission and vision. The activities for each responsible operator have been defined, and some employees have been identified as responsible for the

management of innovative processes. The results are a perfect division of tasks, that has allowed easier communications, and a better understanding of company's ultimate goal. "The competence is in here, even if a consultant comes to bring me the competence inside the company, the skill must remain in here" states Katia Pizzocaro.

Moreover, in 2016 the Paoul Academy was established with the aim of bringing expertise and competence especially to the company's retailers. In this way, everything that is learned remains inside the company, even if is transferred to retailers as a training medium.

Paoul is implementing this strategy because, having the company more than 50 years, and having face several generational passages, it has to clash with an Internet information learning that happens at the speed of light, since the average customer wants to get information in a few seconds.

All this cannot happen without a flexible owner, argues Pizzocaro. In fact, if the owner doesn't change the company remains anchored to the past.

### *Strategic Area*

Innovations have led to effects in all respects. Firstly, Paoul has been able to enhance delivery speed and to become more rapid and punctual thanks to a planned and well organized activity. If the efficiency of the processes is continued, the processing costs are reduced and delivery speed increases. This has improved the relations with Paoul's suppliers. Moreover, the company has reduced the response times by responding to customers' needs in real time.

Being Paoul perceived as an innovative organization within the district, it has ensured that its suppliers and customers have perceived this. "Within the district you are confronted with realities that are technology oriented, like Politecnico Calzaturiero that is a development laboratory. Being part of this group, customers have the perception that the organization is innovative because it offers a service that others don't have" states Katia Pizzocaro.

As regard the project EnProMa, Katia Pizzocaro sees it as a project that remains primarily within the company, because it has brought an increase in efficiency that is mainly seen by company's workers.

Surely, these strategic moves have allowed the company to differentiate itself from its competitors, especially those overseas, who have begun to copy its business model and to work with different costs and times. In fact, thanks also to the marketing and communication of a well-studied product, in August of this year, Paoul has learnt from the competition that it has obtained the recognition of a top product in the world in terms of quality, even if the price of their shoes is high. It can be said that Paoul shoes are universally recognized as the Ferrari of dance.

The predominant mentality regarding new technologies and innovation is summarized by the words of Katia Pizzocaro “We can do much more: there are many things to develop and, therefore, if you have limited resources in terms of people, you have to understand how to move to make the most suitable choices for the company”. In fact, once the need to innovate is perceived, or the idea arises following a conference or professional updating, the company obtains important information that is discussed by managers. If the innovation is considered efficient, it is activated once programmed at the budget level.

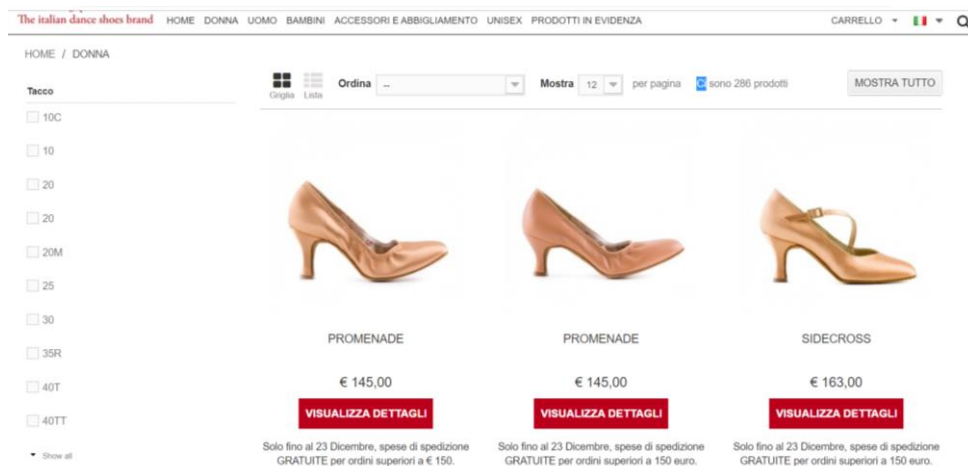
With regard to the future, Katia Pizzocaro is of the idea of continuing to bet on technology because a company that doesn't innovate is a company that is destined to fall more and more. However, for Paoul human relationship still appear to be predominant: technology must be present, but the real success lies in people.

To date, Paoul aims for the improvement of its own e-commerce platform, created in 2013 but not upgraded until now since the company's priority was to spread the brand, to have an electronic store that is open all over the world. With regard to the theme of sales, the e-commerce has given support to company's turnover by constituting the 5% of it.

“Direct relationship is the most rewarding in all forms: for the customer, who feels completely followed, and for the company, that manages to close orders faster. Testimonials, usually the best dancers in the world, who are the first to travel wearing the brand and the first to spread it, are willing to buy the product online, but firstly they require to see and put on it in order to test its fit. [...] E-commerce becomes something colder, but on the other hand more rapid, concrete, practical and useful” affirms Katia Pizzocaro.

The idea is that of giving customers the confidence in the brand, through testimonials, to make them decide to turn to online sales. The e-commerce platform mustn't have obstacles in terms of shipping costs, accessibility, language exc.

**Figure 36: Paoul srl e-commerce page web**



*Source: www.paoul.com*

E-commerce becomes fundamental since the company has been able to open a resale concession in Moscow, is following the opening of a second one in Beijing, and is working with the most prestigious dance schools in Japan, United States, Canada, Korea and other countries.

Moreover the organization is included in the list of companies, together with Politecnico Calzaturiero, Fondazione Univeneto, Consorzio della Moda of Verona and Confartigianato Veneto, that have adhered to the RETE FACE DESIGN, an operational plan drawn up for the years from 2017 to 2020, whose objective is the improvement of the realities that operate in the most important representative fields of Made in Italy. The action of the RETE develops in 2 distinct directions: a multisectoral and transversal action aimed at promoting the presence of the companies in an international market with the development of new strategies, systems, services, products and mode of communication; and a vertical action within the various production chains with the aim of promoting the investments in R&D, technologies, innovations and human capital. The new digital technologies are then used for promoting new value chains and business models.

## 2.2 Del Brenta srl



### *Made in Italy Area*

Del Brenta srl was founded by Giorgio Polato in 1968 in Fiesso d'Artico, in the province of Venice, and was specialized in the production of heels.

In 2001 Luciano Polato, one of the three sons of the founder, took over the company closing the existing plant in Fiesso d'Artico, and opening its new headquarters in Vigonza, in the province of Padua.

The company's business has remained unchanged, in fact, to date, Del Brenta deals with the creation of heels, wedges and platforms for women' shoes.

**Figure 37: Phase of heels production process**



*Source: [www.delbrenta.com](http://www.delbrenta.com)*

Since 2000 the company is continuously renewing: the excellence of the service and the continuous investment in advanced technologies allow Del Brenta to work with district's shoe factories, to be an important partner of national and international footwear brands,

and to create a competitive advantage over its competitors thanks to the offer of always new products.

The channels that Del Brenta uses to self-promoting are fashion fairs, like LineaPelle and Micam in Milan, and feedback from loyal customers in order to attract other potential clients that want to find a serious company.

“Our task is to carry out in a workmanlike manner what every stylist has in mind. To do this we try to fully understand his person, needs and sometimes even his secrets” these are the words with which the CEO defines the company.

The most important activities are R&D and production. Del Brenta, in fact, operates in a B2B (business to business) logic with the shoe factories of the district and the most important fashion maisons. It offers the service of modelling, thanks to the hands of expert artisans, and supports designers in the choice of existing or customized heels, thanks to consultants’ experience and to the wide availability of models ready for sampling and production.

Del Brenta was able to catch the opportunity to address the needs of large group customers like LVMH and Kering, that are, continuously, searching for quality, control and efficiency in the production processes. Due to its perseverance and dynamic capabilities it has now loyal clients like Prada, Yves Saint Laurent, Gucci, Balenciaga, Givenchy, Vetements.

The targeted clientele of Del Brenta has prompted it to continuously raise the quality level of its products and services also thanks to innovation.

To date, the organization is a development and production pole of more than 3500 mq with 49 employees, and a turnover of 9.86 million of euros in 2018.

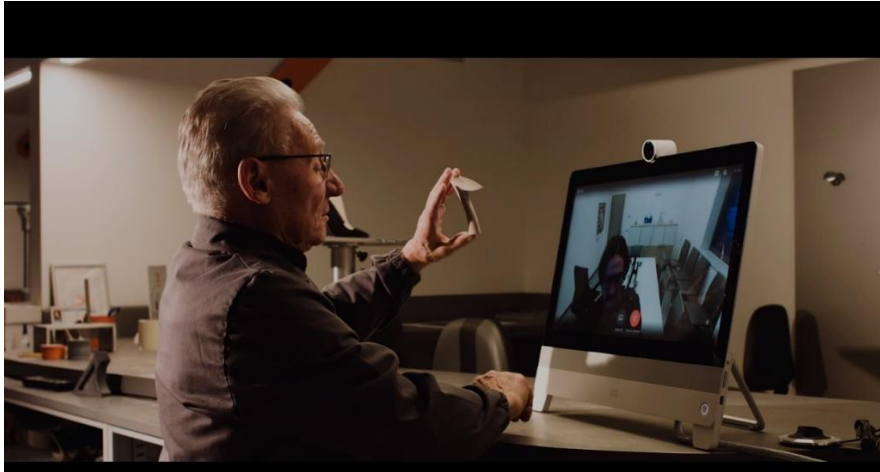
### *Technologies area*

“We can say that one of the mission of Del Brenta is innovation. As a mental approach there is an orientation to Industry 4.0” says Stefano Bezzon, the head of innovation of the company.

Del Brenta has always been innovative, in fact, it had its first 3D printers and 3D scanners over ten years ago, and Luciano Polato was the first, in the district, to create a laboratory area in which modellers can work with the designers 4 hands to create prototypes. “For us what is interesting is to lay out a level of digital over the manual process to make it

accessible from anywhere in the world, and to make it more efficient in order to help customers to be even faster in the realization, and to release of their projects” states the head of innovation.

**Figure 38: Relation between tradition and innovation**



*Source: [www.delbrenta.com](http://www.delbrenta.com)*

“Innovation for us is doing something, maybe even just using paper, which allows us to travel roads that no one has travelled before. When these roads can lead to a competitive advantage for the company, we follow them” states Stefano Bezzon.

Having the company this inclination to innovation, and having the desire to become more efficient and performing, the owner thought that his innovative vision could be applied to interconnections with customer and suppliers. The main objectives were to increase the competitiveness of a company that manage a “mature” product in an innovative way, and to differentiate from competitors.

Luciano Polato has decided to adopt Cisco Webex Teams, a technology that would be beneficial to the entire company, becoming the first Italian footwear company, and among the first manufacturing companies in Italy, to have adopted this platform. As proof of this, organizations like De Rigo, Sit la Precisa, and Air Dolomiti have visited Del Brenta to see how it has increased its efficiency and its business.

“Innovation is having approached a process of change, that many companies are already experiencing, in an innovative way” said Stefano Bezzon. On Cisco Global homepage,



next to Tim Cook, who is speaking with the CEO of Cisco, there is a screen that shows the Del Brenta business case.

We speak, therefore, of process innovation because the product, apart from some cases, remains the same due to the resistance of brands with blazoned names that are very tied to the concept of tradition since luxury product is perceived as a handmade product, linked to history and culture. Moreover, the production phase is highly artisanal, because it is based on the work of blocks of resin, a material that is very easy to shape, and enables to control in real time how the heels is developed.

Cisco Webex Teams can be defined as a “professional WhatsApp” because it allows to communicate in a safe, very fast, and informal way, freeing from the use of e-mail or face to face contacts that are normally slower, formal, and often resulted in lost or missed communication. The application can also be used on the computer to have a reliable enterprise platform, as there are a number of security and message encryption criteria.

It allows to make video calls, audio calls, send messages, create group chats, share files, sketch out ideas, and do interactive drawing and white boarding from phones, tablets or the Cisco Spark Board without changing rooms or interrupt calls or meetings. The Spark Board, that is a touch-based all in collaboration device, constitutes a facility since it allows to have a very large screen that facilitates the drawing with the use of a digital pen, to make presentations, and to keep in touch with some suppliers, that aren't in the vicinity, who can write on it in real time with their mobile phones or computers.

The Spark Board of Del Brenta is the second in Italy, demonstrating the fact that the company aims to be competitive, and to offer a service hardly attainable by competitors.

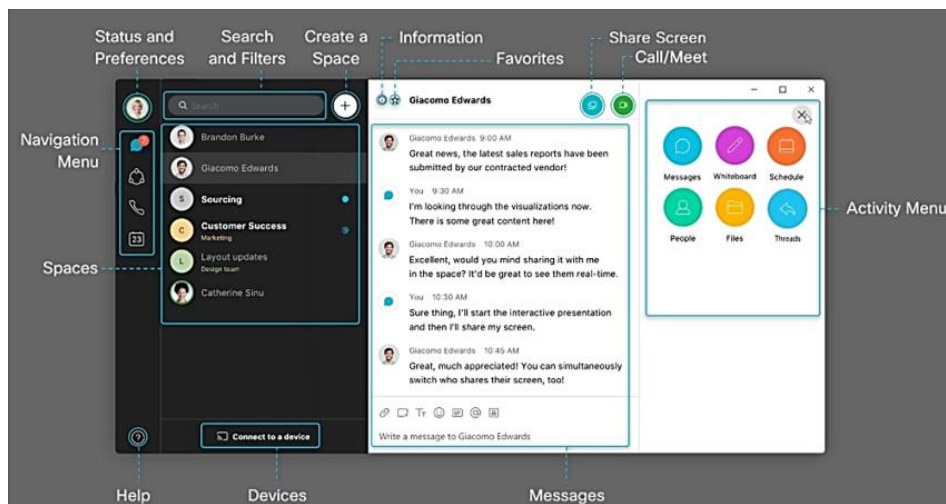
**Figure 39: Spark Board operation**



*Source: [www.delbrenta.com](http://www.delbrenta.com)*

Del Brenta has computers installed in each department with the Cisco application set up on them, so that employees can make calls to each other. Moreover, the system has been strengthened thanks to the use of an App. The App works as a catalyst for change and is used to manage the whole company, thanks to a unique way to communicate that has created a neural network among people.

**Figure 40:Representation of Webex App**



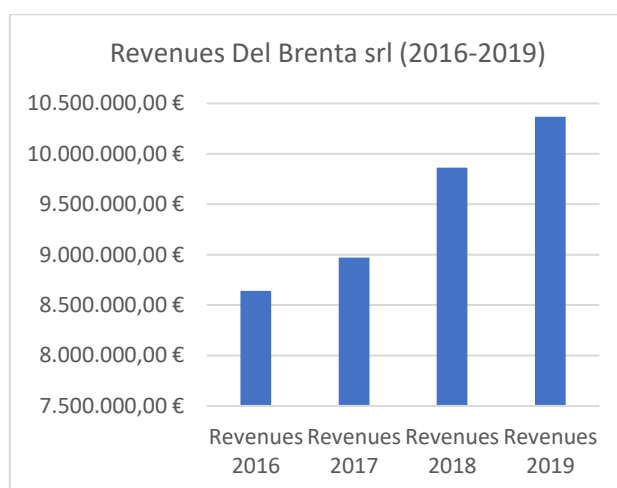
*Source: www.help.webex.com*

The main functions of the App are five: meetings because it allows to reunite people from all over the world for a continuous collaboration through the use of any device; messages because allows to send messages and share files in real time with the members of the team; callings because allows to make calls and videocalls in every moment from and to every device; share of files because the screen is shared and people can talk with each other in real time with the webcam; and whiteboarding because the company has installed digital whiteboards that allows the members of the team to share their ideas by drawing simultaneously on the digital board, even remotely, and to modify the drawings in real time to have immediate technical feedback.

Although it is a fairly simple communication method, the App has allowed to have a much more precise and accurate corporate governance: everything that happens is transmitted in real time, and this allows to quickly react and understand the processes' change in a much more efficient way.

“This technology, however simple, has been fundamental: it has changed the way we work, we have realized that we are among the few” says Stefano Bezzon. In fact, it has proved to be beneficial for the entire organization bringing important advantages by modifying the internal communication system, and, also, the management of the internal processes. Moreover, Webex Teams allows the company to increase revenues by more than 10% every year. Del Brenta’s EBITDA has always been positive and high, and, as can be seen from the graph below, there has been a growth from 2016 until today. Between 2018 and 2019 there was a growth of 19%, that shows that the company is following the right path.

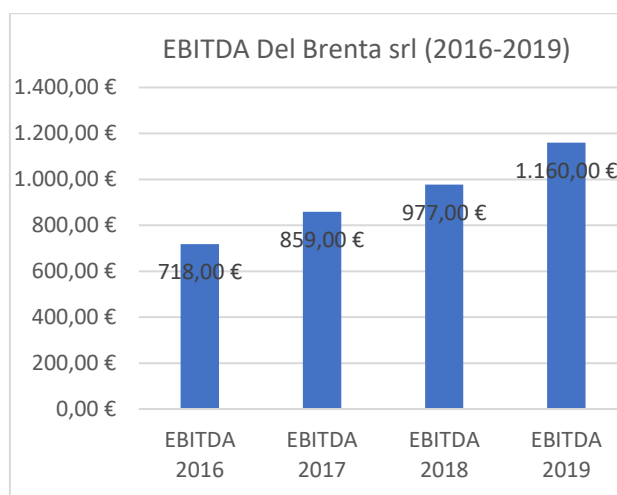
**Figure 41: Revenues Del Brenta srl (2016-2019)**



*Source: Personal Elaboration based on Cerved data*

**Figure 42: Del Brenta srl EBITDA (2016-2019)**

*Values in thousands of euros*



*Source: Personal Elaboration based on Cerved data*

### *Human capital area*

Del Brenta being a small company with 49 workers, somehow had to train its employees on the use of Cisco Webex Teams.

“We have organized small in-house sessions to learn how to use the technological part of the collaboration platform. With regard to the changes in company’s processes, we always did in-house training sessions” said Stefano Bezzon. In fact, all the training activity takes place within the organization since the roles most related to technological innovation didn’t require external training, and the learning process is quite simple.

However, remaining faithful to the district shoe tradition, a large proportion of the codesign and R&D activities has important manual skill elements that the company considered wasn’t advantageous to upset, because its vision envisages that the design phase can’t be replaced by any technology.

Therefore, Del Brenta’s workers already have knowledge concerning the functioning of machines, and the different processes that must be accomplished to realize the final heel. Most employees, both young and old, attended the courses of Politecnico Calzaturiero, so that, consequently, they have already been trained.

### *Strategic Area*

Undoubtedly Del Brenta has achieved clear improvements at the level of its business model, subsequently to the adoption of Cisco Webex Teams.

As regard the competitive strategy, the company tries to be the most unique player on the market by providing value added services to customers. “Del Brenta [...] concerning the management of projects’ birth is more efficient than other companies, and this is a determining element for customers” claims Bezzon.

An improvement in the competitive strategy has allowed the company to perform better, and to be more efficient than their district and national competitors. Del Brenta, in fact, doesn’t need to keep pace with them, but it need to be always be one step ahead by offering customers a completely different, technological, fresh and innovative service to attract their attention.

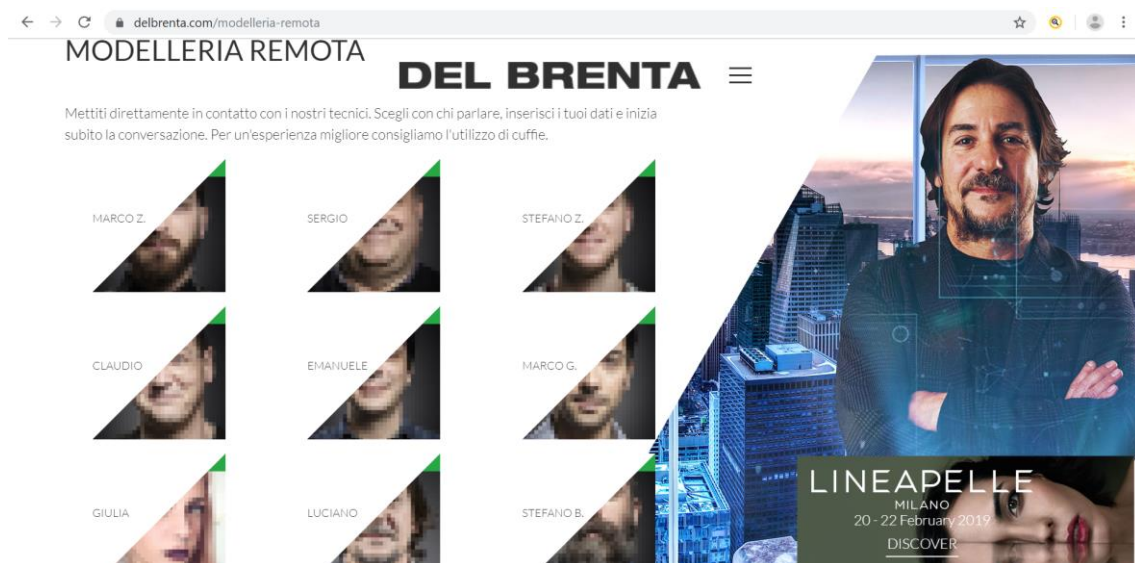
The key word for success, in this case, is differentiation: being the company part of a sector that is quite mature from a product standpoint, where the production of the heel can’t be completely revolutionized, the objective is to be different because the

management of the things is more efficient. This is the winning strategy that lead customers to choose the company over the others.

“Sometimes we have also worried about not appearing too good, and we have also wondered if these technological innovations could frighten the customer”.

On the contrary, customers have realized the benefits they have, in the first place from the way the company has proposed. Firstly, this method of communication is so fast and immediate that a part of them has started to use it. Secondly, customers have the possibility to access to the company’s modelling also remotely. They can get in direct contact with the different Del Brenta’s technicians via webcam, through the company website, to obtain a real time modification of the product. There is the possibility to send files and get updates even when the stylist is drawing his project on the interactive whiteboard.

**Figure 43: Del Brenta srl web page**



*Source: www.delbrenta.com*

“The production process is traditional and there is no intention to change it, but we have to put a digital layer that provides access to that process in an innovative way”. Tradition and innovation overlap on different levels and put themselves at the service of creativity, which, thanks to technology’s advantages, can be expressed without any limit. If there is an issue with how a heel fits or looks, customers can speak with one of the modellers and change it in real time, without any travel or cumbersome email chains, and they can build

the prototype together with the company, so that they can work hand in hand with the artisans to ensure that the final product is exactly as they want.

These changes also permit the company to serve a lot of time. By giving them a way to complete the process in just minutes and in a virtual way, Del Brenta saves customers an entire working day and the travel costs.

For example, stylists who travel the world can call the company from abroad and unlock a project. If the remote modelling didn't exist they would have to personally go to the company, the project would have been released weeks later, and thousands of pairs couldn't be produced and generate income. We talk about efficiency: the possibility of guaranteeing access to international stylists and designers, by enabling the other partners in the supply chain to use the same mechanisms, means starting a projects couple of weeks earlier of what would normally happen.

Del Brenta has also improved the relations with its suppliers, which are increasingly included in the design phases, since they can see if there is the necessity to make changes, they benefit from faster and more accurate information, and they obtain shorter delivery times. The time to market for projects has dropped because the approval of the processes can be done remotely.

Moreover, this efficient communication system has decreased the risk of mistakes in the manufacturing process greatly. Before Cisco Spark, Del Brenta has a 10% error rate with its molds, but now it has reduced it to about less than 1%.

Despite these results, the fundamental rule that is followed by the company is: "Nothing is done because it is fashionable, it must be done, or you want to appear. We never fall in love with a change or technology because we like it. We always give ourselves the rule of 2: every change that we ask to ourselves and our colleagues must have at least two reasons and must be simple". Digital innovations must therefore be faced using the head because technologies, even though initially profitable, may lead to disadvantages in the long-run, limit companies' investments in new technological innovations, hinder processes that are already performing, and cost a lot.

As regard future trajectories, Luciano Polato, the owner, and Stefano Bezzon, the head of innovation, are of the idea of continuing to bet on technologies without falling in love with them. To date, there is a project linked to management and maximization of

processes and production scheduling. Thanks to the use of a software, that communicate with the ERP and machines, the company would identify malfunctions, perform predictive maintenance thanks to the possibility to make automatically or semi automatically corrective actions, or notify them directly to external technicians.

In this way, in the event that scheduled or extraordinary maintenance are necessary and the machine isn't available, production is reprogrammed to optimize processes.

As regard the organization of work and of the warehouse, Del Brenta will adopt this logic not because it is fashionable, but because it believes that in the footwear reality there are some very interesting ideas that could create high competitive advantage especially in terms of response to the market.

## 2.3 Calzaturificio Baldan 88



### *Made in Italy Area*

Calzaturificio Baldan 88 was founded by the brothers Rino, Giuseppe, and Giorgio Baldan in 1948 in Fiesso d'Artico, near Venice. The company from the beginning stood out for the production of women' shoes, specializing through the years in the luxury segment.

In 1988 the founders' sons Andrea and Massimo took over the organization, and have continued to manage it with the same vitality and momentum of their parents, but with an eyes also to the future. To date, Baldan 88 produces shoes for international fashion brands like Yves Saint Laurent, Bottega Veneta, Christian Louboutin, in addition to the production of shoes with its own brand, which is registered. With regard to the latter, the company has specialized in overseas sales, especially to Russia and Arab countries.

Later this year, Baldan 88 has choose to place its own brand on a very high segment of the market, and to sell its own brand shoes online by withdrawing from business to business (B2B) relations, and moving to business to consumer (B2C) relations.



**Figure 44: Baldan 88 own brand**



*Source: [www.baldan.it](http://www.baldan.it)*

The owners have also opened a showroom in Milan, to be more in contact with international customers, and to exhibit their shoes.

“We have a high quality Made in Italy production, in the sense that all production processes take place either within the company, or within the Veneto region” affirms Pietro Simonato, the council member of Baldan 88. The company, in fact, relies on external organizations to obtain some components of the shoe, that will then be assembled for the realization of the final product.

The channels that the organization uses to self-promoting are fashion fairs like Micam in Milan, in which it participated in October with its own exhibition space, and feedback from stylist and loyal customers.

To date Baldan 88 has 70 employees, many of them under the age of 35, and has a production of about 400 pairs of shoes per day. In 2018 it had a turnover of 1,6057 million of euros.

### *Technologies Area*

The company has decided to invest in new technologies in recent years, although it is the bearer of the values, techniques, and experiences of its founders.

We talk about process innovation, since the product must remain as natural as possible to respect the standards of the district, and of Made in Italy.

In the last few years, Baldan 88 has equipped itself with technologically advanced and computerized machines, that, however, aren't interconnected with external realities. “We

have invested in this aspect, but we have understood it as a technology for our company, not as a technology to access other resources” states Pietro Simonato. Consequently, they don’t dialogue directly with the entire production process, but they converse with other systems.

Baldan 88’s first investments in technology were made to adopt CAD software. To date, the company has two CAD workstations for prototyping and programming. This technology has been integrated with specific cutting machines to perform the prototype phase at its best. Unlike so many others, the company didn’t consider 3D because, as stated by Pietro Simonato, it is not necessary for the organization right now.

The organization is also known for Integrated System HD&SW EnProMa (energy, production, maintenance), a project launched in collaboration with Politecnico Calzaturiero that consists of a cloud software for the monitoring and improvement of performances in an Industry 4.0 perspective. Unlike Paoul srl, the other company that took part in the project, Baldan 88 is still in an experimental phase of EnProMa, and hasn’t yet fully developed it.

**Figure 45: Infographic about the functioning of EnProMa project**



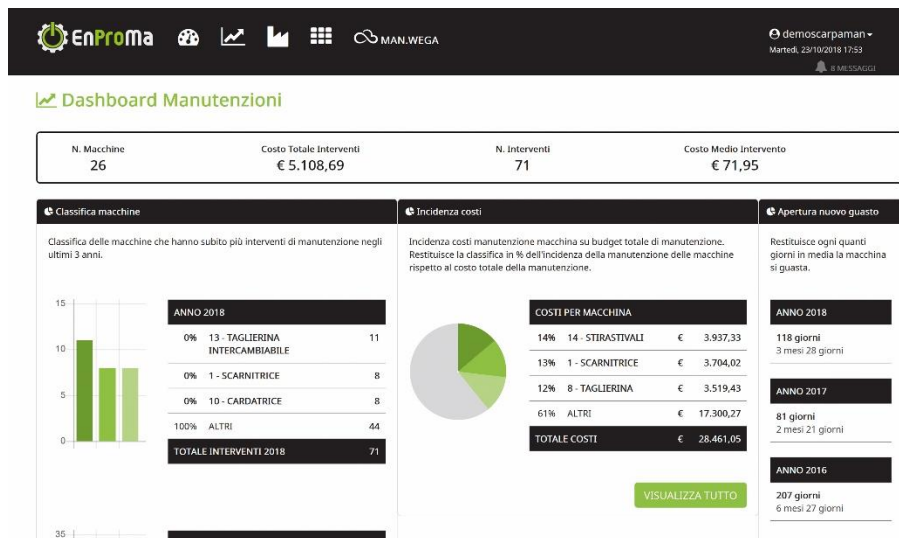
*Source: [www.enproma.it](http://www.enproma.it)*

The software was created mainly for machines that don’t have the opportunity to send data. In fact, the biggest problem for a footwear company is represented by machine; a malfunction can be a burden on production.

“With us, EnProMa works like this: we manage all the machines that are included in this program. Until recently, maintenance was manually managed, while everything now takes place online” explains Pietro Simonato.

There is no doubt that Baldan 88 has benefited from this. In fact, as soon as the problem occurred, a call is made to technicians, who know in real time what intervention they must do, and on what type of machine. “There should be no longer the call phase; everything happens automatically online”. Consequently, the control of the fleet is enhanced, the interventions are tracked, and there is a reduction of the maintenance costs. Moreover, the company can scheduled maintenance: technicians can program annual interventions, then the system alerts if it hasn’t been done on the scheduled date, or if the date approaches. This is possible thanks to the use of PCs or tablets that allow to activate real time calls, to acknowledge the maintenance company by the barcode, and to open and close maintenance operations.

**Figure 46: EnProMa basic module for the management of maintenance processes**

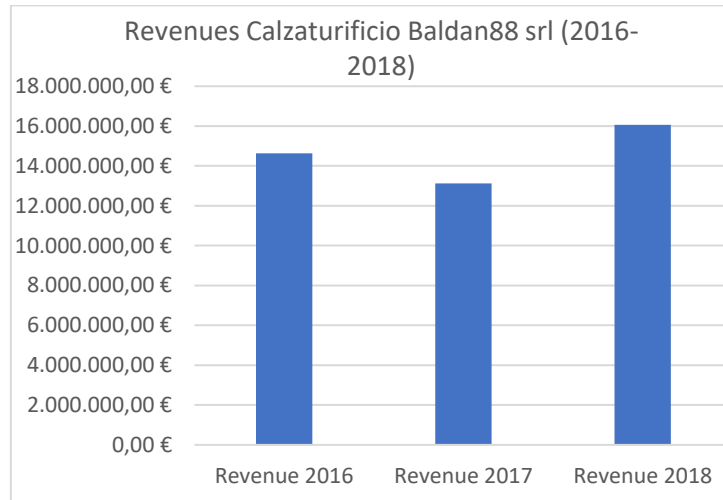


Source: [www.tecnicaalzatueria.it](http://www.tecnicaalzatueria.it)

In this way, employees can have a complete view of the fleet, that allow them to understand if machines are suitable for a specific process. The company can also automatically archive all the data, that the platform returns, in interactive dashboards. Baldan 88, being still in an experimental phase of certain projects including EnProMa whose completion should take place within a few months, expects to achieve costs reduction, a much more streamlined process, and a much more organized job, with a consequent increase in productivity and efficiency.

Although the company has not fully yet implemented this new project, it can still be seen that between 2017, the year of the launch of EnProMa, and 2018 revenues have sharply increased, demonstrating the benefits that Baldan 88 is obtaining from the adoption of services for the predictive maintenance and monitoring of the fleet.

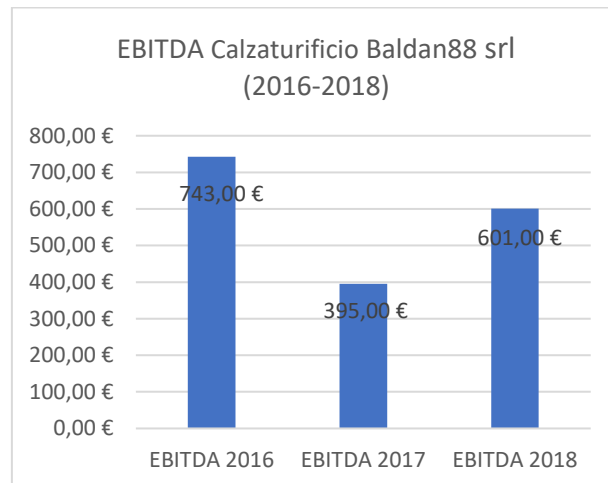
**Figure 47: Revenues Calzaturificio Baldan 88 (2016-2018)**



*Source: Personal Elaboration based on Cerved data*

**Figure 48: Calzaturificio Baldan 88 EBITDA (2016-2018)**

*Values in thousands of euros*



*Source: Personal Elaboration based on Cerved data*

Profitability has always been positive, in fact, looking at the graph above it can be seen how, despite a drop between 2016 and 2017, the following year there has been an increase

of 52%, due to the fact that the investment in new technologies was convenient for the company.

### *Human Capital Area*

Pietro Simonato, speaking of Baldan 88's activities, reports that training is essential to ensure company's survival.

The owners have decided to invest on new figures over the past few years, following the decision to open the company to new technologies. "Training on these new technologies is fundamental for us, workers must have the necessary knowledge" states Simonato.

We are talking about a productive activity that has inherited the old techniques typical of the modellers of a certain age. At the same time, the environment with which the company has to interface is completely different than in the past, and also shoes are different.

In this case the generational interchange becomes increasingly important. Baldan 88 is equipped with an internal modelling where the techniques of craftsmen are evident, and are combined with the knowledge of new technologies like CAD software, or of other innovative machines to support production. "These two aspects interact very well" explains Simonato.

The company, for this reason, has started to invest heavily on young people and new working figures by creating internal training programmes to spread knowledge of footwear and of digital world, and by activating collaboration with Politecnico Calzaturiero, whose courses are aimed at training the future workers of the sector. "Young people are our goal, we have made them grow internally" affirms Simonato.

### *Strategic Area*

Innovation has surely led to changes within the company, especially as regard modelling and the prototyping phase. "Technology has opened us a scenario that before was impossible to have in terms of numbers and timelines" states Simonato.

Being equipped with the support of a new technology, Baldan 88 has been able to quickly satisfy the brands' requests as regard the creation of samples for fashion shows, or of prototypes. In fact, fashion designers, who must realize shoes for the new collections or shows, come to the company to request that samples be made quickly; many times, however, they change their mind and ask for modifications in a very short time. "Having

a cutting edge technological system, we are able to have very fast timelines” affirms Pietro Simonato.

The company adhering to EnProMa, although still in an experimental phase, has already obtained the first benefits. Machines are more controlled, there is a reduction of error rate in the production process, and delivery times shorten sharply since technicians don’t have to wait for a long time to make interventions.

Consequently, the company is starting to see an increase in the level of productivity and efficiency, also due to a higher customer loyalty, and stronger relationships with brands. Even as regard suppliers, the relationship has improved. The ability to manage online maintenance in short times has made the company appear trustworthy in the eyes of them. This strategy has, therefore, allowed Baldan 88 to distinguish itself from district and national competitors that make the same type of shoes, but aren’t yet turned to new technologies. As specified above, top fashion house have started to recognize the superiority of the production process, and have decided to entrust Baldan 88 with the creation of a part of their collections.

Based on these findings the company is of the idea to continue to invest in new technologies which are seen as a support to manual processes.

However, as it shines through the words of Pietro Simonato, craftsmanship is a tradition, is a way of making, and the core of Baldan 88. “Machines can’t be used to produce an entire shoe. Prior there is the man, then innovation arrives”

Innovation is definitely needed because processes must be integrated, and because it allows to obtain numerous advantages. But, at the same time, “the hand is always the hand”, which is why, to date, there is the need for people who are competent in both areas.

To date, Baldan 88 has the future goal of investing in an electronic former since shoes, when are assembled, need molds, that are pieces of resin, that reflect their shape. However, molds are heavy and there is the need to distinguish them depending on the type of product; consequently their management becomes dispersive, and times get much longer.

For this reason, the company will invest to have a computerized former in which moulds can be stored, in order to know how many of them are in the shoe rail, and to plan the production, using them only when are required.

**Figure 49: Example of an electronic former**



*Source: <https://www.newlast.com/chi-siamo/>*

Moreover, Baldan 88 is implementing its own e-commerce platform, thanks also to the development of a dedicated website. Inside the company there is a department devoted to online sales with well-defined and competent figures. “E-commerce will be the evolution of this last year since we have invested a lot in implementing it” explains Pietro Simonato. The online sale will also be supported by the company’s showroom in Milan where finished shoes can be shown in real time to national and international customers via web. The e-commerce platform mustn’t have obstacles in terms of shipping costs, accessibility, language, and, for this reason, would allow the company to reach more and more customers, including international ones, with its own brand.

Finally, there is the will to fully implement projects, that have been adopted on an experimental basis, to make the company more competitive on the market.

### **3.0 Digital transformation in the Riviera del Brenta: a merge between tradition and innovation beyond product and processes**

The examination of case studies has made it possible to have a clearer picture of companies' motivations behind the decision to embark on a digital transformation path different than the trend of the Riviera del Brenta district, which boasts a millenary manufacturing tradition. Analysed organizations, although they fall into the category of small enterprises by number of employees and turnover, are driven by a strong orientation towards innovation, unlike many others in their branch.

There is the need to make a premise. The world economy has been revolutionized by the Fourth Industrial Revolution which has led to the development of increasingly efficient technologies that have completely transformed organizations' activities. The traditional factory mutates and becomes Smart: automated and intelligent systems control business activities and operate in contact with the surrounding environment. In this new context man is still present but not strictly necessary as it was previously.

Looking at the Italian case, the existing literature highlights how it is necessary that our manufacturing sector embraces digital transformation, keeping though the artisan side of production alive, since the value of Made in Italy production is based exclusively on the know-how and mastery of craftsmen. Statistics show how manufacturing SMEs, that have decided to open their doors to digital by investing in different types of technologies, depending on the sector in which they operate and on the product they offer, have obtained positive results such as increase in turnover, improvement of customer service, and product diversification.

To date, however, there is the need to stand out and to be more performing than competitors, since the use of technologies has become more democratic and has allowed their diffusion on a large scale, reducing the competitive advantage that many organizations had managed to achieve.

An example of resourcefulness is provided by the analysed Riviera del Brenta companies, that have been able to distinguish themselves for a reasoned and sophisticated use of technologies. But why are we talking about a "sophisticated usage"? The answer lies in the decision to take a different road, than the custom, and to lay the foundations for the



creation of a Smart Factory with an unmistakable “Italian touch” found in the production phase, still very tied to footwear masters’ traditional techniques.

Obviously we can’t speak of a totally connected factory in the proper sense of the term for none of the three realities. However, the winning move is represented by the investment on the integration and interconnection of all those processes that take place daily within the organization, and which affect indirectly the production process, such as communication and maintenance of machines, thanks to the adoption of advanced technological solutions. Cisco Webex Teams uses interdivisional communication to obtain a faster and more efficient product creation process and to speed up all business activities. EnProMa focuses on the monitoring of operations and on predictive maintenance of machines to avoid possible slowdowns in the production cycle and delays in delivery.

With a view to constitute a reality in which all processes are connected, organizations have started to use their website to favour the integration of their commercial functions with production processes. From the remote modelling of Del Brenta, to the e-commerce platforms of Paoul and Calzaturificio Baldan 88 the world of luxury footwear is being digitalized.

### **3.1. Enabling factors for the digital transformation**

Companies, as we have seen, are driven by the desire to differentiate themselves from competitors, and, consequently, they have based their strategy on actions at the level of the organization in its entirety, and not at the level of individual processes. Usually this approach is adopted by large organizations that operate in completely different sectors from that of luxury footwear.

The ultimate goal is to create a more connected factory to obtain advantages that can benefit productivity, and to eliminate the inefficiencies related to possible machines’ downtimes, slow communication between divisions, and long response times to customers and distributors.

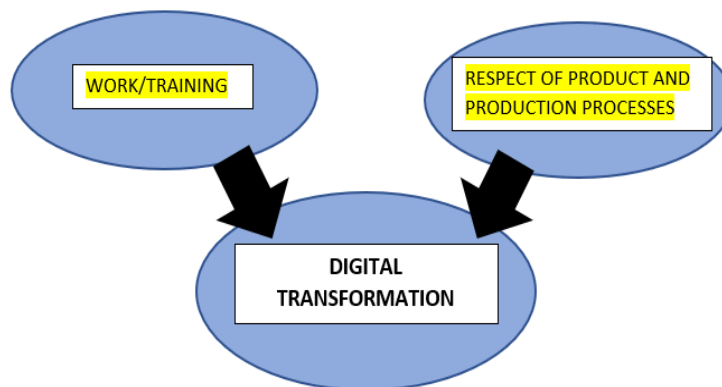
Organizations, in pursuing this strategy, had to put in estimate the possibility of losing the artisan nature, that has always distinguished their products and has assured them world

renowned customers, due to an excessive investment in technology which, over time, could also be found not profitable.

In the implementation phase of Cisco Webex Teams and EnProMa, the first results have emphasized how these fears were unfounded. The artisan component has remained predominant in the organizations, so much that it has represented one of the enabling factors for the continuation of companies' digital transformation.

As can be seen by the infographic below, the cross sectional analysis of the Del Brenta, Paoul, and Calzaturificio Baldan 88 has identified two main factors, common to all organizations, which fuelled their digital transformation: respect of product and production processes, and work and training.

**Figure 50: Enabling factors for the digital transformation**



*Source: Personal Elaboration*

### ***3.1.1 Respect of product and production processes***

The branch of luxury women' shoes, as seen above, owes its success to the human component, especially to model makers, custodians of techniques, traditions, and knowhow, whose hands create real works of art. The three companies, consequently, had the need to maintain both products and production process as tied to tradition as possible. The footwear sector offers examples of realities that have followed a completely different strategy compared to the analysed organizations. Adidas, for example, has digitized the entire sneakers' production process, and has started to make shoes with innovative materials thanks to the use of nanotechnology. Other organizations have invested only in advanced solutions for the production process, like Calzaturificio Fratelli Giannini which

launched digital glasses, equipped with a micro camera, that capture the actions of workers in real time to increase production process's efficiency.

However, acting solely on the product by making it completely with new materials or with the use of digital techniques, doesn't prove to be a winning choice. Stylist, who request Del Brenta's heels, want them to recall in their forms the skill of modellers' hands and their knowledge. The same goes for dancers who expects from Paoul elegant shoes that allow fluid movements, and recall the unique style of Italian manufacturing production. Calzaturificio Baldan 88, taking advantage of both its own brand and of sales to major fashion houses, and having to sell also on foreign markets, must create shoes whose features preserve the typical design of Made in Italy products.

Equally, even the complete digitalization of the production process is no longer the best strategy. Analysing the production chain of the three organizations, it can be seen how, anyway, they have introduced technologically advanced machines in the last five years to avoid certain repetitive tasks, and speed up some stages of the production process.

Del Brenta, in fact, has already adopted 3D printers, numerically controlled machines, automatic millings, and mold making machines for years, Calzaturificio Baldan 88 and Paoul have turned to other technological machines, since 3D wasn't in line with their objectives. These technologies are perfectly integrated with manual work but, making production depended only on the fleet sacrificing completely the human component, would damage the quality of the product. This choice could lead to problems in terms of products' colours, sizes, and characteristics that, from a PC or digital machines, would result different to human eye compared to how they would be in reality.

Therefore, Cisco Webex Teams and EnProMa have been implemented by companies as they enable to protect the product creation process, which continues to be carried out by model makers, and to safeguard the "poetry" of Made in Italy and the ability to make of shoe masters, that are much more worthwhile than any software or 3D technology.

The tendency to invest on processes not directly visible to consumers, but which certainly will have a great influence on the quality of their buying experience and on the value that they give to the product, it can be said that is making its way.

### **3.1.2 Work and training**

It was ascertained that companies' will is to maintain the product and the production processes as natural as possible, so as not to lose their competitive advantage. The transition to a more connected factory has raised doubts with regard to the role workers would play in the organization. Companies couldn't afford to lose the source of their success in favour of automation. Cisco Webex Teams and EnProMa certainly require the presence of competent figures who know their mode of operations, but, simultaneously, run automatically some functions that were previously performed by workers.

Contrary to what usually happens in companies that have automated their processes, respondents have shown how human work continues to play a fundamental role for their realities, since custodian of knowledge and techniques. As a result, man isn't completely replaced by technology nor relegated to a marginal role, but is integrated with it. This is what prompted organizations to continue to invest in this direction, because advanced solutions don't diminish the work of hand but, on the contrary, enhance the value of human labour.

Cisco Webex Teams connects people, allows to see products in real time through specific devices, and to draw real time modifications of their prototypes on the SparkBoard. However, at the end, the modeller is the one who realizes the heel by hand according to stylists' requests. EnProMa allows companies to continuously monitor the performances of their machines, to carry out maintenance work, when the system detects a malfunction, and to be connected in real time with maintainers who, as soon as problems occur, shall endeavour to solve them. However, as affirmed by Pietro Simonato and Katia Pizzocarò, man continues to play a central role in shoe's production process, especially in the product modelling phase.

In the selected companies it was observed how man is facilitated in his activities by Cisco Webex Teams and EnProMa with which it must coexist, but, at the same time, he must remain faithful to values that make Made in Italy products demanded all over the world. Workers must understand how advanced technological solutions work, must be capable of using them skilfully, and of integrating them with existing processes.

For this reason, companies have invested in training programs to better prepare their employees. Both Paoul and Del Brenta have launched internal training courses driven by the need to maintain the skills, taught to their workers, within the organization, to avoid

losing their competitive advantage over competitors. Calzaturificio Baldan 88, on the other hand, has moved in a different direction with the activation of a close collaboration with Politecnico Calzaturiero.

All the three respondents stress the importance of youngsters. This theme has been deeply felt in recent years as there is a shortage of people with the needed skills to carry on the productive techniques of the past, and there is also a shortage on the part of small companies that tend to remain anchored to the past, and not to open their doors to young people, ending up with an old-age workforce not very inclined to innovation and experimentation. The intergenerational change certainly doesn't help, as, many times, master craftsmen's skills are lost when they leave organizations. For this reason, youngsters, once they join companies, are assisted by more experienced workers to be able to learn on the field.

Organizations greatly benefits from this: new figures look both to the future, know how advanced solutions work and are influenced by new trends, and to the past, as they keep the ability to think and to do using the head and hands alive.

### **3.2 Advantages of digital transformation**

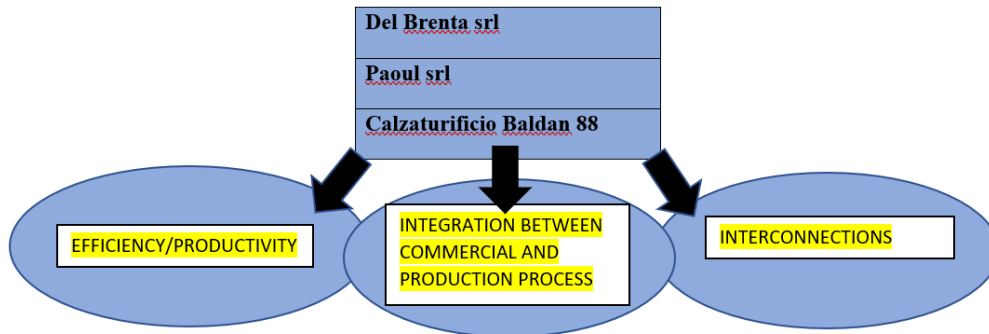
Up to there, we have analysed what were the main reasons that have enabled companies to invest in digital transformation while maintaining alive their artisan component. Innovation no longer concerns only the product or the processes but, concerns the organization's system in its entirety in the perspective of creating a connected factory.

Certainly, depending on the adopted solution, whether Cisco Webex Teams or EnProMa, and on the number of their functions already exploited, companies have been able to address operational inefficiencies by using advanced solutions flexibility, intended as the ability to react immediately and autonomously to different events, and to optimize processes.

Process optimization is also guaranteed by the use of e-commerce platforms to expand customer base and speed up response times, as regards Paoul and Calzaturificio Baldan 88, or by the use of remote modelling by Del Brenta to accelerate heels production times and have a constant contact even with distant customers.

On the basis of the information emerged during the interviews, the advantages obtained by companies, once completed the stages of digital transformation, can be summarized in efficiency/productivity, integration between commercial and production processes, and interconnection.

**Figure 51: Companies' advantages after their digital transformation**



*Source: Personal Elaboration*

### ***3.2.1 Integration between organizational processes***

In the aim of creating a more digital factory, the first advantage is a greater integration, more or less developed depending on the business case, between the production process and other corporate functions to guarantee the most effective solutions for the improvement of companies' results. Competition in the industry is stiff, and the slightest chance of gaining an advantage over competitors is caught by companies.

The integration between production and other organizational processes offers a wide range of possibilities, so much that organizations can adapt them to their business needs. This flexibility is crucial and can be leveraged to remain competitive in an easily changeable market, like that of fashion, influenced by trends, but that, anyway, continues to make of Made in Italy style its source of success.

A striking example can be found in the investments made by companies to improve their websites. All organizations in the district have their own websites, but analysed realities have been able to modernize them to further enhance the visibility of their products and production process. From having a mostly descriptive function, websites are used to perform activities that usually, in the sector, provide for a direct relationship between

companies, customers, suppliers, and distributors. There is the need to reach an international customer, and to overcome the idea that shoes must only be tried and touched to be purchased.

Del Brenta uses an interactive window on its website, called remote modelling, to connect in real time model makers or technicians with stylists or customers who want to proceed with the order of a heel, showing their sketches or expressing their ideas, or with the request of changes. The company, in this way, displays its craftsmanship, and makes a part of its production process visible by enhancing the relationship between tradition and innovation.

For Paoul and Calzaturificio Baldan 88 the integration between production process and the digital world is manifested in a different way. Companies, making complete shoes and not a component of them as Del Brenta does, have a direct relationship with the end customer, in addition to the one with the stylists of fashion brands. Calzaturificio Baldan 88 has its own brand besides producing for fashion houses, while Paoul makes shoes directly for dancers. To expand their customer base they have developed their e-commerce platforms, Paoul for all its production lines and Calzaturificio Badan 88 only for its own brand shoes, to allow national and international customers to consult the online catalogue 24 hours a day, 7 days a week, and order the desired product with very short delivery times.

In the luxury branch of the footwear sector the use of web as a real interactive business card isn't very strengthened because customers need to touch and put on shoes before placing an order, as they must perfectly match the shape of the foot, and heels must be perfectly in line with the style of the shoe.

The novelty is not represented by the presence on online platforms, but by the ability to promote yourself by creating a self-celebrating virtual showcase through the integration of processes, which take places within organizations in compliance with traditional techniques, and the interconnected world of the web.

### ***3.2.2 Interconnections***

The other important advantage is represented by interconnection. One wonders how interconnections can be exploited in heels, luxury and dance shoes' organizations, and, it

is precisely from the idea of a connected manufacturing factory, that companies' competitive advantage arises.

The relevant aspect is that connections allow to take advantage of proximity. Distance creates latency: the only way to minimize it, and offer to the user the maximum experience is trying to reduce it through close connection, as in the case of Del Brenta, Paoul, and Calzaturificio Baldan 88. Close connection is observed between the different departments of Del Brenta that manage to collaborate efficiently to meet market's needs, and to guarantee that company registers positive performances. Paoul and Calzaturificio Baldan 88, although the latter is still in an experimental phase of EnProMa and doesn't fully take advantage of interconnection's potential, exploit close connection with maintenance technicians who promptly intervene, once contacted by the system, to ensure organizations are equipped with efficient and always functioning machines.

Albeit differently, depending on whether Cisco Webex Teams or EnProMa are used, companies managed indirectly to have an impact on the entire production chain, and, it is precisely this, what determines their superiority at national and district level. Production, in this way, can be more responsive to requests. Thanks to EnProMa machines can be easily reconfigured to realize different types of shoes in the same day, while real time communications through Cisco Webex Teams enable to inform the production or model department on any change in the shape of the heel in order to change rapidly the production line and to respect deadlines.

Clients, distributors, workers, and suppliers benefit from the possibility of being more involved in companies' operations, directly in the case of Del Brenta and indirectly in the case of Calzaturificio Baldan 88 and Paoul, and of obtaining real time information on production progress. To facilitate this, the access to Cisco Webex Teams and EnProMa is guaranteed at any time and place, and by any device such as smartphones, iPad, and computers with the application installed.

### ***3.2.2 Productivity and efficiency***

Last but not least advantage is the possibility of having an effect on organizations' results. Some skeptics will object that the direction in which companies have pushed their digital transformation has no results in terms of production performances improvement but,



serve to facilitate and streamline certain additional operations. These assumptions are proven wrong by the outcomes, obtained during the analysis, in terms of efficiency and productivity.

As regards efficiency, all three companies have had positive results, as can be seen in the section dedicated to the analysis of the individual cases, although in the footwear industry many organizations don't seek to raise efficiency with so much energy since they consider the possibility of delays in the realization and delivery of products, or possible errors along the production line.

Inversely to this trend, the error rate in the realization of products has been reduced to approximately 1%, and response and delivery times have shortened considerably.

Del Brenta heels are delivered faster, real time communication allows to communicate even over long distances, and remote modelling enables stylists to request immediate changes during product creation process even if they aren't physically present. Paoul and Calzaturificio Baldan 88, thanks to predictive maintenance and real time control of machines operations, have constant information about the fleet, avoid downtimes associated with the waiting for technical interventions, and satisfy suppliers, buyers, and distributors in shorter times.

Even in terms of productivity, organizations excel both in the Riviera del Brenta district and nationally. In the footwear sector, the more productive you are, the more you can create loyal relationships with customers, if the business relationship is B2C, with stylists who need large quantities of shoes to use them on catwalks and in advertising campaign, or with distributors and retailers, if the business relationship is B2B. This applies to dance shoes, as competitions are frequent, to heels since they are an essential component for obtaining the finished product, and to luxury shoes.

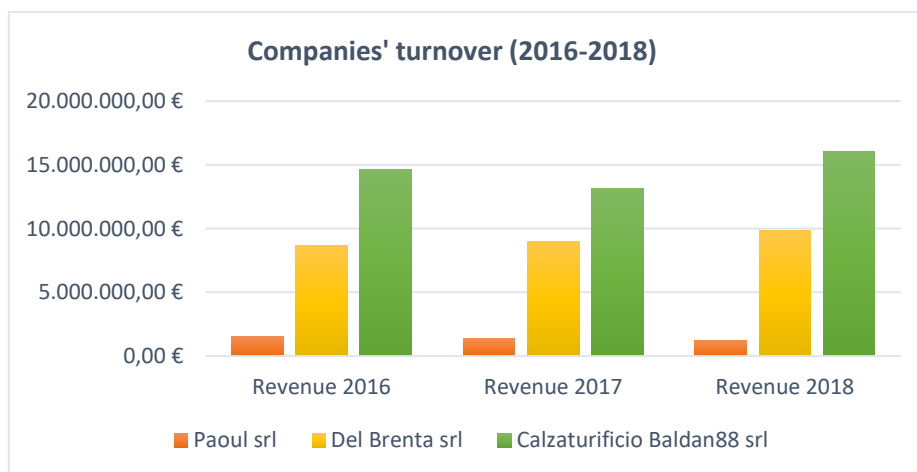
Del Brenta, as specified above, has significantly increased the number of heels produced thanks to a very large customer base guaranteed by Cisco Webex Teams. Calzaturificio Baldan 88 between 2017 and 2018 has noticed the first results from the experimental adoption of EnProMa: maintenance managed online and the ability to schedule interventions have allowed the organization to produce about 400 pairs of complete shoes per day. Paoul, after a slowdown in the past two years due to huge investments for the development of innovative projects including EnProMa, ended 2019 with great prospects

thanks to the possibility of programming machines to realize large quantities of shoes, belonging to different lines, per day.

The relation between these results and companies' decision to invest in advanced solutions to encourage integration and interconnection among corporate function is presented as a novelty to the most.

The interesting side that has emerged reveals that, although these organizations already had technologies such as 3D printers or automatic machines to perform some stages of production, or have used CAD/CAM software for the development of shoe shape models for about four/five years, their results in terms of revenues, profitability and customers/suppliers base are superior following the decision to invest in advanced technological solutions from 2017 onwards.

**Figure 52: Companies' turnover (2016-2018)**



*Source: Personal elaboration based on Cerved data*

As shown in the graph above, companies have boost their turnover, and have registered better performances compared to most of the others footwear organizations.

In conclusion, it can be said that what differentiates Del Brenta, Paoul, and Calzaturificio Baldan 88 from other companies in the district is their entrepreneurs' spirit of openness to the outside world. This openness to digital manifests itself in the necessity of having a 360 degree view of the organization that goes beyond the boundaries of systems and departments thanks to interconnection and integration.

If we consider the organization as a human body, in which machines for the production process symbolize the limbs, the interconnections generated by Cisco Webex Teams and EnProMa represent, instead, the nervous system, whose neurons act as drivers of both arms and legs' performances. Acting on the latter, companies improve their business performances that contribute largely to determine the outcomes of the production processes. Slowdowns in company's intercommunication could cause errors in the various stages of production, like the failure to see a change of order by a customer, or communication problems between the production and the modelling department regarding the delivery times of a specific number of pairs of heels. Similarly, failure to promptly report machineries' malfunctions can lead to a net slowdown in production times and orders fulfilment.

Analysed organizations, in this way, have been able to free themselves from the immobility of the past and to look to the future, developing what can be defined an Italian version of Smart Factory which takes advantage of interconnection, always maintaining though a connection with tradition. Products, in fact, are realized manually, and many phases of the production process provide for human intervention to complete makings that require great attention and precision.

The mixture between the intangible digital world in which innovation isn't experienced first-hand by customers, suppliers, distributors, as it is based on data, information, and algorithms that travel through the web, and the tangible world of the Italian manufacturing production, as far as new, seems to be an ad hoc solution to relaunch our manufacturing and increase its competitiveness.

## CONCLUSION

This thesis dealt with digital transformation in the manufacturing sector and its effects on the Italian economy.

We are talking of a *disruptive* phenomenon, which has radically changed not only individual companies, but, above all, entire sectors of the economy. Every aspect of human life is digitized, and technologies are more accessible in economic and physical terms thanks also to a great mastery of the knowledge and skills necessary for their use.

Digital transformation is considered by the existing literature the best way to start the recovery path, following the economic and financial crisis whose aftermath still affect world countries' economies. For this reason, initially attention has focused on this phenomenon at a global level, to try to understand its dynamics in the past nine years through the presentation of national and international scholars, governments and counselling agencies' interpretations of Industry 4.0 and digital manufacturing.

From focusing on the global context, the attention has been shifted to the Italian situation, since the manufacturing sector has always been the driver of the economic growth determining more than half of our country's wealth. Professors, experts in the field, and entrepreneurs see in digital an ad hoc solution for manufacturing SMEs, which represent the majority of the Italian economic fabric.

Certainly, the conversion can't take place in a twinkling of an eye but, there is the need for a cultural change in organizations. Companies must question the way they operate, as, if they want to survive in the current context, the only solution is to have the courage to change and react. They can't compete on the market as they did twenty years ago.

Of course digital transformation mustn't take place at the expense of craftsmanship, that has distinguished Made in Italy production for decades. Products must continue to be characterized by uniqueness, quality, and elegance, and must arouse the Italian spirit and culture that are appreciated by consumers worldwide. The winning strategy is to adapt and integrate tradition with new technologies.

To support this thesis, an analysis has been carried out on three companies of the Riviera del Brenta footwear district that have decided to embark on a different digital transformation path, with the aim of maintaining products and production processes as

traditional as possible to respect the district's artisan tradition, and to safeguard their competitive advantage.

The interesting element, that has emerged during the interviews, is the desire to create a prototype of a "Smart Manufacturing Company" to improve organizations' productive performances, thanks to the use of advanced technological solutions that promote interconnection among different business processes. At the same time, the artisanal component is important, and man continues to play a central role: there is a continuous interaction between the digital and the physical world. Products, that the customer will then see displayed in big brands' shop windows, worn by models during fashion shows, or sold on online platforms, continues to be shaped by man' skilled hands, despite the fact that many organizations' internal processes are governed by automation and intelligent logic.

Digital doesn't override craftsmanship, but rather is used to further enhance its characteristics, see Del Brenta remote modelling or the e-commerce platforms used by Paoul and Calzaturificio Baldan 88.

As mentioned above, companies have obtained advantages in terms of gains in efficiency and productivity. Moreover, Del Brenta and Paoul, in a greater way than Calzaturificio Baldan 88, have been able to increase their customer base, consisting of final customer, suppliers, distributors, thanks to very rapid response times, speed of delivery, and to the possibility of communicating in real time even at very long distances.

In the light of the analysis, this new approach seems to respond to the need for a mass conversion to digital of our manufacturing sector. There can no longer be only a small percentage of companies that bet on new technologies; entrepreneurs must open up new paths and consider also the intangible world of services, not limiting themselves to action at the product or process level.

The transition to a more connected factory, designed in Industry 4.0 optics, is not at all as burdensome as it might seem. The reason is simple: it is not necessary to introduce new machines or processes because, those that already exist within companies, can be connected to each other thanks to the use of the web, and applications like Cisco Webex Teams and EnProMa can be installed on any existing device.

Therefore, these solutions would facilitate technology averse companies, although they don't consider them in line with their businesses, since product remain unchanged and

production processes continue to be carried out with the same modalities. Even organizations, which have already introduced some technologies, especially those of additive manufacturing, or have specialized machines for production, would benefit. Indeed, companies shouldn't invest to buy other machineries, but they should simply connect them to take advantage of the potentialities of new advanced technological solutions.

Although it is still not possible to speak of real connected factories because organizations have only digitized and connected some business functions, taking this path would create numerous opportunities for Italian companies among which, the most important, is the respect for Made in Italy products despite relying on the digital world for many functions that subtend production.

However, it is essential to emphasize that the growing connection has had an impact on systems vulnerability, as it has increased the number of hacking attempts. Not surprisingly, after careful risk analysis, companies have adopted sophisticated Advanced Malware Protection and have invested in the prevention of hacks. Obviously, there is no definitive solution to protect organizations because the threat landscape is complex, and the attack surface is constantly evolving and expanding. The best defense against these risks is the implementation of dynamic strategies that allow to have always an exchange of information in real time to act promptly, if necessary, and to eliminate the threats before they violate the system.

In conclusion, this 360 degree approach to digital transformation can be said to be more an opportunity than a threat to the survival of Italian SMEs.

It may therefore be said that the time for change has come, and that, now, it's up to companies to take their chance: exploit these new technological solutions to remain competitive in the market and give value to their products, or stay behind and perish.

## **APPENDIX A**

### **Companies interview**

#### **1-AREA MADE IN ITALY**

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*1) Può descrivere brevemente la sua attività d'impresa e che tipo di prodotto realizza?*

#### **2-AREA TECNOLOGIE**

---

*2) Quali sono le tipologie di tecnologie che la sua azienda ha utilizzato?*

*ICT, e-commerce, software gestionali, siti web, social media*

*3) Quali sono le tecnologie dell'Industria 4.0 che la sua azienda ha adottato?*

*4) Quale tipologia di innovazione avete deciso di adottare?*

*ù Prodotto, processo, servizio*

*5) Parliamo di realtà aziendali che puntano prevalentemente all'innovazione di processo. Come mai questa scelta?*

*Per differenziarmi, per essere più flessibile, per offrire economie di varietà, per essere più performanti dei competitor*

*6) Quali risultati avete ottenuto grazie all'utilizzo di queste nuove tecnologie?*

*Incremento del fatturato, velocità di consegna, riduzione dei costi di produzione, raggiungere un numero maggiore di clienti, minori tempi di risposta*

#### **3-AREA CAPITALE UMANO**

---

*7) Come conciliate l'adozione di queste nuove tecnologie in un processo produttivo che comprende numerose fasi basate interamente sulla lavorazione manuale?*

8) Avete attuato programmi di formazione per i dipendenti riguardo l'utilizzo delle nuove tecnologie in azienda?

*Formazione all'interno delle aziende, collaborazioni con il Politecnico, corsi esterni*

#### **4-AREA STRATEGICA**

---

9) Come è cambiata la vostra strategia competitiva successivamente all'adozione di queste nuove tecnologie?

10) Come, queste nuove tecnologie, vi hanno permesso di differenziarvi dai vostri competitor?

11) Queste nuove tecnologie hanno portato dei cambiamenti nel rapporto con i vostri clienti e fornitori all'interno del distretto ed in generale?

12) Come viene gestita l'innovazione all'interno dell'impresa?

13) Dato che la sua azienda ha investito in alcune tipologie di tecnologie dell'Industria 4.0, ad oggi, sulla base dei risultati ottenuti, è dell'idea di continuare a scommettere sulla tecnologia?

*Quali sono i progetti in campo*



## **Del Brenta Interview**

### **1-AREA MADE IN ITALY**

#### ***1)Può descrivere brevemente la sua attività d'impresa e che tipo di prodotto realizza?***

Noi ci occupiamo della creazione, progettazione e produzione di tacchi, zeppe, plateau per scarpe da donna quindi siamo nell'ambito del settore calzaturiero, siamo un'azienda di stampaggio di materie plastiche. Lavoriamo con i calzaturifici della zona ed in generale di tutta l'Italia e anche all'estero per i brand cosiddetti del lusso quindi brand che fanno il prodotto di gamma più elevata che ci sia sul mercato.

### **2-AREA TECNOLOGIE**

#### ***3)Quali sono le tecnologie dell'Industria 4.0 che la sua azienda ha adottato?***

Come approccio mentale vi è un orientamento al 4.0. Industria 4.0 ovvero piano Calenda ecc noi l'abbiamo valutato per la realizzazione del progetto di avanzamento della produzione con la programmazione, schedulazione ecc della produzione. Ma questo richiedeva un investimento tecnico per entrare e per avere le caratteristiche dell'Industria 4.0 superiore al vantaggio che ne avrebbe generato. Quindi di fatto al momento non c'è un investimento 4.0 qui in azienda, ci sarà a breve perché abbiamo acquistato una macchina che faremo rientrare in questo ambito. Il processo che abbiamo adottato è necessario per far rientrare questa nuova macchina nell'ambito dell'Industria 4.0 perché ha creato le basi per avere tutto quello scambio di informazioni fra le macchine, sistemi di fabbrica e sistemi informativi dell'azienda. Abbiamo quindi la comunicazione bidirezionale tra il sistema informativo di fabbrica e le macchine e rispondiamo ai 5 + 2 punti necessari per poter rientrare nei benefici di Industria 4.0. quindi si tratta di un progetto di interconnessione delle macchine che ci sono in produzione ai sistemi di fabbrica al fine di programmare il lavoro delle macchine, schedulare le attività anche nel tempo e avere un ritorno informativo da parte delle macchine sul loro stato di salute (per fare manutenzione predittiva) e sullo stato dei lavori che stanno portando avanti.

I marchi sono restii perché hanno brand blasonati e sono legati molto al concetto di tradizione. Prodotto di lusso è percepito come prodotto artigianale, legato alla storia e alla tradizione. La nostra azienda è sempre stata innovativa, Del Brenta ha avuto le prime stampanti 3d più di 10 anni fa, e il suo successo ad oggi è legato all'idea innovativa che è quella che ha avuto Luciano di lavorare a 4 mani con gli stilisti realizzando una modelleria, cioè un'area laboratorio, dove creare i primi prototipi fatti a mano di fronte al cliente finale per poi riuscire a portare a casa il lavoro partendo direttamente dallo stilista. Avendo Del Brenta questa tradizione e questo DNA, e dovendo fare dei miglioramenti dal punto di vista organizzativo (gestione dei progetti, ridisegnare l'organizzazione aziendale, ecc) ha pensato che l'approccio che ha adottato relativamente innovativo per esempio sulla parte di comunicazione interna, potesse essere utile alla gestione del cambiamento

**4) *Quale tipologia di innovazione avete deciso di adottare? (prodotto, processo, servizio)***

Abbiamo adottato fondamentalmente un'innovazione di processo perché il prodotto a parte alcuni casi rimane lo stesso, nel senso che abbiamo delle novità sul prodotto ma relativamente poche. Qui si parla di innovazione di processo ridisegnato in maniera nuova ed innovativa.

**5) *(Se rispondono innovazione di processo) Parliamo di realtà aziendali che puntano prevalentemente all'innovazione di processo. Come mai questa scelta? (per differenziarmi, per essere più flessibile, per offrire economie di varietà, per essere più performanti dei competitor)***

Il cambiamento ha portato dei vantaggi importanti: cambiando il sistema di comunicazione interne, e cambiando la modalità con cui gestiamo i processi interni. Il prodotto tacco è un prodotto abbastanza semplice e abbastanza maturo come prodotto. Immaginare di fare un tacco in maniera molto diversa è relativamente difficile ad oggi. Per quanto riguarda il desiderio di rendere l'azienda sempre più efficiente e sempre più performante c'era ampio spazio di miglioramento per quanto riguarda il cambiamento dei processi. Ragione: aumentare la competitività dell'azienda che gestisce un prodotto che è maturo, in maniera innovativa e differenziarmi dai competitor ed essere più performanti.

**6) *Quali risultati avete ottenuto grazie all'utilizzo di queste nuove tecnologie? (incremento del fatturato, velocità di consegna, riduzione dei costi di produzione, raggiungere un numero maggiore di clienti, minori tempi di risposta)***

L'anno scorso l'azienda ha fatto il 5% in più di fatturato con un utile altrettanto buono leggermente maggiore in percentuale rispetto all'anno precedente. Questo grazie al lavoro di tutti in un contesto di rinnovamento di processo che ha portato finora buoni risultati.

### **3-AREA CAPITALE UMANO**

**7) *Come conciliate l'adozione di queste nuove tecnologie in un processo produttivo che comprende numerose fasi basate interamente sulla lavorazione manuale?***

Il concetto di lavorazione manuale riguarda molto quello che potremmo definire la fase R&D di Del Brenta o il co-design (progettazione con il cliente o lo stilista del prodotto finito). Questa fase ha ancora elementi di manualità importanti, poi il vero processo produttivo è fatto con le macchine che sono presidiate dagli operatori che controllano ogni pezzo che esce. Per quanto riguarda la parte più manuale, abbiamo ritenuto che non fosse vantaggioso sconvolgere il modo in cui le cose vengono fatte perché riteniamo che la fase di co design sia estremamente veloce ed importante e che non possa essere sostituita da alcuna tecnologia, nemmeno dalle stampanti 3d perché il tempo che un modellista modifica la linea di un tacco è di pochi secondi, solo cambiare i parametri di un disegno CAD e poi inviarlo alla realizzazione in 3D è di diversi minuti. Per noi quello che è interessante è stendere un livello di digitale sopra il processo manuale per renderlo

accessibile da ovunque nel mondo e per renderlo più efficiente per aiutare il cliente per essere ancora più veloce nella realizzazione e nello sblocco dei suoi progetti.

**8) *Avete attuato programmi di formazione per i dipendenti riguardo l'utilizzo delle nuove tecnologie in azienda? (formazione all'interno delle aziende, collaborazioni con il Politecnico, corsi esterni)***

Si Abbiamo attuato pochissimi percorsi di formazione perché si trattava di cose abbastanza facili da imparare. Abbiamo organizzato delle piccole sessioni interne all'azienda per imparare ad utilizzare la parte tecnologica delle piattaforme di collaboration. Per quanto riguarda i cambiamenti dei processi dell'azienda abbiamo fatto sempre internamente delle sessioni di formazione. La parte più legata all'innovazione tecnologica non ha richiesto la necessità di formazione esterna. Adesso abbiamo un piano di formazione in corso riguardante la gestione delle operations.

#### **4-AREA STRATEGICA**

**9) *Come è cambiata la vostra strategia competitiva successivamente all'adozione di queste nuove tecnologie?***

L'idea è quella di fornire dei servizi a valore aggiunto al cliente quindi come noi seguiamo il cliente non lo fa nessun altro. Cerchiamo di essere un player più possibile unico sul mercato. "io vado da Del Brenta perché sì è un tacchificio, sì i tacchi si stampano nella stessa maniera, ma per quanto riguarda la gestione della nascita dei progetti è più efficiente rispetto alle altre aziende e per me cliente è un elemento determinante". Avendo anche ottimizzato i processi produttivi e alcuni aspetti legati all'operation siamo anche diventati più competitivi poiché possiamo fare prezzi più competitivi. L'efficienza che ha coinvolto alcune aree dell'operation ci permette di farlo là dove serve.

**10) *Come, queste nuove tecnologie, vi hanno permesso di differenziarvi dai vostri competitor?***

Questo cambiamento è fatto per cercare di differenziarci in un settore che dal punto di vista del prodotto è abbastanza maturo. Cosa possiamo fare noi rispetto ai nostri competitor? Non possiamo fare i tacchi in maniera diversa, sì ci sono alcune cose che possono essere fatte, però è un prodotto maturo per cui non si può fare molto. Possiamo essere diversi perché gestiamo le cose in maniera più efficiente e questo permette al cliente di scegliere noi rispetto ad altri.

**11) *Queste nuove tecnologie hanno portato dei cambiamenti nel rapporto con i vostri clienti e fornitori all'interno del distretto ed in generale?***

A volte ci siamo anche preoccupati di non apparire troppo "bravi" e ci siamo chiesti se queste innovazioni tecnologiche che abbiamo introdotto non potessero quasi intimorire il cliente. Al contrario questo ha suscitato interesse ed ha creato curiosità nel consumatore. I clienti si sono resi conto dei benefici che loro in primis hanno dal modo che noi abbiamo

proposto. Parliamo di aiutare i clienti a portare avanti i loro processi, non di sconvolgerli completamente. Anche i fornitori sono rimasti stupiti ed interessati: sempre nella fase di progettazione dove vi è un co-design, li abbiamo inclusi in degli spazi di lavoro. Sono sempre più vicini a noi e si trovano molto meglio a gestire i loro lavori perché hanno informazioni più veloci e puntuali, vi è uno scambio di informazioni a 4 mani.

***12) Come viene gestita l'innovazione all'interno dell'impresa?***

Qui ci sono delle linee guida: Non si fa niente perché è di moda, bisogna farlo o si vuole apparire. Non ci innamoriamo mai di un cambiamento o di una tecnologia perché ci piace. Ci diamo sempre la regola del 2: ogni cambiamento che chiediamo soprattutto a noi stessi e ai colleghi deve avere almeno due ragioni e una delle due deve essere a vantaggio della persona o del collega a cui lo chiedi. In questo modo alcune cose non vengono fatte perché non hanno sufficientemente forza. Questo è importante perché se si sconvolge l'azienda senza avere una vera ragione e si rischia quando vi è la vera necessità di un cambiamento che la motivazione sia scarsa.

***13) Dato che la sua azienda ha investito in alcune tipologie di tecnologie dell'Industria 4.0, ad oggi, sulla base dei risultati ottenuti, è dell'idea di continuare a scommettere sulla tecnologia? (Se la risposta è positiva si può chiedere se ci sono dei progetti futuri in campo)***

Siamo dell'idea di continuare a scommettere sulle tecnologie sempre senza innamorarsi di queste. Sfruttando la grande opportunità di industria 4.0. Ad oggi c'è un progetto in corso forte e legato all'operation ovvero alla gestione e ottimizzazione dei processi, schedulazione della produzione. Lo facciamo con le stesse tecnologie ed approcci che abbiamo utilizzato per la parte più legata ai processi d'ufficio. In questo caso a breve ci sarà un progetto di industria 4.0 con l'arrivo di una nuova macchina. Per quanto riguarda l'operation c'è un forte lavoro da fare per quanto riguarda l'organizzazione del lavoro, del magazzino. Probabilmente andremo verso logiche di ispirazione vagamente lean, non certo perché va di moda ma perché riteniamo che nel nostro mondo ci siano alcune idee che vengono da questo modo di vedere le aziende molto interessanti che potrebbero darci un elevato vantaggio competitivo in termini soprattutto di risposta al mercato.

## Paoul interview

### 1-AREA MADE IN ITALY

#### *1)Può descrivere brevemente la sua attività d'impresa e che tipo di prodotto realizza?*

Questa azienda come attività svolge attività artigianale, quindi questo significa che noi utilizziamo dei macchinari in ausilio all'uomo, ma prevalentemente artigianale quindi il lavoro dell'uomo è principale. In particolare, riguardo alla tipologia di attività produttiva è stata classificata dalla Regione Veneto come azienda artistica per la tipologia così complessa di artigianalità. Quindi non è solo artigianale ma è anche un'azienda artistica artigianale, quindi ha un albo speciale. Questo sottolinea più di altro l'importanza del lavoro dell'uomo e anche quanto sia difficile per la tecnologia penetrare un sistema di lavoro artigianale così complesso e spostato dal lato umano. Per quanto riguarda il tipo di prodotto noi abbiamo manufatti che sono di natura artistica, trattiamo 4 linee prodotte di cui 3 con collezione, quindi con catalogo, e 1 che definiamo linea tailored o sartoriale e che è una linea che è costituita da progetti unici e speciali, non riproducibili che noi realizziamo su richiesta dei nostri clienti. Le altre 3 linee, invece, sono la linea dance che è quella dedicata al ballo e che rappresenta più del 90% del nostro fatturato, la linea dedicata a cerimonie ed eventi speciali che è la linea Wedding & Gala, e poi la linea theatre che è una linea di calzature storiche (1500/1800 abbiamo più fasce di periodi storici che trattiamo). Sono tutte linee che continueranno ad essere sviluppate con nuove collezioni. Oggi l'insieme delle collezioni porta circa 300/400 modelli. La linea dance è quella più trattata e sviluppata.

### 2-AREA TECNOLOGIE

#### *2)Quali sono le tipologie di tecnologie che la sua azienda ha utilizzato? (ICT, e-commerce, software gestionali, siti web, social media)*

Da un punto di vista produttivo la tecnologia che è stata introdotta da questo sistema molto artigianale è il sistema CAD/CAM che quindi prevede la digitalizzazione del modello, più precisamente dello stampo che viene convertito a file, il file fa il passaggio al macchinario di taglio e quindi il taglio con la lama avviene attraverso questa tecnologia. In termini di utilità ha portato ad un incremento della produttività e a una migliore definizione della linea di taglio rispetto al lavoro dell'uomo. Infatti, dal nostro punto di vista, in ambito produttivo, è fondamentale riuscire a applicare la tecnologia in questo tipo di fasi dove il lavoro dell'uomo risulterebbe leggermente penalizzante rispetto al lavoro della macchina che è un lavoro di alta precisione. Dall'altro lato non posso applicare la tecnologia in tutte le fasi di lavorazione perché, per esempio, la fase di montaggio per avere l'elevata precisione richiede l'occhio dell'uomo e l'esperienza. Questo accade soprattutto quando si lavora con prodotti su misura, manufatti specifici: in questo caso l'occhio dell'uomo e la capacità di creare in un modo unico il prodotto non può essere sostituito dal macchinario. Disponiamo anche di una premonta tutta computerizzata, oggi le macchine fanno dei calcoli e delle elaborazioni. Sia da un punto di vista di settore calzaturiero che è evoluto ma fino ad un certo punto (non ha fatto ancora

il grande salto per es: l'isola tecnologica che era già esistente ma per le sneakers o scarpe di linea diversa dalla nostra).

Abbiamo applicato anche della informatizzazione da un punto di vista organizzativo con la gestione dei processi tramite software: tutte le nostre bolle di lavorazione che vengono stampate, una volta acquisiti gli ordini vengono processate, l'ordine è caricato nel gestionale, vengono poi stampate le bolle. Per poter ottimizzare al meglio il processo si cerca di fare una frammentazione degli ordini dei clienti attraverso una nuova programmazione ordinata per articolo in modo tale da andare in produzione con il maggior numero di quantità rispetto allo stesso articolo anche se questi sono diversi gli uni dagli altri. Abbiamo adottato questa scelta per cercare di migliorare i tempi di lavorazione che altrimenti si dilatano tantissimo. Noi basiamo tutto sull'aumento dell'efficienza e sulla riduzione dei tempi di lavorazione perché il nostro lavoro rispetto a uno più ordinario e standardizzato più del 60% è occupato da unità singole: i tempi di lavorazione sono iperdilatati ovvero i costi dei modelli si iperalzano. Per rimanere sul mercato visto che alcuni competitor stanno lavorando anche oltreoceano con costi e tempi diversi, la battaglia è non tanto far la guerra a loro ma riuscire a contenere un prezzo in maniera ragionevole per mantenere la leadership mondiale e rimanere competitivi e non uscire dal mercato perché si hanno prezzi troppo alti. Dopo anni di marketing e di comunicazione di un prodotto ben studiato, ad agosto abbiamo appreso dalla concorrenza un riconoscimento generale di prodotto in termini di qualità top al mondo. Sappiamo di essere borderline sul fronte dei prezzi perché il nostro mercato si sta spostando su un prodotto economico quindi c'è questa sfida da affrontare. Anche a livello di gestione dei processi con l'informatizzazione aziendale si ha un'efficienza anche a livello di ufficio perché tutto l'avanzamento delle bolle di lavorazione produce come effetto il controllo degli ordini a PC dagli impiegati commerciali e quindi italiani e esteri che riescono a rispondere al cliente e dialogare sullo stato di consegna. E-commerce è una tecnologia che abbiamo introdotto nel 2013, è uno strumento che va potenziato perché in questo momento è di supporto da momento che non c'è stato fisicamente il tempo e la priorità giusta per dedicarci a ciò perché in questo momento la nostra priorità è riuscire a spingere l'azienda a diffondere il brand (investimenti si sono focalizzati sull'andare a piantare semi intorno al mondo: abbiamo attivato una prima concessione di rivendita a Mosca, stiamo seguendo una seconda concessione di rivendita a Pechino, stiamo lavorando con una scuola di ballo in Giappone, stiamo attivando collaborazioni in Australia, stiamo lavorando con scuole di ballo distribuite negli Stati Uniti e in Canada, stiamo aprendo con Corea e altri paesi). La nostra attenzione si è focalizzata sul mettere in piedi il prodotto e far circolare il brand verso il prodotto che la storia ci ha insegnato essere il metodo più veloce per far circolare il brand e anche il mezzo con maggiore sostanza. L'investimento in termini di marketing online o promo online (a pagamento, focalizzato sulla vendita) non è stato il nostro primo obiettivo. Il rapporto diretto è quello più premiante in tutte le forme: per il cliente che si sente completamente seguito e per l'azienda che riesce a chiudere l'ordine più velocemente. Dall'altro lato l'e-commerce da come supporto un negozio elettronico che è aperto in tutto il mondo e non è da sottovalutare per tutte quelle persone che non possono accedere a noi in altra forma nel senso che non prendono il telefono per problemi linguistici, non hanno la capacità di mettersi in relazione. L'e-commerce diventa qualcosa di più freddo ma dall'altro lato più rapido, concreto, pratico

e utile. Vi è in programma anche di riprendere in mano la parte del sito web, e-commerce nell'ottica di uno sviluppo. Social media è qualcosa che ha dato una grande spinta all'azienda e che ritengo da potenziare perché credo che per poter recuperare una relazione con il pubblico sia fondamentale. Quindi tutta questa attività di social media, siti web ecc la vedo come una grande opportunità di sviluppo solo da implementare.

### **3) Quali sono le tecnologie dell'Industria 4.0 che la sua azienda ha adottato?**

In questo caso il pensiero mi va a Enproma, che è un progetto realizzato con il Politecnico Calzaturiero, che è un software iCloud che si è arrivati a costruire testandolo sulla nostra azienda e su Baldan 88 (azienda che produce calzature, è principalmente terzista e recentemente sta proponendo un e-commerce su una linea prodotto con marchio proprio). Il senso è la gestione del parco macchine dell'azienda riuscendo quindi a valutarle da un punto di vista di età, costi di manutenzione, di analisi dei consumi elettrici. Vi è un software iCloud che memorizza i dati specifici di ogni singolo macchinario e per ciascuna vi è la possibilità di gestire interventi tecnici di manutenzione con la relazione diretta con i manutentori che ricevono la chiamata, intervengono e compilano il foglio di manutenzione in tempo reale. Vi è un controllo ben fatto di tutto il parco macchine e dei costi che ogni macchinario sta presentando quindi anche in funzionalità. Questo porta l'imprenditore a fare una valutazione sul senso di mantenere quel macchinario rispetto ai suoi costi annui e alla sua età anagrafica. Oggi si lavora in funzione anche alla parte energetica e quindi in funzione ai consumi e all'efficienza energetica. Questo è un progetto finanziato dalla regione del Veneto e che ha portato efficienza a livello aziendale.

### **4) Quale tipologia di innovazione avete deciso di adottare? (prodotto, processo, servizio)**

Sul prodotto innovazioni: sono quelle che derivano da uno studio fatto anche insieme ai nostri testimonial quindi derivano da persone che vivono ballando e che ci riportano, in funzione anche all'evoluzione della disciplina sportiva del ballo, delle richieste di prodotti che si adattino al meglio al movimento. La nostra bravura sta nell'applicare la tecnica calzaturiera alle esigenze della tecnica di danza e insieme arrivare all'innovazione di prodotto. Ci avvaliamo anche delle strutture che abbiamo vicine, tra cui anche il Politecnico, per fare dei test (es: prodotto magister, prodotto sul quale hanno lavorato per molto tempo e sul quale sono stati fatti dei test sul tacco, sui materiali). Come materiali quelli che cerchiamo di utilizzare sono prettamente naturali ed è garantita la traspirazione per cui il sintetico non è prediletto. Siamo sempre alla ricerca di trovare il materiale che deve avere riconosciuti dei requisiti minimi non valicabili, poi si valuta se prendere il tessuto sintetico che però per noi non rientra nella vocazione del naturale per fare determinati prodotti. Ci sono 2/3 prodotti dove sono state usate fibre artificiali però come impostazione classica il materiale è il più naturale possibile.

Sul processo innovazioni: abbiamo avuto per più di un anno e mezzo uno psicologo del lavoro che ha lavorato con noi per ridefinire missione e vision dell'azienda. Abbiamo ridefinito tutte le attività per ciascun operatore responsabile, abbiamo individuato le persone come incaricati responsabili alla gestione di alcuni processi. Questo è stato importante sia per il comparto produttivo ma anche per noi come amministratori e per tutto il gruppo perché ci ha permesso di comprendere "chi fa che cosa" che è importante perché non si sa chi è responsabile di cosa: si è fatto un perfetto ordine delle cose e è diventato anche più facile comunicare e comprendere il fine ultimo dell'azienda. Ha aiutato a trovare anche un punto comune che contenesse le visioni dei 3 amministratori.

Sui servizi innovazioni: per tutti gli strumenti tra cui anche l'e-commerce, software gestionali, social media come assistenza costante, sito web come fonte di informazioni sono tutti servizi che si sono messi a disposizione del cliente e anche dei nostri dipendenti (per esempio condividiamo info sulla chat aziendale dove sono tutti inseriti e dove se qualcuno vede qualcosa o ha un commento da fare, se si è all'estero per fiere o eventi si pubblicano su quel gruppo le notizie: contatto in tempo reale). Negli ultimi 4 mesi sono stata in 4 nazioni diverse quindi in ogni nazione ero ad un evento (Praga, Stoccarda, Blackpool e in Francia). Ad ogni momento potevo portare qualcosa da condividere: i dipendenti vedevano Paoul gravitare in tutti questi ambiti.

***5)(Se rispondono innovazione di processo) Parliamo di realtà aziendali che puntano prevalentemente all'innovazione di processo. Come mai questa scelta? (per differenziarmi, per essere più flessibile, per offrire economie di varietà, per essere più performanti dei competitor)***

Innovazione di processo crea dell'efficienza che aumenta la gratificazione sotto tanti profili, di conseguenza snellisce, ha delle ripercussioni anche sull'immagine. Un'azienda efficiente è un'azienda che è più performante e quindi il cliente lo riesce a capire perché mantieni anche la parola data sui tempi di consegna. Ci differenziamo perché rispetto ai competitor quello che si sa di Paoul è che è un'azienda seria, precisa, che fa quello che dice. Nel nostro lavoro al primo posto c'è una flessibilità mentale dell'operatore che rende possibile l'innovazione di processo. Se tu hai un operatore rigido l'innovazione di processo viene bloccata dall'individuo (solitamente l'operaio storico con cui vi è un rapporto di fiducia). Ci sono degli abbattimenti incredibili in termini di tempi, costi. Per essere più performanti dei competitor senza ombra di dubbio.

***6)Quali risultati avete ottenuto grazie all'utilizzo di queste nuove tecnologie? (incremento del fatturato, velocità di consegna, riduzione dei costi di produzione, raggiungere un numero maggiore di clienti, minori tempi di risposta)***

Le innovazioni portano sotto tutti i vari profili degli effetti. Riguardo al tema delle vendite l'e-commerce nella sua poca parte (costituisce il 5% del nostro fatturato) ha dato un piccolo supporto all'azienda in termini di incremento di fatturato. Tutta l'attività di incrementazione dei processi aumenta la fidelizzazione al brand e quindi più di una volta ho sentito i nostri rivenditori che fanno più del 65% del nostro fatturato dire non compriamo da altri perché oltre al prodotto voi date anche il servizio. Velocità di consegna ovviamente, perché se si ha un'attività programmata e organizzata si riesce ad essere rapidi e puntuali. Se si continua l'efficientamento del processo si riducono i costi di lavorazione e di conseguenza si aumenta la velocità di consegna. Siamo riusciti a raggiungere un maggior numero di clienti in primis con i social media anche se il mezzo più veloce per l'acquisizione di nuovi clienti rimane l'evento in cui si conosce un gran numero di persone appassionate al settore, si conosce e si semina conoscenza. Il rapporto umano vince ancora sempre rispetto alla tecnologia. Meglio che la tecnologia ci sia in assenza di altro, se però c'è l'azienda con le persone che la rappresentano in loco si riesce a vincere su tutto. Abbiamo ridotto i tempi di risposta rispondendo in tempo reale. A volte ci sono delle tecnologie che non sono dirette dell'azienda (es: Etsy o Market Place dedicato all'artigianato che per noi sono stati una riscoperta e hanno contribuito ad una piccola quota di fatturato inserendoci con la linea Theatre in una nicchia che cercavamo



da tempo ma che non riuscivamo a fornire ai fruitori. Piazzando la linea su Etsy siamo venuti in contatto con molti contatti Americani e Canadesi, Australiani che sono molto interessati al prodotto). Gli eventi a cui partecipiamo sono realizzati da Federazioni di danza sportiva nazionale e internazionale per esempio in Inghilterra per 15 giorni che è l'evento più importante al mondo per la federazione VDC, l'altra è la Federazione VDSF il cui evento principale si svolge a Stoccarda. Sono i 2 eventi principali in cui quando presenti il prodotto ti stai presentando al mondo: questi eventi sono così importanti dal punto di vista mondiale che attirano utenti da tutto il mondo. Io se vado in Inghilterra per esempio è come se atterrassi in Asia. Li Europei erano in minoranza rispetto agli Asiatici perché il potere di acquisto è tutto spostato in Asia dove il ballo di coppia è molto diffuso. L'Asia è un mercato veramente forte, i nostri testimonial almeno 9 volte l'anno sono in Asia per lezioni, presentazioni perché c'è un grande potere di spesa. Questo accade anche in Indonesia. La VDSF, invece, mostra ancora una presenza maggiore europea e meno extra UE. Ci sono altri eventi tipo a Praga, organizzati da un franchising di 250 scuole di ballo Arthur Murray, dove una sezione era dedicata invitando tutte le scuole della stessa catena. Cerchiamo di partecipare agli eventi dove fiutiamo un maggior bacino di utenza e buoni contatti.

### **3-AREA CAPITALE UMANO**

#### ***7) Come conciliate l'adozione di queste nuove tecnologie in un processo produttivo che comprende numerose fasi basate interamente sulla lavorazione manuale?***

Non è facile perché manca proprio la tecnologia in alcune cose. Per esempio, la colla: noi abbiamo introdotto in tantissime fasi la colla ad acqua ma tante volte anche volendola utilizzare in tutte le fasi non è possibile perché non è un collante sufficientemente che attacca e non è confrontabile con la colla tradizionale. Anche la tecnologia su quella materia non può essere applicata per questa ragione. Anche sui macchinari ho sentito spesso questa frase: "Non c'è la tecnologia evolutiva" perché è un mercato più fermo. L'altra cosa importante è la flessibilità delle persone e soprattutto del titolare: infatti se il titolare non è flessibile l'azienda si inchioda o prosegue con le tecnologie degli anni '80.

#### ***8) Avete attuato programmi di formazione per i dipendenti riguardo l'utilizzo delle nuove tecnologie in azienda? (formazione all'interno delle aziende, collaborazioni con il Politecnico, corsi esterni)***

Per noi la formazione è veramente importante e dove non c'è la formazione organizzata all'esterno facciamo anche noi della formazione interna (si estrapolano informazioni dall'esterno e poi vengono presentate all'interno dell'azienda). Questo succede sia da un punto di vista vendite e amministrazione (le ragazze quando fiutano dei corsi di formazione addirittura chiedono alle amministratrici di poter partecipare a determinati corsi). Se lo ritengo interessante per me è un sì subito perché preferisco in linea generale che le competenze mi vengano portate in azienda e non che io debba dipendere da qualcuno. La competenza è qui dentro, se anche un consulente viene arriva per portarmi la competenza in azienda, ma la competenza deve rimanere qua dentro. Dal 2016 abbiamo

introdotto la Paoul Academy, di cui io sono la responsabile, che è un'accademia che viene fatta in particolare per i nostri rivenditori per portare anche a loro la competenza. Tutto ciò che noi apprendiamo rimane in Paoul ma poi viene trasferita ai nostri rivenditori come mezzo formativo. Il mio problema più grande è la flessibilità mentale anche dei rivenditori: molti pensano di sapere già e questa è la peggior difficoltà per un imprenditore. Quando ti scontri sul chi sa già devi rinnovare il parco clienti alla velocità della luce. Noi stiamo attuando questa strategia perché avendo un'azienda che ha più di 50 anni e avendo affrontato diversi passaggi generazionali che hanno portato delle chiusure e avendo alcuni rivenditori che portano avanti i metodi anni '80, dobbiamo scontrarci con una velocità di apprendimento delle informazioni attraverso internet che avviene alla velocità della luce. Quindi il consumatore medio che vuole prendere delle informazioni in pochi secondi le ottiene. Se il cliente si confronta con un rivenditore con uno stile anni '80 si reca successivamente direttamente in azienda per essere seguito come ritiene.

#### **4-AREA STRATEGICA**

##### ***9) Come è cambiata la vostra strategia competitiva successivamente all'adozione di queste nuove tecnologie?***

Nel 2013 abbiamo introdotto il restyling del brand e poi il rifacimento cataloghi e la registrazione del brand a livello internazionale. I risultati non si sono visti subito concretamente perché si pensava che nel giro di 2/3 anni potesse tornare indietro. In realtà dal 2013 al 2019 in 6 anni oggi abbiamo avuto le prime risposte che Paoul è un brand di altissimo prestigio. Prima si sapeva che era tra i migliori al mondo, ora la conferma che ci arriva è che è il migliore al mondo e questo ci ha emozionato molto. Questa informazione ci è arrivata dalla concorrenza di alto livello che è quella con cui ci confrontiamo direttamente e che allo stand di Stoccarda ha fatto sapere (il direttore) che si le scarpe costano ma sono tra le più belle che si possono trovare nel mercato. Tutto questo processo di innovazione di comunicazione, marketing, immagine aziendale ha dato risposta 5/6 anni dopo.

##### ***10) Come, queste nuove tecnologie, vi hanno permesso di differenziarvi dai vostri competitor?***

A livello di marketing e comunicazione i nostri competitor hanno copiato molto. Noi possiamo fare molto di più: ci sono molte cose da sviluppare e quindi se hai anche risorse limitate in termini di persone devi capire come muoverti (se investi in formazione per esempio non puoi investire nel nuovo sito: sono tutti passaggi che vanno programmati gradualmente). Per noi non è importante per esempio quanti follower hai raggiunto nella pagina se questi sono stati comprati ma piuttosto è più importante averne un po' meno anche se fa meno immagine ma io so che quando mettono like questi sono utenti che seguono la mia pagina per loro volontà non perché sono stati comprati.

***11) Queste nuove tecnologie hanno portato dei cambiamenti nel rapporto con i vostri clienti e fornitori all'interno del distretto ed in generale?***

All'interno del distretto come cambiamenti l'azienda è vista come un'azienda innovativa quindi i nostri fornitori e clienti sanno che ci muoviamo in questa modalità. All'interno del distretto ti confronti con realtà che sono orientate alla tecnologia vedi il Politecnico che è un laboratorio di sviluppo. I clienti hanno la percezione che l'azienda è innovativa e da un servizio che gli altri non danno. Il progetto del Politecnico lo vedo più come un progetto che rimane all'interno dell'azienda poiché porta dell'efficienza che viene vista principalmente dagli addetti ai lavori. Piuttosto una consulenza che è arrivata e che ci ha permesso di evolvere dal fronte commerciale ha sicuramente segnato delle evidenze e delle innovazioni agli occhi dei nostri clienti.

***12) Come viene gestita l'innovazione all'interno dell'impresa?***

Una volta che si percepisce il bisogno, nasce l'idea o tramite un convegno arrivi alle informazioni con l'aggiornamento professionale, si parla tra amministratori e si fanno dei ragionamenti e normalmente si mette in previsione in base alle urgenze. Se si ritiene valida l'innovazione si attiva, una volta programmata a livello di budget.

***13) Dato che la sua azienda ha investito in alcune tipologie di tecnologie dell'Industria 4.0, ad oggi, sulla base dei risultati ottenuti, è dell'idea di continuare a scommettere sulla tecnologia? (Se la risposta è positiva si può chiedere se ci sono dei progetti futuri in campo)***

Sono assolutamente dell'idea di continuare a scommettere sulla tecnologia nel senso che per me un'azienda che non innova è un'azienda che è destinata comunque a calare sempre di più. Adesso la sfida per noi più importante è riuscire a sviluppare un parco clienti che sia più pertinente alla nostra linea prodotto. Continuare a stare sul Made in Italy significa, per quanto continui ad efficientare e migliorare, stare su una fascia di prezzo un po' più alta. Il nostro settore arriva fino ad un tot per quanto riguarda il mercato italiano, un po' meno per quanto riguarda il mercato europeo, ancora meno sul fronte extra UE. Si tratta di riprendere in mano i mercati e sceglierli modificando le quote percentuali di ciascun mercato e la tipologia di cliente che ti compra. Non più il rivenditore come riferimento principale ma sia il canale B2B e il canale B2C frazionandoli tutti. Poi tutta la parte dell'e-commerce per un maggior contatto con la clientela straniera.

## Calzaturificio Baldan 88 interview

### 1-AREA MADE IN ITALY

#### *1)Può descrivere brevemente la sua attività d'impresa e che tipo di prodotto realizza?*

Siamo un'azienda specializzata nella produzione di calzature da donna. Siamo un'azienda storica della Riviera poiché abbiamo 70 anni di storia. Siamo partiti concentrandoci sulla produzione di scarpe e ci siamo specializzati nella produzione di calzature da donna a livello alto. In questo momento stiamo curando la produzione di griffe internazionali, oltre ad avere una produzione a marchio proprio che è depositato e registrato. Con il nostro brand siamo stati specializzati nelle vendite all'estero fino alla stagione scorsa nello showroom ricevevamo la clientela estera. Abbiamo una produzione molto alta tutta Made in Italy nel senso che tutte le lavorazioni avvengono o all'interno dell'azienda o nell'ambito territoriale del Veneto. Stiamo implementando un progetto che ci porterà alla classificazione del prodotto come Made in Italy in collaborazione con il Politecnico. Siamo una delle poche aziende che sta seguendo questo percorso. Abbiamo scelto di collocare in questo periodo il nostro brand su un segmento molto alto del mercato e solamente sulla vendita online per una scelta di innovazione. Questo processo è accompagnato da una fase di ricerca e sviluppo che durerà altri tre quattro mesi. Abbiamo ritirato da quest'anno il nostro marchio storico dal B2B e siamo andati sul B2C per quanto riguarda la vendita online. Noi produciamo 400 paia al giorno, siamo una 70ina di dipendenti. Noi lavoriamo principalmente per il gruppo Kering, Yves Saint Laurent, Christian Louboutin, Bottega Veneta.

### 2-AREA TECNOLOGIE

#### *2)Quali sono le tipologie di tecnologie che la sua azienda ha utilizzato? (ICT, e-commerce, software gestionali, siti web, social media)*

Per quanto riguarda il 4.0 noi abbiamo investito ma il valore più importante rimane comunque l'artigianalità e la manualità che sono fondamentali nel processo di realizzazione della scarpa. Nulla toglie che ci siamo--o dotati di macchinari che sono tecnologicamente molto avanzati e computerizzati ma non sono guidati da un sistema di interconnessione per cui non vanno a dialogare direttamente con la produzione ma dialogano con altri sistemi. In questo momento noi stiamo implementando una nostra piattaforma e-commerce per la quale l'azienda ha sviluppato internamente un sito internet. All'interno dei nostri uffici abbiamo sviluppato un reparto adibito alla vendita online con figure ben definite. L'e-commerce sarà l'evolversi di questo ultimo anno poiché abbiamo investito molto per implementarlo. Abbiamo anche un sistema di sviluppo a Milano dove abbiamo il nostro showroom. Prima lo showroom serviva di supporto alla clientela internazionale soprattutto quella russa o dei paesi arabi, ora è di supporto allo sviluppo di una piattaforma e-commerce perché permette di poter mostrare in tempo reale il prodotto finito al consumatore.

**3)Quali sono le tecnologie dell'Industria 4.0 che la sua azienda ha adottato?**

Abbiamo fatto degli investimenti per quanto riguarda il CAD. Abbiamo due postazioni CAD per quanto riguarda i programmi di prototipia, di programmazione. Non abbiamo investito nel 3D perché non è necessario in questo momento per l'azienda. Abbiamo integrato la tecnologia CAD con macchine da taglio specifiche per seguire la parte della prototipia. Abbiamo investito anche per quanto riguarda i macchinari che vanno in produzione per cui abbiamo macchinari che sono tecnologicamente avanzati ma non sono interconnessi con sistemi esterni poiché gli investimenti per avere le agevolazioni fiscali sarebbero molto elevati. Abbiamo investito su quest'aspetto ma l'abbiamo intesa come tecnologia per la nostra azienda non come tecnologia per accedere ad altre risorse.

**4)Quale tipologia di innovazione avete deciso di adottare? (prodotto, processo, servizio)**

Abbiamo deciso di focalizzarci sull'innovazione di processo. Inoltre, questo passaggio è collegato al nostro obiettivo interno di certificare il sistema di qualità per quanto riguarda la produzione e tutti i vari processi che si dovrebbe concludere nel giro di uno due mesi.

**5)(Se rispondono innovazione di processo) Parliamo di realtà aziendali che puntano prevalentemente all'innovazione di processo. Come mai questa scelta? (per differenziarmi, per essere più flessibile, per offrire economie di varietà, per essere più performanti dei competitor)**

La tecnologia per noi è molto importante e vi abbiamo investito sempre di più in questi ultimi anni per poter crescere come azienda. La scelta per quanto riguarda la qualità deriva da un programma che stiamo facendo da circa un anno un anno e mezzo di organizzare in maniera più stringente tutta l'attività produttiva e tutti quanti i processi poiché il lavoro si svolge sia internamente che con laboratori esterni per cui ci deve essere un'organizzazione anche per quanto riguarda la qualità dal momento che parliamo di prodotti che hanno un grosso valore.

**6)Quali risultati avete ottenuto grazie all'utilizzo di queste nuove tecnologie? (incremento del fatturato, velocità di consegna, riduzione dei costi di produzione, raggiungere un numero maggiore di clienti, minori tempi di risposta)**

L'obiettivo principale è quello di poterci distinguere dai competitor. Vorremmo staccare un attimo da quello che fino ad ora è stato fatto qui in zona poiché per lavorare con i brand abbiamo bisogno di offrire un qualcosa in più rispetto agli altri. Noi siamo in fase di implementazione di determinati progetti (EnProMa) per cui puntiamo ad ottenere questi risultati nel momento in cui andremo ad adottare nell'intero il progetto. In questo momento c'è un investimento molto grosso di tempi e di persone che devono sistemare i processi. Quando arriveremo all'ultimazione che ormai è imminente, questione di un mese un mese e mezzo al massimo, sicuramente otterremo una riduzione dei costi, un processo molto più snello, un lavoro molto più organizzato. Di conseguenza la produttività e l'efficienza.

### **3-AREA CAPITALE UMANO**

***7) Come conciliate l'adozione di queste nuove tecnologie in un processo produttivo che comprende numerose fasi basate interamente sulla lavorazione manuale?***

Una gran parte del processo si svolge manualmente. Investendo sulle figure nuove in questi ultimi anni ci siamo focalizzati sull'assunzione di personale competente. La formazione anche su queste nuove tecnologie per noi è fondamentale, i lavoratori devono avere le conoscenze necessarie. Parliamo di un'attività che ha rilevato gli schemi vecchi riguardanti la realizzazione delle calzature che è tipico dei modellisti di una determinata età. L'ambiente con il quale ci dobbiamo interfacciare però ad oggi è completamente diverso, le scarpe che si vedono sono diverse. Da noi è evidente l'intercambio generazionale: abbiamo una modelleria interna nella quale sono evidenti le conoscenze, le tecniche, e i saperi dei modellisti più anziani, che si combinano con il sapere legato alle nuove tecnologie vedi CAD, software a supporto della produzione. Questi due aspetti interagiscono molto bene insieme.

***8) Avete attuato programmi di formazione per i dipendenti riguardo l'utilizzo delle nuove tecnologie in azienda? (formazione all'interno delle aziende, collaborazioni con il Politecnico, corsi esterni)***

Noi investiamo moltissimo sui giovani e sulle figure nuove, e abbiamo attuato anche dei programmi di formazione interna per creare delle figure che abbiano conoscenza della calzatura e che sappiano come funzionano le nuove tecnologie. I giovani sono il nostro obiettivo, li abbiamo fatti crescere internamente. Abbiamo attuato programmi di formazione interna ma anche collaborazioni con il Politecnico Calzaturiero poiché i giovani hanno seguito determinati corsi. I giovani da noi andranno avanti con conoscenze storiche ma anche con le conoscenze delle nuove tecnologie.

### **4-AREA STRATEGICA**

***9) Come è cambiata la vostra strategia competitiva successivamente all'adozione di queste nuove tecnologie?***

La nostra strategia sicuramente è cambiata. È cambiata soprattutto per quanto riguarda la parte modelleria, prototipia. Aver dotato queste fasi del supporto di una tecnologia nuova ci permette di soddisfare velocemente i brand per quanto riguarda la realizzazione dei campioni o prototipi. I brand hanno le sfilate e vengono in azienda per chiedere che velocemente vengano realizzati i prodotti. Molte volte nel giro di poco tempo gli stessi stilisti cambiano idea e chiedono delle modifiche in tempi molto brevi del prodotto. Avendo un sistema tecnologico all'avanguardia riusciamo ad avere tempistiche molto veloci.

***10) Come, queste nuove tecnologie, vi hanno permesso di differenziarvi dai vostri competitor?***

Questo permette di differenziarci da competitor che realizzano la stessa tipologia di calzature ma che non sono ancora rivolti verso le nuove tecnologie.

***11) Queste nuove tecnologie hanno portato dei cambiamenti nel rapporto con i vostri clienti e fornitori all'interno del distretto ed in generale?***

Minori tempi di consegna, rapporto con i brand che è molto più stretto. Questo si traduce in aumento della produttività, dell'efficienza e nella fidelizzazione del cliente. Lo stesso vale per i fornitori. La tecnologia ci ha aperto uno scenario che prima era impossibile avere in termini di numeri, tempistiche.

***13) Dato che la sua azienda ha investito in alcune tipologie di tecnologie dell'Industria 4.0, ad oggi, sulla base dei risultati ottenuti, è dell'idea di continuare a scommettere sulla tecnologia? (Se la risposta è positiva si può chiedere se ci sono dei progetti futuri in campo)***

Sicuramente il futuro della nostra azienda comprende l'investimento nelle nuove tecnologie che possono sicuramente dare un aiuto alla manualità. Il nostro obiettivo futuro è quello di investire sulla formiera elettronica. Le scarpe nel momento in cui devono essere montate hanno bisogno delle forme che sono dei pezzi di resina che riprendono la forma della scarpa. Le forme sono pesanti ed hanno bisogno di spazi, c'è la necessità di saperle distinguere ecc. la gestione di questo materiale quindi diventa dispersiva e le tempistiche si allungano di molto. Il prossimo investimento quindi sarà quello di avere una formiera computerizzata in cui le forme potranno essere archiviate, potranno essere utilizzate quando ce ne è la necessità, si saprà quante ce ne sono in manovia. Le forme permettono di poter programmare la produzione. La tecnologia ti aiuta e andrà ancora sviluppata sicuramente.

## **APPENDIX B**

### **Politecnico Calzaturiero interview**

#### ***1) Può descrivere brevemente le attività principali del Politecnico Calzaturiero?***

Il Politecnico non ha una sola attività principale ma ne ha sostanzialmente 3.

- 30%-40% formazione,
- 40% ricerca e innovazione,
- 20% servizi.

Nell'ambito formativo noi trattiamo persone che hanno già completato il proprio ciclo di studi o almeno superato i 18 anni. Ci possono essere persone laureate, diplomate o occupate. Abbiamo 2 ambiti: ambito giovani dove i ragazzi possono usufruire di diversi format ovvero di diverse opportunità formative che vanno dalla più prestigiosa ovvero l'ITS cioè il Percorso di Formazione tecnica superiore biennale riconosciuto dal ministero ed equivalente ad una laurea breve, alla Scuola di Design e Tecnica della calzatura che si svolge al sabato o durante la settimana con percorsi intensivi con circa 190 allievi ogni anno. È considerata il fiore all'occhiello del Politecnico ed esiste dal 1922. Sempre in ambito giovani si parla anche di Formazione aziendale sulla base dei fabbisogni delle singole aziende che usufruiscono di una particolare tipologia di finanziamento tale per cui i giovani possono partecipare a dei corsi di durata medio lunga (500 ore di aula, dai 2 ai 6 mesi di tirocinio in azienda). Questo è finalizzato a dare una formazione che consente ai giovani di entrare in azienda. In confronto al passato dove vi era un limitato numero di giovani disposti ad acquisire queste competenze, ad oggi il numero è aumentato. I giovani sono interessati ad apprendere il lavoro manuale e per questo vengono offerti loro corsi di pelletteria, imballaggio, finissaggio, CAD, gestione dei processi ecc.

Gli occupati: possono partecipare alla scuola di design e tecnica della calzatura ed in più possono partecipare a corsi di specializzazione a catalogo dove possono apprendere nozioni su (Photoshop, illustrator, CAD, gestione dei processi, qualità del prodotto e del processo, marketing e social marketing). Tutti questi corsi sono focalizzati sulle scarpe: processo formativo fatto in verticale nel settore calzaturiero.

Ambito ricerca e innovazione abbiamo 2 tipologie di progetti: progetti finestra che sono progetti nei quali andiamo a cercare le innovazioni nei centri ricerca, università e negli ambiti nei quali si sviluppano le idee, e cerchiamo di applicarli al settore calzaturiero con progetti all'interno delle aziende capendo se possono essere innovazioni o tecnologie promettenti per il settore. Una volta svolta questa attività le aziende interessate fanno dei progetti specifici sui loro fabbisogni.

Ambito servizi: prototipazione rapida, qui abbiamo un laboratorio dove facciamo conoscere le nuove tecnologie alle aziende e gli offriamo un servizio di stampo, servizi legati alla sicurezza nell'ambiente di lavoro, servizi legati al controllo qualità materiali che comprendono test e certificazioni.



**2) Ad oggi, il Politecnico è considerato il polo di riferimento ed il motore di sviluppo per le aziende della Riviera del Brenta; a che cosa si deve questo successo?**

Il successo si deve al fatto che siamo molto vicini alle aziende calzaturiere e rispondiamo ai loro fabbisogni. Per quanto riguarda la formazione: la scuola forma delle figure generaliste e noi gli diamo quella specializzazione che gli consente di saper fare le cose fatte bene in azienda, trasformiamo le idee interessanti che nascono nelle università attraverso il trasferimento tecnologico in progetti utili per il settore. Gestiamo l'ultimo miglio nei vari processi in cui interveniamo. Cerchiamo di avere quel linguaggio comune: il professore universitario e l'imprenditore molte volte non si capiscono, se parla il professore universitario con il Politecnico e poi con l'imprenditore gli viene offerta la possibilità di dialogare e capirsi un po' meglio: omogeneizzare il linguaggio.

**3) Partendo dal presupposto che il digital manufacturing sottolinea come ci sia la necessità di una maggiore diffusione della cultura tecnica e dello sviluppo di nuovi metodi di insegnamento che coinvolgano maggiormente gli studenti, quali sono i punti di forza della Scuola di Design e Tecnica della Calzatura e della Pelletteria?**

I punti di forza sono: in primis la vicinanza con le imprese perché questa è una scuola, io faccio parte del comitato direttivo dell'ACRIB, gli imprenditori partecipano ai tavoli di programmazione delle attività della scuola per cui cerchiamo di rispondere rapidamente ai fabbisogni grazie a questa forte vicinanza. Riusciamo a sviluppare corsi customizzati per la singola impresa. Vi è una forte vicinanza tra gli imprenditori e la scuola, poiché quasi tutti hanno fatto questa scuola. I docenti sono gli stessi imprenditori, tecnici e stilisti, per cui sono aggiornati in tempo reale sulle tecniche ecc. Un altro fattore è che il politecnico non è soltanto una scuola ma è anche un centro di innovazione e ricerca per cui, in qualche maniera, tutto ciò che esce dal laboratorio innovativo o dai progetti poi viene inserito all'interno della didattica.

**4) Il Politecnico offre anche un programma di formazione per le imprese rivolta ai quadri e ai tecnici delle aziende. Che cosa prevede questo corso?**

Rispetto a quelle che sono le problematiche delle aziende che emergono durante il Consiglio direttivo ACRIB, il Politecnico raduna piccoli gruppi di imprenditori per capire quelli che sono i trend del mercato, i fabbisogni che loro hanno e quindi consente di elaborare delle strategie di sviluppo che in qualche maniera poi si concretizzano in progetti. I quadri e i tecnici sono istruiti sulle ultime tecnologie e innovazioni per essere sempre all'avanguardia.

**5) Rimanendo nell'ambito della formazione, nel 2016 il Politecnico è stato riconosciuto come FabLab, con lo scopo di creare una Fabbrica del Futuro all'interno del distretto; quali sono i principali ambiti in cui opera? E la sua mission in quanto FabLab?**

Noi avevamo creato un FabLab quando non si chiamava FabLab ossia nel 2007. L'idea era quella di sperimentare sostanzialmente diverse tipologie di approcci, trovare le tecnologie che erano più idonee per questo settore quali, per esempio: prototipo estetico, prototipo funzionale che significa scarpa, realizzazione di piccole serie per le sfilate e per i campionari. Sulla base di quello abbiamo selezionato le tecnologie più idonee e abbiamo

iniziato a farle sperimentare alle imprese. Quindi volevamo essere gli apripista per quanto riguarda questi aspetti tecnologici.

**6) *Avete attuato progetti di collaborazione con le Università e le Scuole di Formazione? Se sì, con che Atenei ed Istituti? Come sono strutturati?***

Il primo nostro progetto del 2007 è nato in collaborazione con CISAS, centro interdipartimentale spaziale di Padova, con la sezione di robotica assieme al professor Rossi. Per quanto riguarda la sperimentazione di materiali innovativi abbiamo collaborato con DPCM (dipartimento per i processi chimici) del Professor Moresti, con Venezia abbiamo collaborato con il Professor Tundo per la sperimentazione di solventi innovativi per creare collanti di nuova generazione, attualmente stiamo collaborando con lo Iuav per quanto riguarda la sostenibilità, stiamo collaborando con Ca' Foscari nella sezione management con il Professor Musco e, inoltre, con il Professor Finotto abbiamo realizzato un progetto legato alla valorizzazione delle aziende e dei prodotti dei calzaturifici collegati al territorio, con l'università di Verona trattiamo la parte legislativa legata a come difender il Made in Italy e come tutelarci rispetto alle normative internazionali, con Padova con il dipartimento di ingegneria gestionale guardiamo tutta la parte legata all'efficienza delle filiere e al management delle filiere. Abbiamo rapporti anche con scuole e istituti internazionali: abbiamo creato rapporti consolidati con i maggiori centri di ricerca e sviluppo del settore calzaturiero di Spagna, Francia, Portogallo, Polonia, Grecia. Con le scuole di design abbiamo progetti consolidati con la Parsons school di New York e con l'Institut Francais de la Mode (scuola più importante in Francia). Con la Parsons vi è la possibilità di attuare progetti di scambio così gli studenti italiani possono imparare a dialogare con gli stilisti di altri paesi.

**7) *Quali tecnologie dell'Industria 4.0 si possono trovare all'interno dell'area del Politecnico dedicata all'innovazione e alla ricerca?***

Noi abbiamo appena sviluppato un prodotto che è sul mercato da settembre e che stiamo vendendo molto bene (ce l'hanno già 15 aziende) che è una piattaforma cloud che utilizza sistemi IOT per la rilevazione dei parametri fisici a distanza, e che esegue la manutenzione predittiva delle macchine che sono utilizzate nei calzaturifici fornendo dei cruscotti alle aziende per analizzare i dati della propria macchina. Altre tecnologie sono legate alla prototipazione rapida: stampanti 3d, laser cutter, frese, taglio laser.

**8) *La vostra società è molto attiva anche nel campo della ricerca e dell'innovazione di prodotto, processo, sistema e materiali. Quali sono i progetti più importanti che vi vedono impegnati nel campo dell'innovazione e quali sono i risultati che vi siete prefissati di ottenere attivandoli?***

I progetti importanti sono molti. Noi dividiamo i progetti in due categorie: quelli basati sul capitale umano e quelli basati sulle tecnologie.

Per quanto riguarda il capitale umano abbiamo sviluppato delle metodologie innovative per la capitalizzazione e il trasferimento dei saperi alle persone all'interno delle aziende, abbiamo sviluppato l'atlante del lavoro ed abbiamo analizzato tutti i processi calzaturieri per identificare le competenze di chi ci lavora. Questo è importante a livello europeo e a

livello nazionale perché ci hanno chiamato dal Ministero per elaborare la mappa specifica per tutto il settore calzaturiero italiano.

Per quanto riguarda innovazione e ricerca andiamo dai progetti rivolti al mercato per cui, per esempio, con H-farm abbiamo sviluppato nel 2007 le vetrine interattive, i configuratori di prodotto bidimensionali e tridimensionali e tutta una serie di altri totem interattivi per il campionario (tablet). Nel 2008/2012 abbiamo sviluppato un impianto automatizzato con 3 stazioni robotizzate per fare le scarpe con l'ottica di dire non sostituiamo l'uomo ma lo sostituiamo negli ambiti pericolosi e nelle operazioni ripetitive. Abbiamo realizzato un progetto Europeo che riguarda il tema delle persone che hanno problemi ai piedi, quindi tutto ciò che si può fare per migliorare la progettazione delle calzature: dall'aspetto estetico fino ad arrivare all'ottimizzazione della filiera (dal medico che visita la persona, dalla sanitaria che vende il prodotto, all'azienda che poi produce la scarpa). Un progetto che stiamo gestendo ora riguarda la tracciabilità: per quelle aziende che hanno ancora il marchio proprio uno dei temi riguarda la valorizzazione del Made in Italy, il ben fatto ed il territorio per cui abbiamo collegato la tracciabilità e la certificazione di origine con anche tutta una serie di campagne di comunicazione di tipo innovativo utilizzando social, influencer.

Vetrina interattiva: Bata ha partecipato a questo progetto e con lei abbiamo realizzato un'applicazione per consentire alle persone tramite la vetrina di chiedere quali sono i prodotti che devono arrivare dopo le svendite in programma e così via.

Tracciabilità: tag iterativo inserito all'interno delle scarpe, l'azienda certifica ciò che dirà attraverso il tag e la piattaforma, poi c'è l'ente che certifica la cosa ed, infine, vi è l'ente che consente per la prima volta alle aziende di parlare con il consumatore finale cosa che fino a ieri non succedeva perché il modello di business era: "io faccio le scarpe le porto in fiera, anzi io faccio i prototipi li porto in fiera, incontro i dettaglianti che me le ordinano, gliele vendo e poi il contatto con i clienti spetta a loro".

Il contatto con il cliente finale vi è relativamente poco: nell'ambito del rapporto con i marchi è inesistente perché è il marchio che ha il rapporto con il cliente ed il calzaturificio progetta e produce e basta. Nel caso in cui le aziende abbiano un marchio proprio hanno un dialogo con il buyer, con il rivenditore o con i negozi che, poi, hanno un rapporto diretto con il cliente.

### ***9) Come riuscite a gestire questi progetti con successo trovandovi all'interno di un distretto, come quello della Riviera del Brenta, che è uno dei più tradizionali in Italia?***

Ad oggi il successo futuro della Riviera potrebbe essere incrociare servizi innovativi con le grandi capacità artigianali. Ci sono anche aziende (poche) che in qualche maniera hanno intrapreso questa strada mentre molte altre non la hanno intrapresa. Nei prossimi anni sarà il mercato a selezionare le aziende più di successo. Il denominatore comune sia tra quelli che lavorano per i grandi marchi che, per le aziende che hanno marchio proprio è il miglioramento dell'efficienza produttiva. Questo ha portato alla nascita di molte fabbriche nuove (alcune dai marchi, altre dai calzaturieri) perché l'immagine vuole la sua parte ed ha la sua importanza.

Efficienza: miglioramento dei processi interni, riorganizzazione, adozione della lean, sistemi informativi più efficaci per l'integrazione con la filiera. Quindi il focus principale

è questo. E 'chiaro che chi si muove sul mercato sta guardando a tutti i modi che ci sono per comunicare con questo e sta pensando a comunicare qualcosa di appetibile ed interessante (non devo comunicare il vecchio). La tracciabilità diventa un elemento fondamentale se collegata con il Made in Italy, il territorio e la sostenibilità. Ci sono aziende che si sono smarcate dal modello precedente e altre che invece segnano il passo. Oggi vi è il problema della concorrenza in Italia: prima i marchi venivano quasi esclusivamente qui mentre, negli ultimi tempi, ci sono state altre zone che hanno visto calare tantissimo il loro fatturato e i loro marchi per cui hanno iniziato a fare concorrenza in questo segmento. L'efficienza è richiesta per tenere il passo.

Altri distretti: Marche, Toscana, ma adesso anche la Puglia per le sneakers e la Campania per le scarpe da uomo stanno diventando dei competitor. Oggi fra la calzatura classica e le sneakers nei campionari c'è un rapporto 7 a 1 per le sneakers. Anche alcune nostre aziende per questo stanno iniziando a produrle per rispondere alla concorrenza.

***10) Avete attuato progetti di collaborazione con le imprese del distretto?***

Sia nel campo formativo che nel campo della ricerca. Nel campo della ricerca con Bz Moda per quanto riguarda l'impianto e Ballin srl per quanto riguarda impianto automatizzato. Paul srl e Baldan 88 per quanto riguarda il sistema di gestione della manutenzione in formato automatizzato, poi sui collanti innovativi abbiamo coinvolto Peron e Sandro Vicari. Dietro tutti i nostri progetti vi sono delle aziende.

***11) Se sì, con che aziende? E come sono strutturati? Quali sono i cambiamenti in termini di risultati ed i benefici, se esistenti, che le aziende ne hanno tratto?***

Nell'ambito della tecnologia CAD che è stata una delle nostre mission principali, ad oggi, non c'è quasi più nessuna azienda che non la adotta poiché ha portato benefici nella fase di progettazione e di taglio automatico dei modelli. Adesso affrontiamo l'ambito del CAD con la tematica del 3D che è tanto che è sul mercato ma, non aveva mai risposto ai fabbisogni reali delle aziende. Alcune aziende, quindi, la stanno sperimentando ed ottengono benefici poiché riducono il numero di campioni che realizzano dal momento che arrivano ad un livello estetico e di design eccezionale e, dal punto di vista produttivo, perché uno di questi software fa lo schieramento automatico molto preciso che è uno dei punti chiave per cui tanti altri software non vengono utilizzati in 3D. Ambito dei software di progettazione.

***12) Ad oggi, quali sono gli obiettivi futuri del Politecnico nel campo dell'innovazione? Ci sono nuovi progetti che avete in programma di realizzare?***

Il sogno nel cassetto è quello di costruire un impianto d'eccellenza, un dimostratore che diventi un po' una palestra per tutto il personale delle aziende sia nell'ambito della progettazione avendo a disposizione tutte le tecnologie innovative che ci sono, sia nell'ambito della produzione riconfigurando il processo produttivo non più con la catena di montaggio ma a isole e studiando le singole isole per capire come è possibile automatizzare alcune operazioni di queste isole specifiche.

Per quanto riguarda le nanotecnologie noi abbiamo fatto una serie di progetti per vedere che impatto potevano avere nei nostri processi. Un risultato positivo lo abbiamo avuto quando abbiamo sperimentato l'arricchimento con delle polveri (anche Del Brenta) degli abs che si utilizzano per lo stampaggio dei tacchi ottenendo delle prestazioni molto buone. Poi queste sono state trasferite all'industria. Abbiamo provato progetti innovativi anche per i trattamenti superficiali delle pelli, della tomaia e delle fodere ma ci siamo fermati a livello sperimentale perché non è arrivata la risposta da parte di alcuna azienda.

Nell'ambito della sostenibilità: abbiamo messo a punto servizi per cui le aziende che vogliono certificarsi con le diverse tipologie di certificazioni nel campo dei tessuti, delle pelli ma anche delle calzature possono farlo. Attualmente non ci sono molte risposte dalle aziende perché quelle che lavorano con i marchi sono già state spinte ad adottare questa tipologia di politiche per cui hanno dei capitolati rispetto a cui devono garantire la sicurezza del prodotto, la sicurezza nell'ambiente di lavoro, di responsabilità sociale e di responsabilità. Per quelle a marchio proprio che potrebbero sfruttare la sostenibilità anche dal punto di vista promozionale siamo un po' agli albori. Il tutto è legato al progetto della tracciabilità ed al progetto che si sta realizzando in collaborazione con l'università riguardante la sua applicazione al mondo calzaturiero. Noi abbiamo un'azienda che fa tutto vegano e utilizza materiali bio e certificati ed un'altra che utilizza solo materiali naturali per fare le scarpe.

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