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**Exploring the Artificial Intelligence
implementation: understanding its perception
and its applications.**

Relatore:

Prof. Andrea Perna

Tesi di Laurea di:

Giuliani Beatrice

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ABSTRACT

In questa tesi si affronterà il tema dell'intelligenza artificiale: la sua implementazione e le sue applicazioni all'interno di un'azienda.

Si cercherà di spiegare come queste tecnologie pur essendo nuove e non ancora ben implementate, nel mercato e nelle aziende, abbiano una forte rilevanza per aiutare i lavoratori e le stesse aziende a migliorare l'efficienza e il lavoro stesso.

La tesi si basa su un approfondimento teorico, svolto tramite la lettura di libri, articoli scientifici e attraverso interviste ad un ricercatore PhD nel settore dell'intelligenza artificiale, delle nuove tecnologie di intelligenza artificiale che si stanno evolvendo sempre di più nel mercato e delle percezioni che le organizzazioni hanno di queste tecnologie per poi finire con un'analisi dettagliata di tre aziende e di come implementano e utilizzano l'intelligenza artificiale.

Nei seguenti quattro capitoli si affronterà questo tema sotto vari aspetti, si tratterà sia della parte teorica, nel primo capitolo, cercando di spiegare che cosa sia l'intelligenza artificiale, i vari livelli di intelligenza artificiale, la sua storia quindi si cercherà di dare una visione completa su cosa sia l'intelligenza artificiale e le varie applicazioni di intelligenza artificiale che si stanno sviluppando.

Nel secondo capitolo si cercherà di sviluppare l'argomento più nello specifico cercando di capire come l'intelligenza artificiale viene percepita dai lavoratori

all'interno di un'azienda, dai manager che gestiscono l'azienda e come essi si pongono nei confronti di queste nuove tecnologie.

In questo secondo capitolo si parlerà anche di come l'intelligenza artificiale possa aiutare a migliorare il lavoro quindi dei pro e contro di queste nuove tecnologie e come potrebbe cambiare il mondo del lavoro nei prossimi anni.

Nel terzo capitolo verranno presentate tre aziende: Xelexia Srl, Grottini Lab, Benelli Armi, queste aziende sono state contattate in un primo momento tramite email e poi attraverso un'intervista telefonica in cui sono state sottoposte al manager una serie di domande specifiche sui vari aspetti dell'implementazione delle tecnologie di intelligenza artificiale all'interno dell'azienda, sulla percezione sia dei lavoratori sia dello stesso manager intervistato e come l'intelligenza artificiale abbia portato benefici sia in termini di profitto sia in termini di efficienza.

Le tre aziende sono state selezionate perché esse utilizzano in tre diversi modi le nuove tecnologie di intelligenza artificiale.

Attraverso le interviste in un primo momento si è cercato di capire chi fossero le aziende, in che tipo di mercato di sviluppano, che tipo di organizzazione adottano, e quanto le aziende hanno investito e quando hanno guadagnato grazie alla tecnologia utilizzata.

In seguito si è cercato di entrare nel vivo della tecnologia di intelligenza artificiale che viene utilizzata da ogni azienda perciò ci sarà una breve introduzione su che tipo di tecnologia viene utilizzata, poi si spiegherà come i lavoratori e/o utilizzatori

che si rapportano con queste aziende hanno visto l'avvento di queste nuove tecnologie e come hanno reagito dovendoci lavorare insieme.

Nel quarto capitolo si sviluppa un'analisi dei risultati ottenuti tramite le interviste e delle ricerche teoriche svolte nei primi due capitoli; si cerca di capire come teoricamente è vista l'intelligenza artificiale e come in pratica all'interno di aziende diverse, startup, piccola-media impresa e grande azienda, si sviluppano, si organizzano, si percepiscono queste tecnologie.

L'analisi si sviluppa in tre diversi livelli: una prima analisi sulle diverse tipologie di intelligenza artificiale tra le varie aziende spiegando anche in base alla teoria trattata nei capitoli precedenti come esse funzionano; il secondo paragrafo di questo capitolo mette a confronto come le varie aziende e i lavoratori hanno percepito e si sono rapportati con queste nuove tecnologie affrontando anche il tema della privacy e della paura di perdere il lavoro.

Nella terza parte dell'analisi si sviluppa un'analisi in base alle opportunità e vantaggi che l'utilizzo di queste tecnologie portano in azienda e confrontando i vari risultati ottenuti dalle interviste e i dati che ci sono stati inviati in merito a profitti e investimenti.

Questo lavoro è volto a focalizzare le barriere, le limitazioni e le potenzialità dell'intelligenza artificiale quando essa viene implementata.

INTRODUCTION

In this thesis we will address the issue of artificial intelligence: its implementation and its applications create benefits in a company.

We will try to explain how these technologies, despite being new and not yet well implemented in the market and in companies, we have a strong relevance to help workers and the companies themselves improve efficiency and work itself.

The thesis is based on a theoretical deepening, carried out by reading books, scientific articles and interviews with a PhD researcher in the field of artificial intelligence, of the new artificial intelligence technologies that are evolving more and more in the market and of the perceptions that the organizations have of these technologies and then finish with a detailed analysis of three companies and how they implement and use artificial intelligence.

In the following four chapters we will address this issue in various aspects, it will be both the theoretical part, in the first chapter, trying to explain what artificial intelligence, the various sub-types of artificial intelligence, its history will therefore try to give a complete view on what is artificial intelligence and the various types of artificial intelligence that are being developed.

In the second chapter we will try to develop the topic more specifically by trying to understand how artificial intelligence is perceived by workers within a company,

by managers who will have to go to coordinate departments or companies that use these new technologies and how they approach these new technologies.

In this second chapter we will also talk about how artificial intelligence can help improve the work and therefore the pros and cons of these new technologies and how it could change the world of work in the coming years.

In the third chapter, three companies: Xelexia Srl, Grottini Lab, Benelli Armi, these companies were contacted at first through e-mail and then through a telephone interview in which a series of specific questions on the various aspects of the implementation of artificial intelligence technologies were submitted to the manager. within the company, on the perception of both workers and the interviewed manager himself and how artificial intelligence has brought benefits both in terms of profit and in terms of efficiency.

The three companies have been selected because they use the new artificial intelligence technologies in three different ways.

Through interviews at first, we tried to understand who the companies were, what kind of market they are developing, what kind of organization they adopt, and how much the company has invested and when they have earned thanks to the technology used.

Later we tried to get to the heart of the artificial intelligence technology that is used by every company so there will be a brief introduction on what kind of technology is used, then how the workers and / or users that relate to these companies they saw

the advent of these new technologies and how they reacted by having to work together.

In the fourth chapter an analysis of the results obtained through the interviews and theoretical research carried out in the first two chapters is developed; we try to understand how artificial intelligence is theoretically seen and how in practice in different companies, startups, small-medium enterprises and large companies, these technologies are developed, organized and perceived.

The analysis is developed in three different subtypes: a first analysis on the different types of artificial intelligence among the various companies explaining also on the basis of the theory dealt with in the previous chapters how they work; the second paragraph of this chapter compares how the various companies and workers perceived and related to these new technologies, also addressing the issue of privacy and the fear of losing their jobs.

In the third part of the analysis an analysis is developed based on the opportunities and advantages that the use of these technologies bring to the company and comparing the various results obtained from the interviews and the data sent to us regarding profits and investments.

This work is aimed at focusing on the barriers, the limitations and the potentialities of artificial intelligence when it is implemented.

1- SHORT OVERVIEW OF ARTIFICIAL INTELLIGENCE

1.1 INTRODUCTION OF ARTIFICIAL INTELLIGENCE

In the course of modern history, some events have greatly changed the fate of human destiny; the first and second industrial revolution, respectively in the second half of the 18th century and after the discovery of electricity (approximately 1870), are two of the best examples that can be taken into consideration.

The technological innovations that have been introduced in the production (in particular in the textile and metallurgical sector) have significantly changed the lifestyle of the population creating not a few discomforts and imbalances.

Nevertheless, we are still living in an industrial revolution, which some call "Third industrial revolution": this started in the first half of the eighties of the twentieth century and has not stopped.

Like the previous ones, this too is represented by a strong push towards technological innovation and the transformation of production processes.

Although all the fields of the economic-industrial sector have been widely developed, the third industrial revolution has concentrated very much in the field of electronics, information technology and telematics.

These are certainly the sectors that, even today, undergo frequent transformations and affect the productivity and life of people.

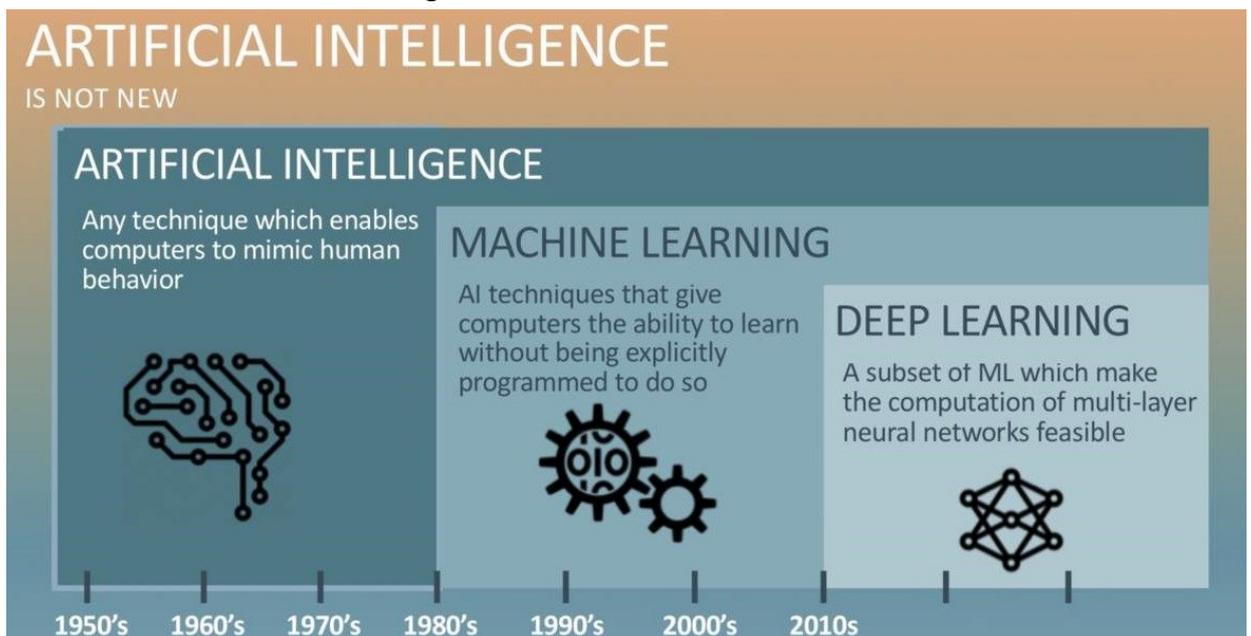
When we talk about digital and in particular about the digital revolution, we refer to the digital technologies that have been developed over the years with a common base: the Internet.

In chronological order, however, other equally important technologies must be considered:

- 1947-1979 - transistors, electronic devices that allow to control the current of a circuit, have laid the foundations for the development of the most advanced computers.
- 1980 - the computer became a machine available to a wider audience and before the end of the 80s it will become a necessity for many jobs. In these years the first mobile phone was introduced on the market.
- 1990 - one of the most used innovations still today has been introduced in this decade, i.e. the World Wide Web. By 1996 internet became a necessity in some sectors and before the end of the millennium, it became available for half of the American population.

- 2000 - in the 21st century, the digital revolution began to spread around the world: mobile phones became common objects, the number of internet users continued to grow and television stations started to change signals from analog to digital.
- 2010 - Internet is available for over 25% of the world's population, tablets and smartphones are part of everyday life. Mobile Internet traffic exceeded the fixed traffic and the cloud has effectively entered the digital ecosystem.

Evolution of artificial intelligence:¹



Oracle (2018)

¹ Oracle (2018)

The term Artificial Intelligence (AI) is officially introduced in computer language in 1956, on the occasion of the congress of Dartmouth College in Hanover.

Attended by the most important representatives of the new discipline and designates a branch of computer science and engineering that deals with identification of models for the development of algorithms that allow machines, or computers, to emulate intelligent skills at least in specific domains.

The definitions of Artificial Intelligence abound, but still there is not one that explains the science in question.

The first step is to understand what "intelligence" means when it is applied to machines.

Intelligence is that "complex of psychic and mental faculties that allow us to think, understand or explain facts or actions, to elaborate abstract models of reality, to understand and be understood by others, to judge and adapt to the environment"².

According to Mainstream Science on Intelligence, a 1994 statement, intelligence is:

² Treccani.it

“A general mental function which, among other things, involves the ability to reason, plan, solve problems, think abstractly, understand complex ideas, learn quickly and learn from experience.

It is not just about learning from books or about cunning in tests.

Rather, it reflects a wider and deeper ability to understand what surrounds us, to grasp things, to give them meaning”.

The more this intelligence is attributable to computational skills the more it is mechanized, one of the things that distinguishes the machine from the man in the definition is that intelligence also includes the ability to experience the environment and above all the imagination and the creativity in autonomy.

Generally understood as the mechanization of human thought, Artificial Intelligence has received different definitions that have underlined its ability to simulate man in the use of thought or that of constructing rational computational models.

In the literature, Artificial Intelligence is defined as "the ability to exercise the cognitive functions that lead back to the human mind, such as perception, reasoning, learning, interaction with the environment, problem solving and even creativity"³.

³ Wikipedia.it

In a more general definition, we could say that artificial intelligence is the study of intelligent agents, understood as digital systems that work not based on rule-based programming but based on an autonomous ability to generate rules for data analysis and the consequent decision-making.

The definition of Artificial Intelligence can, however, also refer to Artificial Intelligence as an enhancement of human abilities and include a vision of humanity's future.

In another the Artificial Intelligence is in general the strengthening of human cognitive abilities through software and automation and this can not but have a positive impact on the wellbeing of humanity.

1.2. THE DIFFERENCE ABOUT STRONG AI AND WEAK AI

Speaking of Artificial Intelligence it is important to distinguish between weak AI and strong AI.

The weak AI is that which is spoken in the newspapers and which characterizes the most common applications. We therefore speak of AI as an enhancement of human cognitive faculties, through the grafting of computational power and algorithmic sophistication into specialized activities.

In this sense Artificial Intelligence is useful in recognizing objects or people, in evaluating specific risks in certain environmental contexts, in predicting events and behaviors and supporting also mechanical actions starting from these analyzes and evaluations, but the objective of replicate the full range of human intellectual abilities

On the contrary, when we talk about strong AI, following the definition of the University of California by Berkeley, we talk about that type of AI whose ultimate goal is the development of machine intelligence to the point where their intellectual abilities are functionally equal to those of humans.⁴

In this case, it is a question of considering Artificial Intelligence as a replica of human intelligence.

There are examples that suggest a progressive hybridization between humans and computers⁵: for example Alpha Go, the Google AI system, a software that is able to defeat a human master in the game, for example poker, that is, not only using arithmetic but also the ability to develop moves on intuition and has the ability to bluff.

The research on the strong AI is continuing, however, not by crossing the research and development of weak AI.

⁴ www.ocf.berkeley.edu/~arihuang/academic/research/strongai3.html

⁵ Kurzweil

At the base of both Artificial Intelligence, there are above all machine-learning technologies, which are centered exactly on the ability of machine learning. The ability to make predictions is certainly the heart of the Artificial Intelligence, thanks to it and to the so-called prediction machine the costs regarding the forecasts are drastically reduced over the years.

This has led to the use of AI-based systems more and more to solve problems typically encountered through the ability to predict behaviors and events.

The decrease in prediction costs is pushing the spread of this approach to the organization and management more markedly, inducing specialists to translate more and more any problem into a prediction problem in order to be able to deal with this technology, which has become increasingly cheap over time

1.3. CONTRIBUTION OF MACHINE LEARNING AND DEEP LEARNING

Machine learning is a branch of artificial intelligence that brings together a set of methods, developed since the last decades of the twentieth century.

Machine learning develops with the study of artificial intelligence, and is closely linked to it: in fact, already by the first attempts to define artificial

intelligence as an academic discipline, some researchers had shown interest in the possibility that machines could learn from data.

Machine learning answers the question: "how can we put the computer in a position to choose the most effective algorithm to reach a certain objective, starting from the available data and on the basis of what the computer has learned from the previous data and elaborations?"

Machine learning is therefore a software approach to discover associations between data, which have the predictive capacity.

The software extracts the functions that map the relationships between the various input variables and these targets; we need many data and many iterations to find and optimize these functions.

An example of machine learning is the self-driving saddle car development, using the prediction problem approach the self-driving car becomes a system in which automatically activate a series of decisions that a good driver would take in different contexts and situations, i.e. to enable the system to predict these human decisions in order to be able to replicate them, with adequate timing and procedures.

To better understand machine learning, just compare the self-driving car explained above with cruise controls.

In the case of the latter, the driver sets a certain speed and the car accelerates or decelerates according to this pre-programmed rule and to the data detected by the speed sensor.

So briefly, a rule is established and through this sensor this pre-programmed rule is respected, there is no possibility of action that is not previously set.

In the case of the self-driving car instead not only uses sensors and processing of more complex data but what makes the real difference is that it is able to predict what will happen and understand what is the most effective and / or efficient, based on to the objectives of the system, learning from experience.

In this case, the rewards are the feedback that the system was able to not collide with obstacles on the road in specific environmental and action contexts.

To make the machines learn different types of algorithms are used, in the case explained above the algorithms serve to foresee events / behaviors and to recommend / decide actions based on three main activities / objectives:

- Individualization of objects
- Identification of objects
- Location of objects and motion forecasts

Recently, deep learning has become the heart of Artificial Intelligence that is the version of machine learning based on neural networks.

In 1943, the first artificial neuron was conceptualized, proposing a computational model of the neuronal system of the human brain.

During the 1950s, this approach was applied to a system to reduce interference in telephone networks; since then, much progress has been made.

Deep learning is based on neural networks, i.e. it refers to an automatic learning based on the complex organization of conceptual networks.

Neural networks are networks of factors or concepts that are increasingly abstract, so complex that they can include several million connections between nodes; such connections can be weak or strong, depending on how much one neuron affects the other.

Deep learning is not based on calculations or algorithms to pass from an input to an output, unlike traditional programming.

A network of neurons is trained with many examples of input data that correspond to specific output data, once the neural network has "learned" is able to give answers to the input never seen before in training.

According to some scientists involved in the study of artificial intelligence, there are few basic principles and few fundamental laws that explain these processes.

Machine learning is "learning from examples and data, knowledge is the basis of intelligence"⁶.

⁶ Bengio, 2016; Mandelli, 2018

Learning, the construction of knowledge, is not a process that can be easily formalized: there are many things that humans know intuitively, i.e. knowledge that we do not have access to through words; the solution is to teach machines to build this knowledge on their own.

To understand the intuitive knowledge you can take the example of a child throwing a ball and without knowing the laws of Newton will already know that the ball will bounce on the floor.

This knowledge is called intuitive physics, the child discovers these laws alone, and it is precisely the ability to learn the greatest challenge for Artificial Intelligence by themselves. Humans when they interact use abstractions and concepts, for example words with specific meanings.

In deep learning, the machine must know that there are increasingly abstract levels associated with the most basic input and must be able to access these deep meanings when necessary.

Machines can do this through increasingly unsupervised learning, on the contrary in supervised learning the machine is taught to recognize an image by subjecting many examples of what is meant in that image.

In the unsupervised learning, the machine, on the other hand, learns to understand what an image represents starting from data that it has in input and continues to arrive.

For example, in the self-driving car you use unsupervised learning to make the machine understand how to behave on the road, which is equivalent to the fact that we do not have to die in the car to understand what happens if we make a tragic driving error.

To conclude in unsupervised learning, it is a matter of teaching the machine to create plausible images of the future, which is to imagine "what could happen if ..." even without giving data on what really happened in that situation.

1.4 THE PHILOSOPHY OF AI

Nowadays the business has been transformed from weak AI applications, specialized applications that do not have more general objectives to more and more specialized artificial intelligence technology, in particular, deep learning, and consequently this technology opens up possibilities that refer to models of learning, experience and decision-making that once we considered typical of general intelligence.

To understand the development that the strong AI is undergoing in recent years we must take a step back and understand the biological and neurological processes that govern the mental processes of man, in this way it becomes possible to imagine the artificial replication of human intelligence.

Throughout history, various philosophical hypotheses have been developed concerning mind / body dualism.

The various philosophies that have developed over the years into three macro-philosophies can be summarized and each of them can be connected with a different implication for the development of artificial intelligence:⁷

Philosophical hypothesis	Materialistic hypothesis	Mentalist hypothesis	Hermeneutic-personological hypothesis
	The mind is a product of brain processes	The mind (soul) cannot be traced back to bodily phenomena	Brain processes produce mental processes but also culture, which in turn changes these processes and reality. The mind / knowledge is relational, not simply neurological.
	↓	↓	↓
Implications for the development of	Feasibility of strong AI, although	Development limited to weak AI.	Ambitious goals such as those of strong AI but starting from a non-

⁷ Mandelli, 2018

artificial intelligence	difficult to understand the complexity of human brain processes.		anthropocentric, emergentist and neurophenomenological view of human intelligence and knowledge.
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Although through this scheme we can see how we can connect the human mind to a development in the field of artificial intelligence, the problem of the relationship between language learning and the learning of physical reality remains to be solved, and the relationship between individual action and social interaction, one of the major problems concerning language is the possible universality of the methods of acquisition of the grammatical structures of languages.

These abilities for the human being are considered innate and genetically inherited.

Cognitive technologies developed in recent years have made the distinction between natural intelligence and unnecessary artificial intelligence.

We can not define intelligence as a merely psychological phenomenon, but not only cognitive and neurological.

Intelligence is a skill that can connect, associate, connect fragments of reasoning, stories, routine or routine actions and hook them to a variety of structures, some of which are neural networks, some are software, others of images, others of ritual conversations.

In this perspective if we want to replicate the intelligence we must take it with the right complexity.

Concluding, Artificial Intelligence can be defined as an ecosystem in which very different computational guidelines are identified: predictive analytics, natural language generation, prescriptive analytics, machine learning system, deep learning.

This description focuses on the objectives of these different computational guidelines; at the base of the computational guidelines listed above there are machine learning technologies, which however follow technological or functional-specific developments.

Trying to identify the boundaries of development, Peter Buell Hirsch⁸, a professor at Stanford University, describes the current state of Artificial Intelligence as the combination of these capabilities:

- Machine learning algorithms
- Deep learning

⁸ Hirsch (2017)

- Reinforcement learning
- Robotics
- Computer vision
- Ability to interact with people through true dialogue
- Collaborative systems
- Algorithmic game theory and computation, social choice, the social and economic dimension of AI.
- IoT, possibility to collect and process data from each device

Among the various definitions of Artificial Intelligence used and usable, we can find some that emphasize the possibility for machines to replicate human intelligence, while others suggest to abandon an anthropocentric view of the world and cognitive skills to explore the potential of new hybrid networks, others still prefer to focus on a specialized application vision, that is, how we can use these technologies to improve the lives of people and communities and to explore new business opportunities.

In a broad sense it can be argued that Artificial Intelligence is actually the stage at which digital technologies have arrived today, a stage that at the managerial level places great emphasis on the availability and use of data, the ability to forecast and automate many decisions and actions that were previously the responsibility of human personnel and managers, with the aim of increasing their efficiency and effectiveness.

2- HOW IS ARTIFICIAL INTELLIGENCE PERCEIVED ON MANAGEMENT? PRELIMINARY OSERVATION

2.1- DEVELOPMENT OF ARTIFICIAL INTELLIGENCE IN ITALY

“Confused and back on the times.⁹” this is how Italian companies are described by the Observatory on Artificial Intelligence of the Politecnico di Milano in its latest Report.

Confused because they do not yet have a clear idea of what artificial intelligence is and what its advantages are.

Back because only 12% of companies have brought an artificial intelligence project up to speed, one in two is going to do it and 31% have pilot projects underway, but only 21% has already allocated a budget.

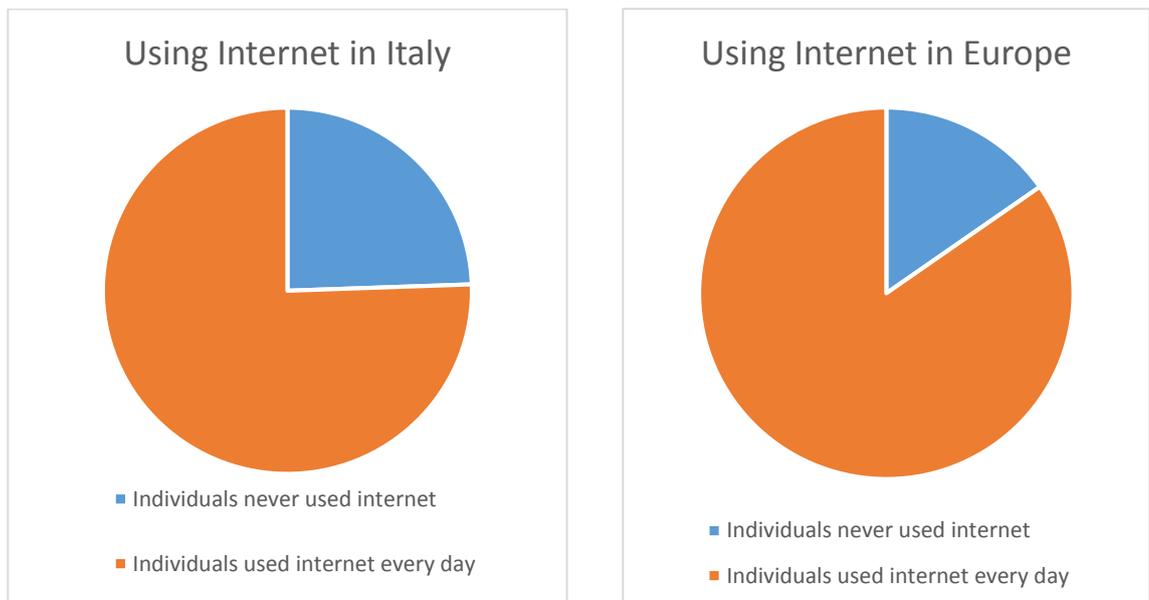
And it's mostly large corporations or multinationals so what in other countries is a market that is advancing even if slowly, in Italy it is still in its infancy, with an expense for the development of algorithms of just 85 million euros in 2018.

So we can deduce that Italy is late on the front of innovation, artificial intelligence and in general on all connected services.

⁹ Observatory on Artificial Intelligence of Politecnico di Milano (2017)

In Italy, 22% of individuals have never used the internet in 2017 (compared to a European average of 13%) while 68% used the internet every day (compared to a European average of 72%).

Despite the serious immaturity of our country in the use of the internet, it is interesting to highlight how Italy ranks first among European countries in relation to the time spent on the internet daily.



As regards the data relating to the use of digital services, the analysis of data shows a serious delay in Italy in relation to all the activities analyzed: in relation to the most elementary of activities, namely the sending and receiving of emails,

Italy records a percentage equal to 55% compared to a European average of 72%.

We are the last in Europe for calls and video calls made, with a percentage that stops at 28% and with regard to the online search for information on goods and / or services, there is a percentage of 38%.

Also with reference to the banking/financial sector, Italy reveals a certain immaturity.

And in fact, if you look at the purchase or sale of shares, bonds, funds or other investment services, the purchase or renewal of insurance policies, the granting of a loan or credit management by banks or other financial entities Italy is far behind, with a percentage of 7% compared to a European average of 15%. Compared to internet banking, compared to a European average of 51%, in Italy in 2017 the percentage of individuals who resorted to internet banking stopped at 31%.

Italy is the fifteenth in Europe for potential in artificial intelligence, slightly above the average of EU countries but still back on skills, especially those related to the analysis and use of big data.

The term big data generically indicates a collection of data so extensive in terms of volume, speed and variety that specific technologies and analytical methods are required for the extraction of value or knowledge.

The term is used in reference to the ability to extrapolate, analyze and relate an enormous amount of heterogeneous, structured and unstructured data, in order to discover the links between different phenomena and predict future ones.

Leading the ranking is Belgium followed by the Netherlands, Malta and Denmark.

According to some studies it is expected that the market for artificial intelligence technology will grow at an average annual rate of 65% in the period 2017-2022 to reach 300 million euros in 2022 from a starting value of 24 million in 2017.

More than 70% of the realities that deal with artificial intelligence in our country are companies or startups, followed by universities (11%) and research centers (10%).

Most are found in Lombardy (21%), Lazio (18%), Emilia Romagna (12%) and Campania (9%).

The most widespread Artificial Intelligence technologies in the various realities present in Italy are machine learning and deep learning, followed by natural language and Chatbot processing systems.

"Artificial intelligence is one of the most promising technologies of our time that will help solve some of the greatest problems of the century: from the treatment of chronic diseases to the fight against climate change to the

anticipation of cyber threats,"¹⁰ the economist Stefano da Empoli said, who then underlined the importance of launching a definite national strategy on the subject as soon as possible: "It is difficult to imagine that Italy could become a leading country in the production of hardware or software related to artificial intelligence, even if in some areas, especially B2B, it is right to engage in the international challenge. What is certain is that, if our country wants to remain on the frontier of economic and social development, it must at least become a leader in the adoption of artificial intelligence technologies ".

Artificial Intelligence was born in the 50s, but it is only today that the technological advances recorded in the field of computing power, the availability of data and the ability of their analysis to solve complex problems have allowed applications to be born and spread.

The basic technologies are mature, and through cloud, services are available at affordable costs.

However, a design approach is needed to introduce artificial intelligence into processes.

If until 10 years ago the barriers to the introduction of companies were linked to the lack of equipment, or inadequate analytical skills, the topic today is not technological, but mainly cultural and of specific competences.

¹⁰ Stefano da Empoli

According to experts, today 70% of the effort related to an Artificial Intelligence project is for process redesign, 10% for algorithm writing and only 10% for the technological part.

Currently the most advanced sectors in the adoption of artificial intelligence projects are banks, finance and insurance, automotive, energy and logistics.

2.2- HOW ARTIFICIAL INTELLIGENCE CAN HELP THE FIRMS

Artificial intelligence in this new industrial revolution, in which the network is increasingly bursting and mixes the physical and virtual dimensions, changes the way we understand, decide and evaluate and therefore the way we do business.

According to a recent report on the state of artificial intelligence applied to business¹¹, these technologies are now applied primarily in all activities where classification, forecasting and clustering are useful or necessary to solve problems or support decisions.

¹¹ Mandelli (2018)

- According to this report, some researchers have identified that in most cases artificial intelligence technologies are used with an incremental orientation, to add value and efficiency to ongoing processes.
- The three macro categories of use that have shown the greatest potential so far are:
 - The management of process anomalies;
 - Logistic and scheduling optimization;
 - Customer service and personalization.
- Artificial intelligence can also be useful in many sectors within a company. Here are some examples of how artificial intelligence can be useful if implemented within a specific sector.

ARTIFICIAL INTELLIGENCE AND HUMAN RESOURCES

The search for the ideal candidate is a demanding and strategic activity, which takes a lot of time for the Human Resources team. Analyzing CVs is increasingly difficult and a quick reading of the data does not always guarantee effective correspondence to the skills and abilities the company needs.

An in-depth analysis is needed, for example comparing the experiences and background of an employee already present in the company, verifying the actual

level of knowledge of a software based on the years in which it was used.

Artificial Intelligence helps.

On the market, as-a-service solutions are coming that can support the recruiting activity, such as the one developed by Avanade and based on Cortana, currently used internally by the same company.

The tool supports the Human Resources managers in selecting a shortlist of open positions in the company, leaving the final decision to the HR managers and managers of reference.

It consists of a dialogue interface integrated with the Robotic Process Automatization and internal company databases, the search interface on the network (in particular on LinkedIn) and matches the skills present in the corporate database, returning a list of profiles with percentage compatibility values.

The solution therefore maintains a human-centered approach but is enhanced by the capacity of automation and Artificial Intelligence, thus redesigning the talent search experience, drastically reducing the time required for research and increasing the quality of the results.

ARTIFICIAL INTELLIGENCE AND MARKETING

In the Marketing sector Artificial Intelligence systems used in different activities and with various objectives have been seen for some time; the most important undoubtedly concerns the management of the relationship with users, which has always been the focal point of any brand, even in the B2B world.

The Artificial Intelligence technologies used range from voice / virtual assistants (Chatbot and systems such as Siri from Apple or Cortana from Microsoft) that exploit artificial intelligence algorithms both for natural language recognition and for learning and analyzing habits. of user behavior, up to the most sophisticated engagement mechanisms that include the real-time analysis of large amounts of data (especially on social media) to understand the "sentiment" and the needs of people with activities that go as far as to forecast purchasing behavior from which to derive communication strategies and / or service offers.

Chatbot and other systems based on the Natural Language Program are now widely used also within the departments that deal with customer assistance, service and support (contact center, customer service, maintenance and support, etc.

This sector is a sector in which artificial intelligence has developed more, especially in the field of Customer Relationship Management (CRM).

The CRM develops a support for the customer in his experience personalizing as much as possible and creating a sort of relationship between the company and the customer.

To better explain the concept of journey experience we must refer to different aspects:

- Artificial intelligence for personalization and the offer of dynamic marketing
- Artificial intelligence for brand engagement
- Smart and robotic services
- Real-time relationship risk management.

Regarding the first point, the "new" consumer wants more and more personalization.

In the previous years the so-called one-to-one marketing had developed that allowed not only to segment the market but also to personalize the customer's shopping experience; with the new algorithmic approaches, however, it becomes possible to increase the ability to propose content, services and experiences by automatically customizing the offer and communication to individuals, also taking into account their previous research.

This type of customer approach is not only useful in B2C relations but also in B2B ones, client managers are particularly demanding because they are very

informed about their options and because their competitive field has become global and turbulent.

With regard to artificial intelligence for brand engagement, we can easily explain that consumer engagement is often the goal of campaigns carried out by companies on social media.

This process is not always easy, above all, to choose the contents to be shared based on this objective, on the one hand it becomes important to have de insight on the expectations and interests of the individual targets, which can be extracted from the intelligence platforms enhanced through machine learning; on the other hand it is also important to understand the context where that engagement can be generated in the most positive way for the consumer and the brand.

Artificial intelligence also helps to stimulate the direct involvement of employees in brand engagement on social media, being more reliable as a source of consumer information than managers of the same companies.

Considering the third point, smart and robotic services, we refer to services that can be provided thanks to the use of data and the automation made possible by artificial intelligence and robotics technologies.

An example of this category of services are smart products that have within them an artificial intelligence incorporated, managing to integrate data on the preferences of users coming from a multiplicity of systems and interactions.

For example, as shown above, a very well-known example is Chatbot.

Regarding the last point, the real-time relationship risk management, concerns above all the reputation crisis management, therefore we talk about the fact that companies at the time of social media have to deal with processes of spreading information amplified and viral.

These crises can have internal origins, for example the manager's incorrectness, or external; in the latter case not much can be done to avoid it being caused by negative externalities.

Social media can have a very significant impact on the formation of perceptions, attitudes and opinions of customers and stakeholders, through big data and artificial intelligence managing internal crises has become simpler, for example through the identification of fake news or of negative influences.

Furthermore, through predictive analytics it is also possible to anticipate critical behaviors and events by individual influencer.

ARTIFICIAL INTELLIGENCE AND SUPPLY CHAIN MANAGEMENT

The application of artificial intelligence techniques in supply chain organization can create substantial value in many processes starting from logistics.

These technologies can optimize routing plans, improve efficiency and reduce time.

The theme of risk management is of fundamental importance also for the optimization and management of the supply and distribution chain where, in addition to sophisticated analysis, we also need "intelligent systems" capable of connecting and monitoring the entire supply chain and all the actors involved.

One of the most interesting cases of use of Artificial Intelligence, in this context, concerns the Order Management activities within which the technologies that exploit artificial intelligence are not only aimed at simplifying the processes but also at their total integration , from the purchases to the inventory, from the warehouse to the sales up to the integration with the Marketing for the preventive management of the supplies according to the promotional activities or the communication campaigns.

2.3- STRONG AND WEAK POINTS OF ARTIFICIAL INTELLIGENCE

When we talk about which technologies are revolutionizing business processes, we cannot but think of the impact of artificial intelligence in the world of work.

We must ask ourselves when it is necessary to integrate it in order to avoid being left behind with respect to our competitors, with future economic damage, and how to avoid adopting solutions that instead risk not bringing real added value. In fact, Artificial Intelligence in the world of work has both strengths and limits. Company managers are left with the task of understanding which solutions can bring value to their business and when, instead, the human footprint is still fundamental.

STRONG POINTS

- Artificial Intelligence helps companies to free and raise the quality of human work, helping to increase turnover and profits and to acquire new customers, as well as limiting the risks of an activity and improving efficiency in general. Artificial Intelligence, however, serves not only to optimize the contribution of human labor, but also to:
- Amplify human intelligence: Artificial Intelligence acts primarily as an aid to expand human intelligence, providing contextual knowledge from data that the human mind alone could not access and process;
- Free workers from trivial or burdensome tasks: there are functions in the company that require little human cognitive effort;

- Enable robotic processes for self-improvement and self-correction: Artificial Intelligence technologies can be very useful in cases where there is no direct interaction with the human being after an application has been set and started.

Artificial Intelligence, therefore, has the potential to bring great changes throughout the enterprise, transforming it into an ecosystem, since it will push in these directions:

- Accelerated transformation in customer-facing applications. The service and customer support organizations are already experiencing a transformation driving Artificial Intelligence, thanks to the use of voice recognition, NLP (Natural Language Program), virtual agents and machine learning. This does not simply reduce the volume of calls but Artificial Intelligence will fundamentally change the recruitment and training practices of the agents of an organization, the creation and preservation of knowledge, and the procedures and processes directed towards customer engagement.
- Strong changes in traditional industries. The changes related to Artificial Intelligence are not always immediately apparent in the affected industries. In some cases, like shipping and logistics, the accumulation of multiple technologies imposes an important change on the industry, once the technologies reach a certain level of maturity. The introduction

of sufficiently safe vehicles self-guided by land, sea or air, has been going on for decades, but once they are introduced, they will radically transform the level of service offered up to that point, the business model and the classification of employees.

- Interconnected business intelligence web. The tendency to anthropomorphize intelligence is a distinctive sign of every human being, and we can see that it is also extended to Artificial Intelligence software. The Artificial Intelligence systems that will form the basis of smart businesses in the future, however, will be similar in development to many other technologies, representing an ecosystem of interconnected pieces that mutually support each other

WEAK POINTS

The greatest obstacle to the adoption of Artificial Intelligence seems to be the fear of replacing man with machines.

The reality is quite different: the future will be hybrid, with the presence of human beings and machines working together to increase overall efficiency.

In this regard, certain aspects must be taken into account:

- Humans and intelligent machines work better in tandem. Much of the current concern about Artificial Intelligence systems stems from an

anxiety about technological unemployment. In truth, most Artificial Intelligence systems do not always and not only replace personnel: they often allow the performance of low-value, too expensive or burdensome tasks for humans. In fact, human beings have to connect the technologies of all three sensory components to build Artificial Intelligence systems that are able to feel, think and act autonomously.

- Human-computer interaction far exceeds computer-human interaction. We are only at the beginning of the discovery of how machines can communicate more effectively with us, and this is a relatively poorly studied area.
- True Artificial Intelligence does not exist today. The companies that have achieved real successes from a business point of view in the use of these systems have kept the scope of the use cases reduced and have developed their applications so that the Artificial Intelligence could be limited to simply answer queries, questions or input within a limited scope. The most successful implementations include: virtual agents for customer service, image analysis in the security and surveillance sector, and interactive voice response systems.

A second consideration is that, although investments in Artificial Intelligence technology are on the rise, the challenges that hinder the adoption of this technology remain, and include the absence of certain elements, including:

- A clear business case. Since the ongoing development of Artificial Intelligence is a relatively recent phenomenon, many organizations have not yet figured out how to apply it to achieve specific business goals. As in many technologies, researchers and the academic world were the first to develop and spread Artificial Intelligence systems, while companies are just starting to take care of them. Without a well-oriented path towards achieving ROI, many organizations have difficulty justifying investments in this area.
- Specialized skills for building, implementing and managing Artificial Intelligence systems. There is now a group of researchers, known in the academic world, who is specializing in deep learning and Artificial Intelligence, while the talent pool in the business world is still very small. Moreover, since the adoption of Artificial Intelligence for business is still in an embryonic state, even fewer people have the ability to interpret Artificial Intelligence and apply it to the business context. This does not mean that tomorrow you will have to completely renew a company's staff, but you will need to add them again. For example, a large international consultancy company is adding a linguist to its team with the aim of building an application capable of automatically classifying a textual content.

- A robust data management platform. In general, computers do what they are asked to do, bad input will therefore produce an equally bad output, and this is even more true in the case of Artificial Intelligence systems. These systems often need huge amounts of data to learn how to perform a specific task. On the other hand, "ensuring the quality of data extracted from a wide variety of sources", which should be a goal for many organizations, remains a distant goal for most companies.

Change management practices and processes. Beyond the challenges concerning individual cases, skills and company data, one of the biggest organizational impacts of Artificial Intelligence systems, and the one that companies seem to be most worried about, is the impact of these systems on the company same.

In fact, change management seems to be considered one of the greatest risks, and indicates the need to prepare for restructuring of one's workforce due to Artificial Intelligence.

A first conclusion indicates that it is important to use artificial intelligence technologies in the maturation phase and to follow the progress of those that have a potential for concrete development.

This for the following reasons:

- Artificial Intelligence systems still require particular care in design, knowledge engineering and model compilation. The goal of many

Artificial Intelligence systems is to obtain functionally autonomous applications; the problem is that, in order to engineer the contained knowledge and to build models that know how to incorporate input and perform actions, the Artificial Intelligence systems require significant design efforts.

- Artificial Intelligence technologies require new skills, not new staff. They involve the use of new skills, such as familiarity with deep learning, text analysis techniques and emotional computation. However, it is not necessary or appropriate to acquire new personnel specialized in Artificial Intelligence, separated from the rest of the personnel. Intelligent systems can be developed with the same people in charge of development and existing data science, but adopting new models of collaboration and new roles, but not without having provided adequate training.

A second conclusion is that Artificial Intelligence technologies, through their own tools and service platforms already available, allow application developers to keep the promise of additional contextual, appealing and intelligent applications.

Building complex Artificial Intelligence systems may seem impossible, when in fact many Artificial Intelligence features are already integrated today into existing applications and business processes.

To do this you need:

- Start with a modular and then scale-out approach. The addition of Artificial Intelligence to business applications is not a monolithic project: often intelligence is not provided through a single application that has been perfectly trained and tuned, but through the addition of functionality, both one at a time, and in the 'together.
- Exploit the platforms and products on the market to obtain prefabricated intelligence components. Not all organizations can afford to build a large internal unit dedicated to Artificial Intelligence, in particular to try to solve complex problems such as language analysis and some aspects of NLP (Natural Language Program).
- Establish priority orders in the collection and preparation of data specifically designed for the tasks of Artificial Intelligence. Without data, there can be no intelligence. Collecting a sufficient number of suitable data also requires time and investment. Even if the company is not ready to adopt advanced Artificial Intelligence technologies, the applications designed for collecting behavioral data and for reviewing internal practices and processes on the representation of knowledge will enable a very rapid start tomorrow.

2.4-ARTIFICIAL INTELLIGENCE: WHAT'S NEXT?

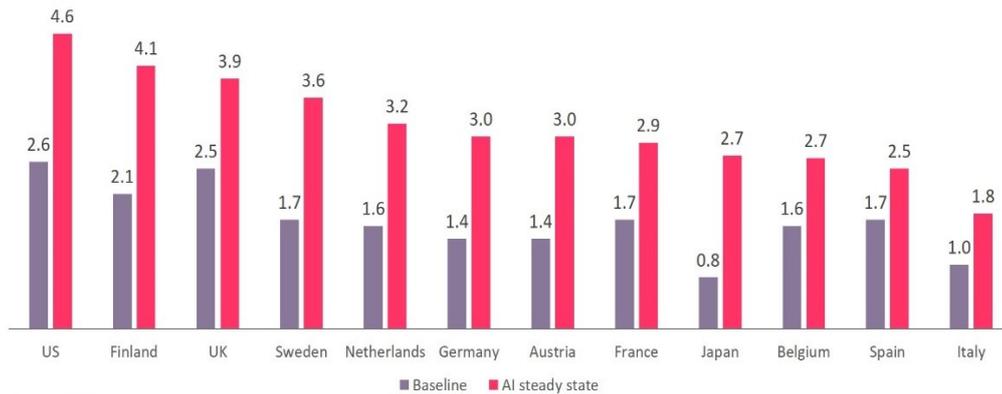
Artificial intelligence, to date, is a set of multiple technologies that allow machines to perceive, understand, act and learn, both independently and for the purpose of strengthening human activities.

Important data and studies reveal a discouraging truth about today's growth. To boost economic growth, a clear reduction was recorded in the traditional levers of production, capital investments and labor.

But it is not just a question of data and studies. Artificial intelligence is a new factor of production and has the potential to introduce new sources of growth, changing the way in which work is perceived and strengthening the role of people driving work growth.

The research of the Accenture Institute for High Performance on the impact of Artificial Intelligence in 12 main economic sectors reveals that Artificial Intelligence could double the annual rates of economic growth in 2035, thus changing the nature of the work and creating a new relationship between the man and the car.

It is estimated that the impact of Artificial Intelligence technologies at work will increase labor productivity by up to 40% and allow people to make more efficient use of their time.



Source: Accenture and Frontier Economics

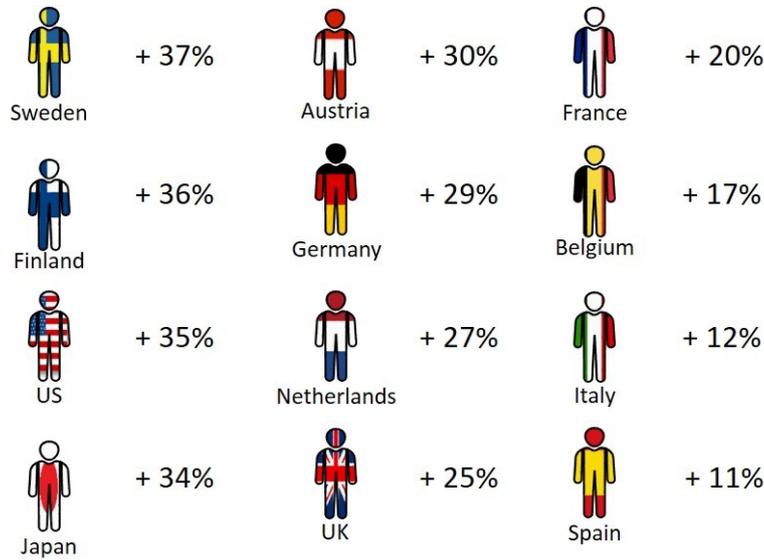
Annual growth rates by 2035 of gross value added (a close approximation of GDP), comparing baseline growth by 2035 to an artificial intelligence scenario where AI has been absorbed into the economy¹²

The potential to significantly boost the productivity of labour in developed economies will be driven by innovative AI technologies that enable people to make more efficient use of their time and do what humans do best, create, imagine and innovate new things.

The productivity increase dramatically reduces the number of years required for the 12 analysed countries to double in size.

This “doubling time” is an indicator of economic development and the results are primarily driven by a country’s ability to diffuse technological innovations into its wider economic infrastructure.

¹² Accenture and Frontier Economics



Source: Accenture and Frontier Economics

Percentage increase in labor productivity with AI, compared to expected baseline productivity levels by 2035¹³

A growth of around 60% in the last year alone, which has brought companies' investments in the sector to 12.5 billion dollars, which, by 2020, will exceed 46 billion.

These numbers provided by IDC (International Data Corporation) would be enough to understand the exponential growth of artificial intelligence in our lives.

¹³ Accenture and Frontier Economics

Day after day, more and more companies are grasping the importance of understanding and using the incredible volumes of data they already collect with cutting-edge systems.

The same systems that led to the creation, for example, of virtual assistants with whom to converse and able to respond to practically all our needs, from Apple's Siri to Amazon's Alexa.

The amazing technological tsunami that we face has already changed our lives, but it will have even more unpredictable effects in the medium to long term, not only in terms of employment.

Is it really to be feared that tomorrow a particularly advanced artificial intelligence can take control of our lives and impose something on our well-being? "If this is your concern, you can sleep peacefully. It won't happen, at least not with the technologies we have today."¹⁴ explains Oliver Schabenberger, Executive Vice President & Chief Technology Officer of Sas, one of the leading experts in the field of artificial intelligence.

The effects of this new era driven by analytics and algorithms can and will be disruptive, a hundred years ago, agriculture employed more than 40% of the US population, today the percentage is less than 2%, however, we are not facing rampant unemployment.

¹⁴ Oliver Schabenberger

One cannot even imagine the kind of works that Artificial Intelligence will be able to generate, but one can understand that it is already doing it, for example Wall Street companies are hiring more software developers than financial analysts and this is a signal that there is new skills are needed.

Regarding the Italian situation and the future of artificial intelligence in our country, a national Artificial Intelligence Laboratory has been set up to which 43 Italian universities and over 600 researchers have joined.

The Laboratory is led by Rita Cucchiara, a professor at the University of Modena and Reggio Emilia and promoted by the National Interuniversity Consortium for Computer Science.

The Laboratory is a reference point for start-ups in the sector and wants to collaborate with the industrial world, in full revolution 4.0. He will deal with research and will also devote himself to training.

The goal is to create an Italian ecosystem of artificial intelligence, networking and enhancing the country's best skills.

The problem of Italy is that of skills and professional figures: too few in Italy those already formed or in the process of being trained.

The most active sector for now is banking with 24% of applications, followed by energy, resources & utility (13%), automotive (10%) and retail (9%).

According to a research developed by the Artificial Intelligence Observatory of the School of Management of the Politecnico di Milano, according to which

currently only 12% of companies have brought at least one artificial intelligence project, while almost one in two has not moved yet but is going to do it (8% is in the implementation phase, 31% have pilot projects in progress, 21% have allocated the budget).

Among those who have already implemented a project, as many as 68% are satisfied with the results and the most widespread are those of Virtual Assistant/Chatbot.

However, Italian companies still have a confused view of the opportunities offered by artificial intelligence: the majority, 58%, associate it with a technology capable of completely replicating the human mind (a concept that has little to do with the practical implications of the discipline), 35% to techniques such as Machine Learning, 31% to virtual assistants only, while only 14% understood that Artificial Intelligence aims to replicate specific abilities typical of human beings.

Many questions remain about the impact of artificial intelligence on the job: if on the one hand 33% of the companies interviewed declare that they had to hire new qualified professionals to create artificial intelligence solutions, on the other 27% had to relocate personnel after the introduction of an Artificial Intelligence solution.

The punctual survey on the employment balance in Italy reveals how Artificial Intelligence is to be considered more as an opportunity than a threat: 3.6 million

equivalent jobs can be replaced in the next 15 years by machines, but in the same period due to the reduction in the labor supply (mainly due to demographic issues, assuming continuity on migratory balances) and the increase in demand, a deficit of approximately 4.7 million jobs in the country is estimated, from which a deficit emerges positive of around 1.1 million jobs.

In this scenario (which is moreover widespread) of a progressive reduction of the labor force, Artificial Intelligence appears not only as an opportunity, but as a necessity to maintain the current levels of economic and social well-being, reducing the costs of assistance needed to maintain the standards of life, creating new jobs with greater value, to get closer to 1.5% of the average annual rate of productivity growth that would be necessary, over the next 15 years, to maintain the current socio-economic balance of the welfare system of our country.

Expected changes with the artificial intelligence in 2030:¹⁵

Infrastructure	<ul style="list-style-type: none"> • Smarter cars • Self-driving vehicles • Transportation planning • Smart grids • Smarter building
Health care	<ul style="list-style-type: none"> • Electronic health records • Health-care analytics • Health-care robots • Mobile health

¹⁵ Peter Stone (2016)

	<ul style="list-style-type: none"> • Care for the elderly
Education	<ul style="list-style-type: none"> • Teaching robots • Intelligent tutoring systems • Learning analytics
Low-resource communities	<ul style="list-style-type: none"> • Help government agencies • Planning of food distribution
Service robots	<ul style="list-style-type: none"> • Service robots: deliver packages; clean, enhance security • Personal assistant robots (with features such as speech recognition)
Public safety and security	<ul style="list-style-type: none"> • Cameras for surveillance • Drones • Predictive police applications (such as predicting white-collar crime)

Source: Peter Stone et al., Artificial Intelligence and Life in 2030 (Stanford, 2016);
quoted by B20 Digitalization Taskforce policy paper (2017, p. 32)

2.5- THE CHANGE OF THE WORLD WITH THE ARTIFICIAL INTELLIGENCE

The topic of artificial intelligence, as already explained in the previous chapters, is a very "experimental" topic, still and under development.

In this section we will try to explain how the world we know will improve and / or worsen through the use of artificial intelligence technologies.

In the following paragraphs, we will try to go into the details of how this change in the world and in the market is perceived both from the market point of view and from the point of view of the user and from the management point of view. Speaking of artificial intelligence technologies we cannot speak only in one type of technology but we talk about a grouping of different technologies, some already in use, for example the Chatbot and others in development such as self-cars.

These technologies are used to help a company both in the automation of the production process and in the optimization of the search for data and finally in increasing the worker's effort thanks to the complicity between worker and machine.¹⁶

Concerning the automation of the production process, a high performing algorithm can work faster in the development of those repetitive and standardized phases of the production process, thus increasing the efficiency of the company itself.

Algorithms can automate ongoing decision, artificial intelligence represents a very potent tool for companies seeking to interact with consumers efficiently.

¹⁶ Alex Mari (2019)

An example of artificial intelligence in terms of interaction with customers is Duplex, a Google artificial intelligence assistant can independently handle service requests, such as booking an appointment or managing personal agendas.

Regarding the optimization the artificial intelligence can help the firm reducing overhead, decreasing turnaround time and improve output.

For example by reducing the time spent on segmenting customer and developing targeted campaigns, cognitive technologies can dramatically increase the productivity of entire marketing departments.

Concerning the augmentation algorithms can help teams that operate in a traditional way to get more out of their effort by adding layers of intelligence. Artificial intelligence is not about replacing people but enabling all workers to work better, faster and smarter.

Historically, people have built machines because they wanted help.

In the case of augmentation an effective explorative artificial intelligence project begins with the understanding of what human being and machines are good at.

Human beings can usually perform abstract thinking outside a specific context better than a machine: the ability to deal with ambiguity, applying common sense are skills that machine are not expected to match, at least in the near future.

On the contrary machines are faster and more accurate in processing data and provide factual solutions in a well-defined context.

In most cases machines enhance a human's ability to draw conclusions.

The assumption is that some subtasks are more reasonably delegated to the person, and others to the computer.

A collaborative intelligence is intended not to substitute for a human employee, but to engage in a task with one.

Artificial intelligence contributes in the market and in a firm to three fundamental processes: data collection, insights gathering through data analysis and customer engagement.

In the future no company is expected to succeed without making strategic use of the collected data, but also the artificial intelligence needs a human control; a machine learning model is not a static model that continues to trigger campaigns over time, since the environment external to the model is dynamically changing the key business users need to review the model and provide new data sets regularly.

Below it is presented a research of Gartner, the world's leading research and advisory company.¹⁷

¹⁷ Gartner (2017)

By 2022, two-thirds of all customer experience projects will make use of IT, up from 50 percent in 2017.

As the number of digital channels expands, self-service or digital commerce interactions are increasing, as well as the move away from human face-to-face or voice-based interactions.

The proportion of projects using IT to improve the customer experience will steadily rise.

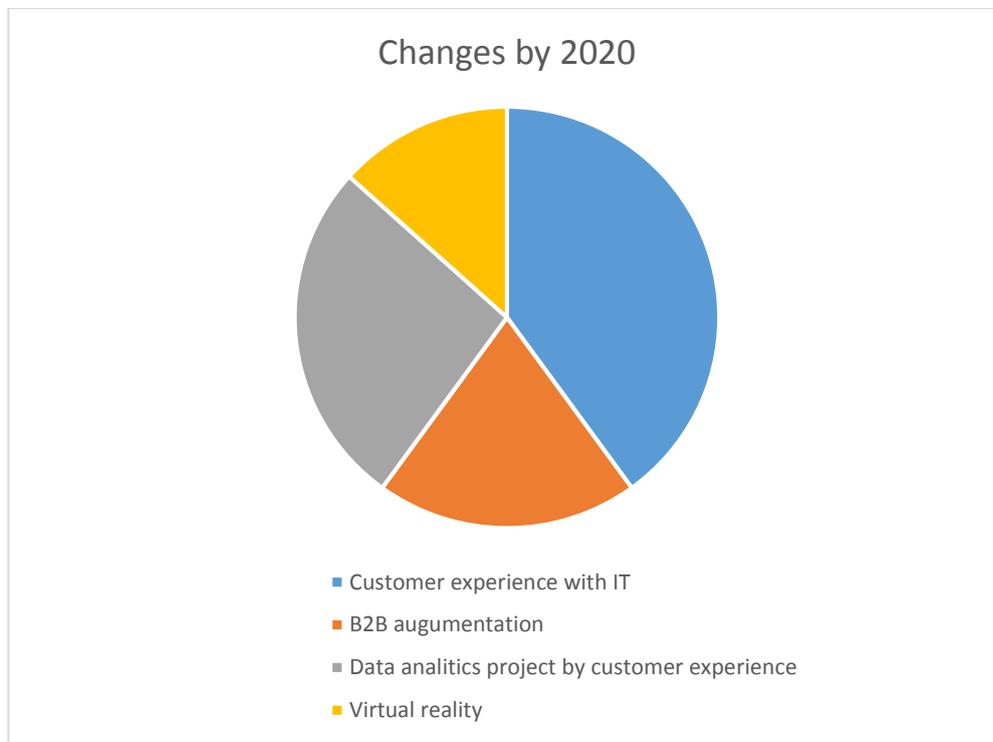
Those not using technology tend to be projects related to recruiting, training, governing and managing customer-facing employees.

By 2020, 30 percent of all B2B companies will employ artificial intelligence (AI) to augment at least one of their primary sales processes.

Artificial Intelligence in sales allows for more efficiency and effectiveness in business processes, often with up to 30 percent higher conversion rates when engaging prospects or leads, according to Gartner.

It is becoming an attractive alternative for sales organizations with high volumes of lead processing, opportunities and forecasting processes because it provides fast and accurate support when performing the different sales stages.

By 2020, more than 40 percent of all data analytics projects will relate to an aspect of customer experience.



Data and analytics is already prominent across marketing, sales, digital commerce, customer service, social media management and field service departments.

However, an understanding of the overall condition of the customer's attitude toward the enterprise is lacking for the majority.

What matters is not the customer's attitude about a store, department, process or product, but the level of trust they have in the organization as a whole and their likely intent to remain loyal.

By 2020, augmented reality, virtual reality and mixed reality immersive solutions will be evaluated and adopted in 20 percent of large enterprises as part of their digital transformation strategy.

Organizations will have the ability to provide employees, customers and suppliers with a means to obtain real-time information, experience virtual environments and engage in social collaboration without a small, limited display and a limited point of view.

Consumers already experience some form of immersive technology, such as Snapchat filters and 360-degree video and photos on Facebook.

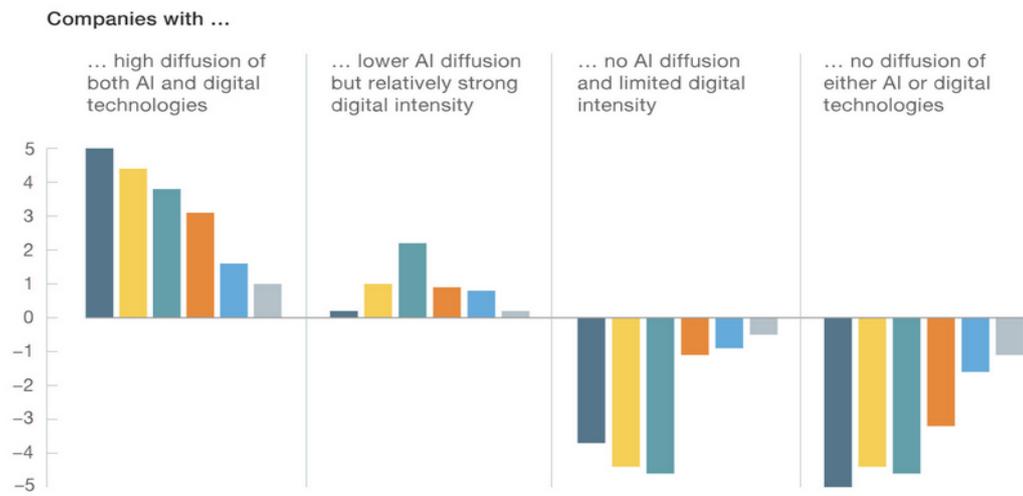
Some emerging studies are already pointing out that companies that invest in artificial intelligence have less operating costs in producing their products and ensure that consumer demand is met at all times for a potential customer who is increasingly profiled, segmented and high value.¹⁸

¹⁸ <https://blog.advmedialab.com/marketing-e-intelligenza-artificiale#8>

Power users that invest in both core and advanced digital technologies see a boost in profits.

Estimated profit margin relative to industry average,¹ percentage points

Energy Automotive Tech
Finance Telecom Construction



¹Sample size for each industry reflects >60% of survey responses.

Source: 2017 Digital McKinsey survey of 1,760 companies; 2017 Vivatech survey of 3,023 companies

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2.6- THE PERCEPTION OF THE ARTIFICIAL INTELLIGENCE

2.6.1- THE GENERAL PERCEPTION

One of the themes addressed in this thesis is the perception that one has of artificial intelligence, not only from the point of view of the customer who is

¹⁹ McKinsey (2017)

catapulted into a market that is evolving more and more to offer him customized products but also a comparison with the artificial intelligence technologies instead of with people.

We will also talk about how these technologies are perceived by the worker who will have to support them and above all from the managerial point of view, who will have to reorganize the structure of the company so that artificial intelligence technologies are used in the best way.

Starting from what is currently one of the most heated points, that is the perception that the worker has of these new technologies that are increasingly entering the company.

A first challenge is philosophical and anthropological. The frontiers of innovation question us in depth about which is the specific human component and quality of work compared to that of the machine.

A second theme is to define how and in what way coexistence can be guaranteed between man and artificial intelligence, between man and robot.

Even before we ask ourselves if robots will really steal our job, we should perhaps understand how current technologies are already changing the way we work.

It is very probable, in fact, that the first real challenge on which we will all be called to confront will not come from some all-rounder automaton, but rather

from changes that new technologies, and in particular those based on artificial intelligence, will bring our work routine.

To confirm a research conducted by McKinsey: in the next 10 years, the analyst bets, only 5% of current occupations will disappear.

Rather, the content of our working day will change. One third of the tasks envisaged by 60% of current jobs will be eliminated, or in any case significantly altered by the advent of technology.

In other words: today's jobs will be there tomorrow, but they will be profoundly different.

One thing is certain: artificial intelligence is scary. Especially to those who consider privacy one of the sacrosanct and inviolable rights of work.

Many have shouted at the scandal after seeing the bracelet patented by Amazon that controls the movements of warehouse operators to facilitate the sorting of goods.

The tools of this risk giving companies, and in particular staff resources, enormous power.

It is doing a lot of discussion these days about the launch of a bot, based on artificial intelligence, able to carry out a first selection activity for companies that are looking for new staff to hire.

Vera, the name of the solution created by the Russian startup Stafory, has been trained to automate some of the procedures that underlie the recruitment

process, including those concerning the recognition of human emotions, such as anger, pleasure, disappointment

"Companies already know a lot about their employees,"²⁰ he explains in an interview with Economist Leighanne Levensaler, managing director of Workday, a company that created software that can predict employee behavior, including a possible intention to leave 'company. "Thanks to the Internet, smartphones and the cloud, employers can already check who is looking at a document, which employees are working and who is in a position to steal files and company contacts. With artificial intelligence, we will go further."

One of the most frequent questions for those who are studying this type of technology is how far we can go.

To reassure the minds we think Steve Clayton, of Microsoft: "These systems are not a big brother, they are designed to improve productivity", underlines the current Chief Storyteller of Redmond.

Clayton speaks from experience, living in a company that for some time has been using a program called MyAnalytics, which brings together data from emails, calendars and other sensitive applications to show how employees use their time, how often they are in contact with key company figures, and how much they are available for multitasking.

²⁰ McKinsey (2017)

The basic idea is that superiors do not see the results of the individual, but the aggregate data of the various units, a sort of summary of the teams that make up the company.

We must also consider all those benefits that could derive from the use of artificial intelligence in those areas in which the lives of employees are at stake. Companies that employ skilled workers in dangerous jobs may for example use intelligent image recognition systems combined with video cameras to ensure that staff wear glasses, helmets, gloves and other accident prevention tools.

Seen in this way we could talk about a technology like all the others.

That is, capable of offering the best or the worst of oneself according to human uses.

The debate around the spread and scope of artificial intelligence solutions continues to mount, also involving that part of the population that until recently did not feel called into question when analyzing the social impact of new digital technologies.

2.6.2- THE PERCEPTION OF WORKERS

To understand how artificial intelligence is perceived in our country, Citrix has carried out a research²¹ in collaboration with the OnePoll institute, interviewing a sample of 500 knowledge workers spread across the country, between 18 and 55 years of age, through a questionnaire administered online asking how they think will change the world of work over the next five years.

Most respondents (68.2%) think first and foremost that artificial intelligence will significantly affect their way of working over the next five years and 50.7% think that the impact is still positive.

Only 7% believe that the impact on their activity will be negative, while 41.64% believe that the possible implications will be both positive and negative.

In particular, almost half of the sample (49.60%) believes that workers will be able, with the support of artificial intelligence, to perform more complex tasks but curiously only 3.8% think that they will come to create new jobs.

Among the fears related to artificial intelligence, the loss of jobs (37.2%) and the evolution towards a "dehumanized" work environment (36.2%) stand out instead. "

²¹ <https://www.corrierecomunicazioni.it/lavoro-carriere/competenze/intelligenza-artificiale-italiani-confusi-creera-o-tagliera-il-lavoro/>

These data show that the scope of artificial intelligence is not yet fully understood by the people who work, although they are perfectly aware that this is an element destined to have important consequences on their way of working"²², says Andrea Dossena, Country Manager of Citrix Italy.

Citrix research shows that Italian workers do not necessarily want to compete with robots and artificial intelligence, despite fears related to the possible loss of their jobs.

When in fact they are asked which superpower they would like to have available for their own activity, only 14.8% say they want a "super intelligence".

What they really want is to be able to develop precise skills over the next five years. In particular, for as much as 43.8% of the sample, these skills relate to technology, while 31.4% would choose creativity and only 10% a soft skill such as empathy.

"Italian workers think they are not prepared enough to be able to master an IT that will become more and more complex within a few years. This perception could change if work environments were adopted where IT solutions are easily integrated and offer a rewarding user experience. And this is precisely what intelligent workspaces offer: the most advanced technology at the service of productivity ", concludes Andrea Dossena.

²² Andrea Dossena

In another research, which also expands to European judgment, it is evident that Italians do not fear artificial intelligence but, on the contrary, look at this innovation as an opportunity.

In fact, two-thirds of employees believe that automation, robotics and artificial intelligence will positively influence their work over the next five or ten years and 80% positively consider the increasing impact of technology on the world of work.

Eight Italians out of ten see the growing impact of technology on the world of work as an opportunity (80%, + 6% on the global average and 10% on the European average), twelfths compared to the 34 countries analyzed by the research.

In Europe, only Greece (82%) and Portugal (83%) are more optimistic. 65% of workers, on the other hand, are convinced that automation, robotics and artificial intelligence will have a positive impact on their work (+ 25% compared to 2014), six points higher than the global average and twelve compared to the average of European countries , of which only Poland (68%) has a more favorable attitude.

The attitude changes if you look at the skills needed to manage the changes brought about by artificial intelligence.

Only 47% of Italians believe that a mix of skills different from those already in their possession will be needed, against 58% of the global average.

In Europe, only Austria (45%), Luxembourg (45%), Holland (45%), Greece (43%), Hungary (43%) and Sweden (40%) are more confident of their skills.

But the Italians are also the first among the analyzed populations to feel under pressure to stay updated on the developments of digital technologies: 80%, a good 33 points more than the global average and 38 more than the European average.

Furthermore, 87% of employees want to acquire more skills to ensure their employability in the future (+ 7% compared to the global average and + 9% on the European average), twelfth in the global ranking and fifth in Europe behind Poland (88 %), Spain (88%), Portugal (89%) and Romania (89%).

A lack of digital skills that starts in schools and universities, with only 50% of the sample thinking that students receive the adequate knowledge to prepare for the world of work (third in the global ranking with 18 points less than the average, less than 15% compared to the European average and less than 23% compared to the average in Northern Europe).

Disappointed by the training system, workers turn to businesses to receive the digital training they feel they need.

In fact, 81% believe that it is the employer's job to prepare training plans to allow employees to acquire the missing digital skills, against 76% of the global average, but only 41% of the sample declares that the company in which he works he is investing in employee training on artificial intelligence and machine

learning (46% of 18-45 year old workers and 35% of seniors), against 44% of the global average.

Few companies are also investing in technologies related to artificial intelligence: only 47% of the Italian sample (two points below the average of the analyzed countries) affirms this, with a reduced gender gap (49% men and 46% women) and a wider gap between young workers (55%) and senior workers (38%).

The consequence of not being caught unprepared is to invest personally in their training on the subject (56%, -3% on the global average), in particular men (60%, against 52% of women) and the youngest (61%, against 49% of senior workers).

Considering instead the fear of losing work, a research carried out by Doxa concerns precisely the workers at risk with the advent of artificial intelligence technologies in Italy.

54% of the employees interviewed declared themselves in favor of using new technologies in the company and only 16% said they were against; 87% even exclude the possibility that machines, Chatbot and algorithms can completely replace people, almost completely eliminating the theorem of generalized fear for the possible loss of a job.

The fear related to their employment, in 74% of cases, concerns instead a particular type of professionalism, that linked to the less young and the less schooled.

Among the different categories of workers, it is the workers who declare themselves more in favor of the use of robots and artificial intelligence (positive opinions are 78% of the total), followed by middle managers (66%) and employees (60%).

The research has therefore highlighted the pros and cons linked to the advanced automation of some business processes.

In terms of benefits, 70% of workers focus on safety in the workplace, 65% on conditions and workloads and 47% on working hours; among the unwanted impacts, on the other hand, 48% fear that these may affect salaries, 43% gratification and employee satisfaction and 39% career opportunities.

Having said that there are obvious differences in evaluation between those who work in companies that are already robotic compared to those who are actually employed, who are still not (67% of the first cluster, for example, overall positively evaluates the use of the new systems, against 53% of the second) it is interesting to record what the attitude of managers and entrepreneurs is.

2.6.3- THE PERCEPTION OF MANAGERS

Among the latter, a decisive optimism stands out, given the fact that as many as 83% express a positive evaluation on the impacts of artificial intelligence and robots at work.

Research²³ conducted by Avanade reveals that 85% of managers (in Europe and the United States) agree that good corporate leadership must be able to manage human resources and machines in an integrated way, if intelligence is desired artificial can express the full potential within the organization.

Today leaders need to balance cognitive intelligence with emotional intelligence to manage work environments pervaded by the use of artificial intelligence tools.

In terms of cognitive intelligence, they need to develop a vision on how to use artificial intelligence within organizational contexts and to know where it can be used in order to free up working time to dedicate to complex operations and to improve productivity.

But the role of emotional intelligence and the dissemination of new skills are even more decisive to show the positive impact that technology brings, to properly address the anxiety that can generate change and to maintain a

²³ <https://www.giornaledellepmi.it/management-e-intelligenza-artificiale-lavoreremo-agli-ordini-dei-roboleader-o-saranno-i-leader-a-doversi-evolvere/>

collaborative spirit within the teams that must define new operational and collaboration methods.

"Artificial Intelligence potentially knows no application boundaries and will progressively affect the economic and social fabric of each country. The speed of diffusion in the different areas will not be homogeneous, but will depend on technological and knowledge factors. Italian companies are paying great attention to this issue so as not to lose opportunities for improving competitiveness. To fully grasp the potential benefits, however, they must first of all fully understand the offer of available solutions and then intervene on the organizational processes and on the strengthening of skills, so that people are actually able to enhance the machines' abilities ".²⁴

This is what Nicola Gatti, Giovanni Miragliotta and Alessandro Piva, Directors of the Artificial Intelligence Observatory of the School of Management of the Politecnico di Milano, maintain.

If we consider the provision of services, Artificial Intelligence is perceived by 32% as a real opportunity for those who make about a purchase a month, a percentage that rises to 45% among those who make at least one purchase a week. Of the latter, however, only 24% are totally optimistic about the correct use of AI with respect to their privacy.

²⁴ Nicola Gatti, Giovanni Miragliotta, Alessandro Piva

Expectations towards Artificial Intelligence are high: 52% associate it with greater speed, 46% are convinced that it brings more services and features, 43% greater adherence to personal needs and 37% greater pleasantness of interaction and of navigation.

Finally, asking the champion, what does artificial intelligence think about, it emerges that there are gaps in knowledge on the subject, proof of which 4% defines artificial intelligence "useless" and "fake", 3% associate it to "fiction" or "science fiction" and 10% fear it considering it dangerous.

These are the most significant evidences that emerge from the 2nd edition of the Experience Matters Research presented on June 28th at the Milan Polytechnic.

Even if the capabilities of AI technologies stopped advancing today, the transformations resulting from the latest developments in AI will have far-reaching effects across a wide spectrum of human activity.

The expert participants at GAO's forum, however, offered mixed views on exactly what they thought these transformations will look like and how they will impact the economy and the nation's education and workforce training systems. One participant noted that while job losses in some sectors of the economy were likely, there is also huge potential for job creation in other areas.

Forum participants agreed that there is a significant gap between the skills employers are looking for and will need in the future and the skills potential employees currently possess.

Even if the job market balances out and AI creates more jobs than it eliminates, there will still be significant numbers of people who will find themselves unemployed because of a mismatch of skills.

We know that the jobs of the future will undoubtedly require technically proficient workers.

What some may not know is that in addition to technical skills, workers of the future will also need strong critical thinking skills in order to understand and effectively leverage human machine interactions.

Clearly there is more that educational and workforce training programs can do to prepare the students and workers of the future to remain competitive in the midst of rapid technological change and increased automation.

Some expert participants in GAO's forum on AI made clear that what humans can do is to immediately begin promoting lifelong learning to those whose jobs are most acutely at risk of being fully automated.

From there, education and training relevant to the jobs of the future could gradually evolve toward more complex, harder-to-automate jobs.

At the same time, it will be important, as some expert participants noted, for educational institutions to pivot toward a curriculum and delivery model that

provides the workers of the future the multidisciplinary skills the market will require.

Incorporating a consciousness of AI and its challenges into the way we provide and experience learning over the career lifespan could be one way of fully realizing the human and technological benefits of this next frontier.

A Deloitte's recent report, *The State of AI in the Enterprise*, 2nd Edition, examines how businesses are thinking about and deploying AI services.

Their findings show that enterprises are employing a wide variety of AI technologies.

More than half of respondents say their businesses are using statistical machine learning (63 percent), robotic process automation (59 percent), or natural language processing and generation (53 percent).

Just under half (49 percent) are still using expert or rule-based systems, and 34 percent are using deep learning.

When asked how they were accessing these AI capabilities, 59 percent said they relied on enterprise software with AI capabilities (much of which is available in the cloud) and 49 percent said, "AI as a service" (again, presumably in the cloud).

Forty-six percent, a surprisingly high number, said they were relying upon automated machine learning—a set of capabilities that are only available in the

cloud. It is clear, then, that the cloud is already having a major effect on AI use in these large enterprises.

These trends suggest that public cloud providers can become the primary way businesses access AI services.

As a result, we believe this could lower the cost of cloud services and enhance its capabilities at the same time.

In fact, our research shows that AI technology companies are investing more R&D dollars into enhancing cloud native versions of AI systems. If this trend continues, it seems likely that enterprises seeking best-of-breed AI solutions will increasingly need to access them from cloud providers.

Given the enthusiasm surrounding AI technologies, it is not surprising that organizations also need to supplement their investments in talent.

Although 31 percent of respondents listed “lack of AI skills” as a top-three concern, below such issues as implementation, integration, and data, Human Resources teams need to look beyond technology skills to understand their organization’s pain points and end goals.

Companies should try to secure teams that bring a mix of business and technology experience to help fully realize their AI project potential.

Our respondents also had concerns about AI-related risks. A little more than half are worried about cybersecurity issues around AI (51 percent), and are

concerned about “making the wrong strategic decisions based on AI recommendations” (43 percent).

Companies have also begun to recognize ethical risks from AI, the most common being “using AI to manipulate information and create falsehoods” (43 percent).

Despite some challenges, this study suggests that enterprises are enthusiastic about AI, have already seen value from their investments, and are committed to expanding those investments.

Looking forward, we expect to see substantial growth in AI and its cloud-based implementations, and that businesses will increasingly turn to public cloud providers as their primary method of accessing them.

3 SOME EVIDENCES FROM ARTIFICIAL INTELLIGENCE APPLICATIONS

Below are the characteristics of three small / medium-sized companies that deal with artificial intelligence technologies in different ways.

In a first paragraph a brief introduction to the company will be developed, explaining what it does and in what market it is located.

In the next section we will try to analyze what kind of artificial intelligence technology the company deals with, how it is used and developed.

The perception that the user and the company has of these technologies will also be analyzed and the different perceptions developed.

The information below is the result of telephone interviews carried out with the managers of the various companies: Xelexia S.R.L., Grottini Lab and Benelli Armi.

The companies chosen are among different types of companies I do not know for the structure and the products but also for the type: a start-up, a small business and a company already developed and with a powerful background.

The three companies are from Marche region and develop their products mostly in this area, some have also expanded to other regions or countries but others like the startup are still developing and gaining their market share.

In this chapter a theoretical analysis of different realities using different artificial intelligence technologies will be developed, in the following chapter this theoretical analysis will be compared with the data found in the previous chapters and also the three companies will be compared among them being three realities many different.

3.1- XELEXIA S.R.L.



Xelexia S.R.L. is an innovative start-up located in the city of Pesaro.

Xelexia deals with innovation in manufacturing and engineering.

The Start-up established just over a couple of years deals with supporting manufacturing companies by developing engineering design solutions based on artificial intelligence and machine learning.

Xelexia does not apply artificial intelligence technologies directly but offers data management software to other companies that require it.

Their main buyers are manufacturing or engineering companies that work with a large amount of data. Being a start-up they have not yet reached a large market

share but rely on the engineering department of the Polytechnic University of Marche to search for buyers.

The companies to which Xelexia offers are companies in the engineering sector, especially mechanical; the biggest buyers for Xelexia are the companies that already have a partnership with the universities of the area being a small start-up that offers their product to small and medium-sized companies.

Xelexia offers an innovative product for its features and its ease of use and being a start-up is starting to conquer a slice of the market

Currently the companies with which Xelexia is in contact with small and medium enterprises with a desire to evolve and willing to learn new knowledge and new methods to optimize time and work.

Xelexia sees experience and know-how as fundamental values in the design phase of new products and iDelph, their main product, is born precisely to enhance these strategic resources and optimize their value.

iDelph aims to support manufacturing companies and independent design firms, proposing solutions during product development, process optimization and quality control, based on known data and experiences.

The iDelph software creates a great competitive advantage for the company as it is a new product that analyzes the data entered beforehand, that is to say, unlike other software already in commerce for years, data analysis is carried out

previously from the realization of the product so that they can make changes before the production has started.

Therefore the substantial difference between the software already on the market is that of shortening the time and not necessarily having to wait for quality control to assess the reliability of the data.

Currently some companies are already using this software with excellent results, for example a company in the area uses iDelph for the design of electric motors. On the contrary, there were companies that despite having tried the software and having seen the improvements it brought to the company decided not to continue using it.

Xelexia defines this software as a new assumption that must be formed according to your rules and your standards so it is essential that it be joined to a worker so that I am updated and controlled.

The software works on the linearity of events and every exception is a new model to learn, so the software is the worker must work hand in hand to do an excellent job.

3.2-HOW ARTIFICIAL INTELLIGENCE IS IMPLEMENTED IN XELEXIA S.R.L.



iDelph is the product developed by Xelexia, it is a software that helps companies to analyze large amounts of data.

iDelph is applicable in different sectors, being able to analyze and correlate any type of data.

Through this software, business performance is improved by supporting the design. With iDelph it is possible to exploit company data to predict processing times and costs, new machine setups and optimize production.

iDelph also supports product development by proposing the design features of the new variants, all with virtually zero calculation times.

The software does not require specific skills for its use and is easily usable by all members of your technical team.

In addition, thanks to an advanced machine learning system, using iDelph over time the system is refined and constantly improved over time, improving the proposal of solutions and customizing them based on your business data.

iDelphi is a software that helps the development of new products both in the design phase and the processes in the production phase with an a priori data analysis.

The software was developed to analyze very large amounts of data, given the recent development of Industry 4.0, it is necessary to analyze ever larger volumes of data.

The software collects data at the entrance and processes it according to established parameters, producing an output that must be controlled by a worker.

In other words, the software can be described as an Excel table where the product types or the various data are found in each row and the various parameters with which they want to analyze the data entered are positioned in a separate row.

After analyzing the output, the worker can decide to modify the parameters entered for data analysis or insert new data or give consent to use the output.

The worker being able to modify the data entered or the parameters chosen for the analysis "teaches" the software of the new schemes, through this work the software through machine learning relies and improves.

The basic theme of this software is that it works as a support to the work so it supports a worker who in turn decides whether to validate the output derived from the software or discard it, the software updating itself through every change made by the worker specializes and improves.

The role of the worker who analyzes the output is to check on the basis of experience and knowledge if the software has correctly analyzed the data.

The software works with well-structured data, in fact a weak point of this technology is the fact that the data must be well structured and in large quantities to try to reset the average statistical error.

Consequently, it is necessary that the workers and the company that use this technology have the will and the ability to collect data and exploit them, first of all the company must be willing to share its data and not to encrypt it.

Xelexia proposes itself to the new companies that require the software with a test carried out by them followed by a training on the use of the software.

Using data from the company that requires the software, Xelexia employees carry out an analysis test together with the workers who will have to go and use it explaining specifically the task of the software and the task of the worker who will support it.

Being a type of artificial intelligence technology that works together hand in hand with a worker, the latter is trained before working with technology and is

explained in detail the diversity of roles he and technology have within the company.

This happens because as explained in the previous chapter one of the negative perceptions that people have of this technology derives from the fact that they do not feel able to work together with these technologies because they do not believe they have the right training to understand them and to develop projects with them.

In this sense, Xelexia closely follows the training of companies that use software without ever leaving them alone in understanding and developing projects.

The points that this software can bring to the company are also explained and analyzed:

- Time optimization: as explained before, having an a priori analysis shortens the analysis time in quality control. In addition, several projects can be processed together.
- Cost optimization: by being able to work on different projects together the costs for personnel are cut by not having to hire more people for different projects at the same time, the software allows to reduce work times on a project by 40%.
- Being a fairly intuitive software, you don't need to take or have to do training to work with it.

- Through this technology, data at 100% of their capacity is exploited.

As far as we are concerned, the cost of software produced by the company was around 25k to develop back-ends and the user interface.

These expenses are only for planning and do not take into account wages as the company has developed internally, working for the back end and user support, creating the startup from people with those skills and having collaborated with the UNIVPM Faculty of Engineering for this joint project.

As far as revenues are concerned they are still not quantifiable, as the company is coming out of tests with the first pilot users in this period and is trying to offer the technology on the market in these weeks and with some difficulty in proposing itself.

Many companies, larger than the company interviewed, try to develop internally rather than test the company's product.

Conversely, small and medium-sized companies that could still use this software, as they are also designed for these realities, are still a bit wary of relying on these technologies and not all of them understand its potential benefit.

The company now has some possible customers in the testing phase to try the solution and is preparing their first commercial offers to them if the test goes through.

At this time, therefore, the expenses are all in Research and Development and commercial / marketing, divided into 50-50% from the beginning of 2018 to today.

3.3. GROTTINI LAB.



The second company interviewed is Grottini Lab, a small company located in Porto Recanati that deals with helping companies through artificial intelligence technologies like cameras in the optimization of the sales point and in customer segmentation through an analysis of the type of customer who mostly frequents the shop.

Grottini Lab is an advanced company of ideas and solutions that operates internationally in the field of Retail Intelligence and Communication Technology.

Marketing Specialists, IT, Creative and Technical Engineers, constitute the research group from which new solutions are developed for analysis and communication, developed for each specific need, designed and implemented

achieving the best technology and interactivity, the most effective emotional impact and the most efficient simplification of content management.

Work in the company is developed in teams that seek to generate contact between Brand, Retailer and Consumer.

The teams investigate the needs in order to develop solutions that can simplify processes and interactions.

The aim is to innovate the client's communication strategies, with the aim of improving his business.

Each proposal is a challenge to habit, passion for analysis, design stimulation, constructive research that draws on the most advanced computer skills, from electronics to design, with targeted objectives, certain times and verifiable results.

The company uses every need to build new interactive communication systems, useful and emotional tools, designed for the future.

One of the company's principles is to "protect" people in the sense that the technology they use uses cameras that are designed not to invade the privacy of the people who work inside the store where they were installed.

The market to which the company refers is mainly composed of a store, supermarkets or retailers.

Being a small company they are still in the development phase, they have not yet conquered a large slice of the market in Italy, but they have developed and made themselves known especially in Indonesia.

Grottini Lab specializes in the study of human perceptions and emotions through artificial intelligence technologies.

The company has also collaborated on a project in the city of Milan in which it was made aware of lights in a Christmas tree based on the emotions of customers inside the shopping center.

The lights turned red if you felt that most people inside were sad or angry, on the contrary the lights turned green if the majority were happy.

3.4.HOW ARTIFICIAL INTELLIGENCE IS IMPLEMENTED IN GROTTINI LAB

Grottini Lab studies people in environments, particularly retail environments.

The company takes care of studying the interaction between the point of sale, the products on display and the consumers, the latter being at the center of our work.

They observe in detail and in a discreet way what happens at the point of sale using Computer Vision and Artificial Intelligence technologies.

The company is prepared to design, develop and implement customized technological solutions based on the needs of our stakeholders.

Their mission is to observe, measure and inform customers about the key performance indicators of a store such as the Shelf Availability, Out of Stock, compliance with the Planogram and consumer behavior and, moreover, about the interactions between all the players involved.

The company is focused on creating knowledge to support the strategic choices of their partners by optimizing their work and increasing their business.

The company offers three different products, each of which is developed to solve a problem within the store and to optimize a department.

During the interview, in addition to collecting information regarding the type of artificial intelligence technology used, data was also collected regarding the weight of investments made for the development of technology and regarding the increase in profit deriving from the use of technology.

Being a small company and having wanted to focus a lot on these new technologies, the investments made for the development of artificial intelligence within the company have been substantial.

The company has invested around 30% of the total annual investments for artificial intelligence technology for its development and its implementation.

Obviously being the first investments regarding these new technologies are not of great value but over the years, thanks to the ever-increasing increase in profits, investments will increase.

Considering the increase in profits from before the use of technologies to after using them, an increase of 40% has been estimated.

Thanks to these technologies and to their development, which will always be stronger, profits will increase a lot in the long term, but the result obtained by the company that has detected a 40% increase in profits is an excellent starting point for investing more in the artificial intelligence technology and so increase profits.

1. SHELF DETECTOR



The Shelf Availability is one of the main indicators of a store's performance.

Shelf Detector is the technology based on a network of sensors that are easy to install and very reliable, capable of creating data on the activity of the products

on a shelf, in particular focusing on stock breaks, planogram optimization and supporting the sales point staff in the management of the refill.

Stock breakages on the shelf are generally the factor that most affects customer satisfaction during their purchases, according to a study conducted by The Retail Feedback Group.

The satisfaction among the buyers who failed to find all the items they had planned to buy is on average 3.97 on a scale from 0 to 5 (where 5 represents the maximum satisfaction), compared to 4.54 of the buyers who they managed to find all the products they wanted.²⁵

Stock breaks hurt sales of retailers and brands: 50% of buyers go to another store to buy the product, 38% permanently forgo the product, 14% buy a different product in the store, while 12% buy the desired product, but of another brand or a different size.

Shelf Detector is a technology patented by Grottini Lab, useful for detecting the movement of products on the shelves, with particular attention to stock breaks on the shelf.

Shelf Detector is assisted by an Artificial Intelligence of the highest level, Computer Vision technologies (hardware and software) and a high knowledge of the market.

²⁵ <http://www.grottinilab.com/>

The result is the state of the art of shelf control, easy to use, which reaches the highest levels of marketing, brand management and point of sale.

Shelf detector Highlights:

- Makes the products available to buyers
- Increases product availability on the shelf up to 97%
- Reduces stock breaks on shelves with peaks of 78%
- Helps optimize planogram performance
- It supports sales staff

Shelf Detector is not just a network of sensors.

Shelf Detector is a mix of technologies of high value and knowledge of the retail trade, an easy to use tool to better manage the products on the shelf with the aim of creating the perfect store.

2. SHOPPER ANALYTICS



Shopper Analytics is the most unique and valuable technological solution to learn more about your customers' behavior.

The Shopper Analytics system discreetly observes what happens in the shop. Artificial Intelligence and Computer Vision are the main resources to which this technology relies.

Grottini Lab together with the Polytechnic University of Marche has developed this technology with the main objective of better understanding consumer behavior.

The areas to be measured are different:

- Showcases and Entrance
- Interactions within the store
- Store flow
- Performance

Shopper Analytics technology:

- Measure the level of attraction that the store creates on consumers.
- Measure the time consumers spend in front of each Brand
- Measures the number of consumers entering the store and interacting with the product

A patented solution for in-store tracking that helps brands and retailers optimize performance and strategies.

The advantages of Shopper Analytics are many:

Shopper Analytics provides support to improve store efficiency:

- Planogram

- Effectiveness of Merchandising
- Logistics
- Work
- Marketing
- Consumer knowledge
- Retail Design
- Branding

The technology also has exclusive features:

- In compliance with the Privacy law
- Secure and real-time data management

3. PLANOGRAM INTEGRITY



Compliance with the planogram means increasing product availability and therefore sales.

Planogram Integrity is an artificial point of view to verify the respect and management of the planogram and the shelf.

Automatically analyzes and processes images from the shelf and indicates positioning errors of products on the shelf, measuring compliance with the planogram in real time.

One of the most "talked about" aspects of artificial intelligence technology is privacy in the sense that people thought it would be increasingly violated.

This is a topic that interests Grottini Lab first hand in using their camera technology.

During the interview we tried to understand how they misdirected this problem.

The cameras used by them and positioned in the various stores taking pictures but immediately encoded in a code so no image is used for surveys or for the functioning of technologies.

The technology that detects and studies images does not study real images but studies codes in which the image has been transformed previously.

This point is explained and pointed out to workers who are in a position to work with cameras that follow them in their work, they are told that they will not evaluate their work and none of the images will be sent to the management.

The interview showed that after explaining the functionality of cameras and technology, workers are very likely to work in an environment where artificial intelligence works to optimize work.

Especially the processed products after a test have immediately seen the improvements that these technologies are able to make inside the store.

A practical example of optimization can be: a worker thanks to this technology that detects when a particular product is missing in a shelf is no longer forced to carry around the whole store a bit of all the products of the department that must supply but will have to bring only the product missing in the right quantity, this is because the camera has detected the particular product and the right quantity and sends a message to the worker on duty in that department so that everything takes place in the shortest time and with maximum efficiency.

These technologies have increased the efficiency of the various retailers that use them.

The points in favor of using these technologies are:

- Customer satisfaction: after having studied the behavior of a regular customer, it is possible to arrange the products as easily as possible and more useful for the customer.
- Increase in turnover: the store organized in the best way in which the shelves never remain empty the products are arranged in the most efficient and organized way has the most turnout.
- Point of sale management: through surveillance of the cameras and artificial intelligence technology, it is possible to manage the store more easily and it is possible to evaluate every single inaccuracy even those that can escape from the human eye.

3.5. BENELLI ARMI



Benelli Armi SpA is an Italian firearms manufacturer based in Urbino (Province of Pesaro and Urbino).

Founded in 1967, it specializes in the production of semiautomatic rifles for hunting, sports and defense use.

The company exports its products to 78 states in the world.

Benelli Armi was born, as a joint-stock company, in 1967, from an idea of 1940 by the Benelli brothers, owners of Benelli of Pesaro, a famous motorcycle manufacturer.

The Benelli brothers, who combine the vocation for mechanical end with a great passion for hunting, believe that the evolution of shotguns advances in the direction of repeating weapons.

This project sees the light thanks to the valid support of Bruno Civolani, an ingenious Bolognese designer who comes to the definition of a weapon of revolutionary conception.

From the project comes an extraordinary shotgun that does not exploit the traditional gas-grip mechanism, but the mass inertia, the whole mechanism is concentrated in the shutter and the reset system is the fastest in the world: 5 shots less of a second.

A living company in continuous growth that invests in research and design: new highly innovative and high-tech products have contributed over the years to strengthening the prestige and dissemination of the Benelli brand in the hunting and sports weapons market, thanks also to the strategic choice of offering a range of products considered to be the most extensive available on the semi-automatic market today.

Benelli was acquired in 1983 by Beretta.

The constant innovation, the research and development of new technologies and materials, the excellence of mechanical processing and a distinctive design, represent the focal points of the Benelli philosophy.

The company mission is represented by the design and production of semi-automatic rifles, which stand out on the market from each competitor for the advanced technology, the refined style and the unparalleled reliability: having a Benelli weapon today means having a weapon with values superiors, a point of arrival for the consumer.

Thanks to the controlled and constant use of technology, Benelli produces industrially, according to very high standards, weapons that combine excellent ballistic performance and superb functional qualities.

The entrepreneurial effort to strengthen research, design and experimentation was significant, and to provide the company with advanced means and systems for the production sector and new management and control software.

Great attention has been paid to the professional growth of all staff, in order to allow products and services to be developed that place the company at a very high level in the market for sporting and defense weapons.

The industrial structure and the advanced technology therefore represent essential points.

The creation of each product comes from the engineers of the technical area who use sophisticated technologies: CAD (Computer Aided Design), CAE (Computer Aided Engineering), advanced software that accurately determine structural calculations and simulate every mechanical process with absolute reliability.

The production structure is equipped with the most advanced machinery that guarantees the maximum mechanical precision with an almost total automation.

1967-2007: 40 years that have seen the company grow and achieve increasingly ambitious goals.

Passion, technology, quality and a relentless production drive are what accompanied Benelli's growth.

A style and a corporate philosophy that have become a model of efficiency, reliability and innovation thanks to a design capacity in constant development, professionally qualified human resources and cutting-edge technologies.

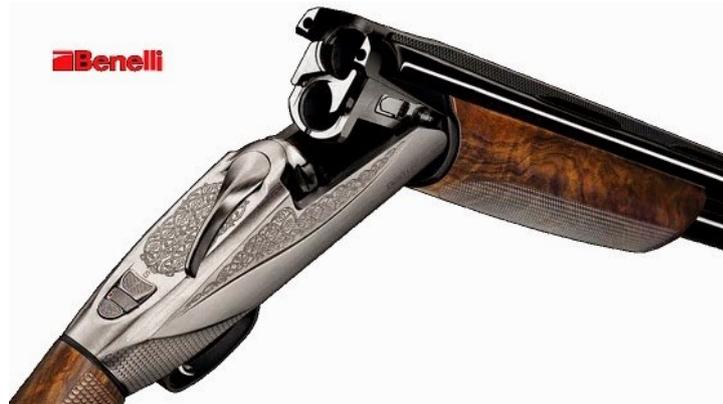
Loving a Benelli product means recognizing and grasping the passion and care behind the undisputed technology.

The elegance of the lines, the quality of the finishes, the preciousness of the materials, the beauty and warmth of the wood grain: every detail bears the Benelli signature.

Semi-automatic forerunners of a new style, able to fascinate, strike the collective imagination and excite.

The company is ready to inaugurate a new chapter in its history, with the same enthusiasm and vivacity that saw it born and grow.

3.6. HOW ARTIFICIAL INTELLIGENCE IS IMPLEMENTED IN BENELLI ARMI



The company during the production of weapons uses artificial intelligence technologies specifically for machine learning.

Machine learning technology is used in the analysis of production data that is crossed with mechanical processing data.

This processed data is analyzed by sensors that evaluate whether the processing was successful.

The purpose of this analysis and data processing is to assess whether the various elements of the gun have been developed in the best way.

The technology is therefore used for optimizing time and data analysis.

The machine learning technology in this company occupies its own department and does not need to be supported by a worker.

The technology used by this company has taken the place of manual work that was previously used to cross-check the various data from the various departments and to assess whether the different pieces produced could be approved.

The technology does not need to be assisted but works alone and is managed by itself, thanks to this the company has managed to optimize the work by greatly reducing the time for data analysis and increasing the accuracy of the analysis.

Thanks to this technology there have been clear improvements especially regarding:

- The quality of the product has improved considerably as artificial intelligence technology crosses data faster and more scrupulously than a worker and therefore it is possible to prevent drifts in the production process.
- Regard to costs, the costs for control and personnel are clearly reduced because in the event that the workers, analyzing the data and in turn crossing it, were wrong, this meant more hours of work for checking the error and for the new analysis and also more staff that had to work on it.

Regarding the company and the company's history with respect to automation, the first Benelli armi automation prototype was introduced in 1980 and is now in disuse.

Thanks to this background, the company has extensive knowledge of automation technology and has been working alongside them for many years.

The workers in the company and the various managers are used to automation technology and have the capacity to manage these technologies.

The company, having for years internalized automation technologies for about a year, has decided to include new machine learning technologies in the production process.

These technologies, as explained above, replace manual work and during the interview we tried to understand the perception workers had of having to give up their work.

The conclusion in this aspect was that there were no major complaints as it was a company already highly developed in this area and not being a small company.

The artificial intelligence technologies or even simple automation within the company are seen with a positive spirit by the workers and managers, this is because thanks to these technologies the competitiveness of the company in the market is increased and in this way the company it grows.

Artificial intelligence technologies as repeatedly explained have specific strengths and weaknesses in the context in which they are used.

In the case of the Benelli company one of the major strengths of this machine learning technology used is the ability to process huge amounts of data that a worker would not be able to analyze.

On the contrary, the weak point of this technology is that being at the beginning of the development there are still no consistent databases to exploit the processing power of these technologies to the maximum.

The technologies, as explained before, occupy a separate department without any workers working alongside them, the workers who know these technologies are the department managers.

The managers received the necessary training to understand and control the final work of these technologies.

Regarding instead the other departments and the other workers, they have not received any type of training regarding these technologies.

The reason why they have not received training is that during work they do not come into contact with this technology.

During the interview it was found that workers who have no contact with these technologies do not know what happens in the department and how machine learning technologies work.

The company has been using these technologies for about a year so it is still in its initial phase but has already achieved great improvements in terms of profit and value of the final product.

The company, as explained, has a consistent history and a strong background from the interview. It turned out that the technology they use is still under development and they are still trying to develop the department where the technologies work and not having given the long-term impact of these technologies, the company has decided not to invest a large sum of money.

The company said it had invested about 7 million during the year in research and development but a few thousand of these were invested in the development of artificial intelligence technologies.

The decision was made based on the fact that there could be no definite basis for the fact that the technologies worked and that they could bring an increase in profit.

Regarding the latter, there are no reliable data because we are still within the first year of development and therefore we cannot have a precise comparison with previous profits.

The results obtained are not yet tangible to carry out an analysis concerning the increase in profit derived from the use of artificial intelligence technologies.

4- ANALYSIS ABOUT THE FIRMS AND THE THEORY

The analysis that will be developed in this chapter aims to compare the data collected from the interviews carried out with the three companies that are very different from each other and the data collected and explained in the previous chapters.

As explained in the first chapter, artificial intelligence is made up of many different types of technologies, so we cannot speak of a single common type of technology but there are many different facets.

The technologies analyzed in the three different interviews are three different types of technologies used for the common purpose of optimizing work and increasing profits.

The three companies interviewed have a different structure and different backgrounds but in any case all three companies are at the beginning of the use of artificial intelligence technologies.

For example, the Benelli armi company is a company that is already well developed and well positioned within the market, unlike the Xelexia company, which is a small start-up, but both companies have started to approach artificial intelligence technologies recently more than a year.

As explained in the second chapter, the Italian situation regarding the vanguard in the field of new technologies is still behind, not many companies use artificial intelligence technologies or in any case they are in the first phase of development.

Both the three companies have "launched" into the use of technologies for a short time and each of them uses them and places itself in different ways.

The Benelli arms having already, as explained in the previous chapter, a strong history of automation has faced the new technologies already with knowledge about it and therefore with knowledge in how to manage these new technologies and how to work with them, but also having this background from the interview turned out to be that the company has yet to learn and develop in the use of these technologies.

Unlike the Xelexia company or even the Grottini Lab company, being the first a start-up and the second a small company, they tried to develop and use artificial intelligence technologies in a more peaceful manner and trying to understand how to use them in the best way and achieving the greatest efficiency.

From the various interviews it turned out that all three companies have achieved a substantial increase in profits and capacities but all three companies have also declared that the intelligence they use is not yet used at the maximum possible

power this because the knowledge in there are few materials and the tools that the technology must use must also be improved.

As for example the databases that two of the companies use as input for artificial intelligence technologies are not yet consistent and well organized to make the most of the potential of artificial intelligence.

Another topic covered in the previous chapters is how artificial intelligence technologies can help within a company, in these three interviews three different types of technologies have been studied which are used in three different ways and the company also poses differently with respect to new technologies: those who work alongside them, those who use them to optimize work and those who use them instead of workers.

In the following, three different characterizing aspects for this thesis will be analyzed in detail:

- The different technologies used, as they are developed within the company,
- The perception that workers, users and customers have of these three different technologies.
- The opportunities that these technologies give both to the company itself and to those who use them.

4.1. ANALYSIS OF TECNOLOGIES

In the table below it is possible to find a summary of the three companies interviewed and the type of technologies used.

Xelexia S.r.l.	Grottini Lab	Benelli Armi
		
Software distributor for database analysis	Distributor of technologies for the optimization of a sales point is for the study and segmentation of the customer at the point of sale	User of technologies for analysis and control of data deriving from different departments and product control.
Technology works alongside a worker	Technology works together with workers	Technology has replaced manual labor.

As explained in the table the different companies use three different types of technology but with a common footprint: all three different technologies are

machine learning technologies, therefore they are basic technologies that learn work from experience over time.

Two of the three companies interviewed, Xelexia and Benelli weapons, use similar technologies that is software for database analysis.

Although the technologies are similar, they are used in two very different ways, Benelli uses data processing and analysis to control a product, Xelexia uses data processing through algorithms entered by a worker that changes according to the needs.

We can therefore define the technology used by Benelli weapons as more static in the sense that being a machine learning technology learns with experience but is modified only if specific problems are detected or if the control on the product is not efficient.

This technology has taken the place of a worker being the action that performs repetitive and standard.

This type of use of artificial intelligence technologies is the most common as also explained in the previous chapters, the company that deals with standardized and repetitive processes using artificial intelligence technologies to make the process faster and automated.

The worker who must always repeat the same movement will have long-term problems like mistakes or at least he will have to stop for breaks, but this does not happen to artificial intelligence technologies and this is why in this type of

work the artificial intelligence of develops more and more and "steals" workers' jobs.

In the case of Xelexia, on the other hand, even if the company does not personally use artificial intelligence but acts as a distributor of it.

The technology that it distributes is a data processing software and therefore is very similar to that used by Benelli weapons but with a Unlike the method by which this technology is used is different.

The software distributed by Xelexia serves to speed up the work of a worker who has to process large amounts of data.

However, in this elaboration the worker has a fundamental role because based on the type of data and the type of processing to be developed he must modify the analysis algorithm.

So this type of technology can be defined as a dynamic technology that develops together with the worker who really learns from the experience of a worker.

Furthermore, the worker has the ultimate task of verifying the validity of the output derived from the analysis of the software thanks to personal and work experience.

So the major difference that has arisen from the interviews with these two companies is the methodology artificial intelligence is developed, in both cases it is used to optimize time and improve quality.

However the way to stand in front of artificial intelligence is totally different in one case artificial intelligence is a tool to cut costs and reduce timing in the other is a way to help a worker work faster and less tiring.

As explained in the previous chapters the technologies are used in different ways: in these two cases we speak of automatization with the case of Benelli weapons and of augmentation in the case of Xelexia.

The third interview company is Grottini Lab which uses a different type of technology that does not need data input.

Specifically, Grottini Lab helps optimize points of sale thanks to the use of cameras.

This type of artificial intelligence does not need a worker who supports it but does not even replace it; it is a type of technology that aims to optimize the store in all its forms.

The camera detects the missing products, or the types of customers that enter the point of sale the most and therefore helps the worker in the store to decide how to set up the products on the shelves or which shelves are empty and need to be replenished.

All this information useful for the worker and for the optimization of the point of sale are reported through a message to the worker directly, therefore very quickly and easily.

This type of artificial intelligence can be defined as a dynamic technology that does not work alongside a worker but works together as a colleague.

Regarding the different types of use of artificial intelligence technologies, the latter can be categorized in the category of optimization.

The choice of these three companies was made precisely for the reason that the three different technologies are developed and are placed within the company in completely different ways and therefore it is possible to analyze how even similar technologies can work and work in different ways within companies.

Despite being machine learning technologies, it is easy to see how even artificial intelligence technologies learn from experience in different ways either through a worker who works alongside them or through samples used to evaluate the work of technologies and from the experience of a worker who works with these technologies.

To conclude this analysis on the different types and different uses of them from the various interviews, it turned out that there is no better way to use artificial intelligence technologies but every company must find the best way to use them that can reduce costs by increasing profits and improving efficiency.

4.2. ANALYSIS OF PERCEPTION

In this paragraph we will analyze the data collected by the interviews in terms of perception.

Before carrying out the analysis, we will introduce the concept of perception already discussed in the previous chapters, by perception we understand in simple terms how the worker, manager or user sees artificial intelligence and what kind of reaction he has towards these technologies.

In previous chapters it has been explained, thanks to research on samples of Italian workers that most of them have "fear" of being replaced in the workplace by artificial intelligence technologies.

A large part of this majority stated that it is not only fear of losing their job but fear of having to work together with a new technology because they do not consider themselves sufficiently trained and educated to work there.

The part of workers that does not feel totally ready to work together with artificial intelligence technologies has a positive perception of these technologies in the sense that these workers think that new technologies will improve the world of work and even the work itself but not feeling able to work with it, the perception of it changes and becomes negative.

In the previous chapters, not only the perception from the worker 's viewpoint has been studied, even though most of the research and data collected are based

on workers' perceptions, there are also researches concerning the perception from the managerial side that is found to direct no longer just people but also technologies without feelings or emotions so you have to improve the way you compare to them.

The managerial side is the most difficult to study regarding the subject of perception because it does not always come into contact with new technologies, sometimes it comes into contact with them only thanks to the dialogue of a worker.

In any case, even in research concerning the managerial side it was found that a part of the sample interviewed is afraid of having to work with new technologies but the majority on the contrary is happy and has a very positive perception given that the various studies on profits with artificial intelligence have shown that it can help companies to have a substantial increase in profit.

In this section we will try to go into the specific analysis of the perception derived from the interviews with the three companies and trying to compare the three different realities that companies have.

As explained in the second chapter, the Italian situation in particular is not very favorable to the changes, in fact, with regard to some research we have positioned ourselves at the bottom of the ranking, as it was also demonstrated by the interviews that have begun to use new technologies for a short time still have not decided to invest large sums of money.

The Italian situation does not help the perception that the population has of these new technologies because there have not been so many studies about it and / or training courses.

With regard to the companies interviewed, they can be defined as three different realities, both as a structure and as a reality within the company, as well as how it uses and implements the new artificial intelligence technologies.

Benelli Armi has a wide reality being a big company, it has a reality among the various departments in itself in the sense that it is difficult for there to be a perfect communication between two very different and distant departments.

Grottini Lab is a reality already implemented but small in size where the relationship between the various departments is still strong and stable.

On the contrary Xelexia being a startup has a very small reality made up of a single department that carries out the most important tasks.

During the interviews an attempt was made to fully understand how the workers working within the three companies reacted to the advent of new technologies.

In each company, since artificial intelligence is used in a totally different way, therefore, workers' perceptions have also been different.

Based on how the company uses technology, if the worker is joined by technology or if the technology replaces the worker, then a different perception of it will occur.

Within the first interview company, Xelexia, technology is joined by a worker who, as explained before, is one of the problems of artificial intelligence that worries the worker the most, having to work together with a technology that he does not know and that doesn't respond normal computer commands.

The worker for this reason is followed by experts for the first period and is initially trained, through training courses he is explained the technology in detail.

Through this course the worker enters into "confidence" with artificial intelligence and for this reason it will be easier for him to work alongside him.

Through the experts who will follow the worker in the first period of use of artificial intelligence, the worker sees with his own eyes that working with the new technology is not impossible and that no superhuman effort must be made. The worker coming into contact with the new technology together with an expert has the opportunity to fully understand the use and usefulness that it brings within the company and to the personal work of the worker, speeding up and simplifying the work.

The Xelexia manager reported during the interview that there were companies that purchased the software they reviewed with very positive feedback and that the workers in that company also received very positive feedback.

Workers said that positive feedback comes from the fact that they were not catapulted into a new reality on their own without the practical knowledge of

the work they will have to perform but they have been followed and trained to cope with the change and the difficulties associated with it.

On the contrary, there have also been companies that after training and testing followed by an outsider have decided not to buy the software and the workers were not very inclined to open up to change and to change the way of working even if this change can bring improvements.

Regarding the second company, Grottini Lab, we were in a discussion not only about the perception itself but also about the perception of workers in terms of privacy.

In terms of privacy, as explained in the previous chapter, Grottini Lab works by installing cameras inside sales outlets.

These cameras do not serve to control the worker but to incorporate information that will then be coded into code that only artificial intelligence technology can decode so it is 100% secure with regard to privacy.

In any case, the worker who is out of the blue to work with cameras inside the store can react badly, which is why at the very moment when the store decides to use this type of artificial intelligence technology it is explained to the workers that they will not be checked and that the images that are detected by the cameras will not be sent to the management but serve only for the information for the optimization of the sales point.

For the most difficult sales points, in the sense in which workers have more difficulty in accepting this type of artificial intelligence, it is shown that the images received by the cameras inside the store are immediately coded and that they are not sent if not through codes.

Grottini Lab during the period in which it implemented this artificial intelligence technology did not receive negative feedbacks from the various points of sale but on the contrary it received many positive reviews also from the workers who immediately discovered the usefulness of this technology and have immediately saw how it can improve work and even simplify it.

Taking into consideration the last interview company, in this case we can talk about one of the biggest problems of artificial intelligence to take the place of the worker within the company.

In the reality of Benelli Armi, an entire department has been replaced by artificial intelligence technologies that have the ability to standardize work and perform faster and with lower costs.

This case is the most common case of using artificial intelligence and also the easiest one in the sense that it is not necessary to instruct or train a worker but it is simply necessary to set the algorithm of artificial intelligence technology.

The company said that there were no complaints from workers who were replaced by technology due to the background that the company has formed over the years concerning the automation of work processes.

This background should ensure that the worker is aware that the company has been working on automation for years and that it would have been natural for artificial intelligence to take hold within the company.

Regarding the perception that the workers working in the other departments have the technology used, there is no information about it because outside the department in which it is used, no training was carried out to explain how it can help the company improve the work or how it works and what kind of work it does.

As can be seen, each company has a different perception on the part of workers and a different methodology for dealing with negative perceptions.

These different methodologies depend not only on how the company is dealing with artificial intelligence but also on how the manager perceives artificial intelligence.

If we have a vision of new technologies as a tool to help the company increase profits, we will try to implement the easiest way to use artificial intelligence through standardized processes, thus reducing processing time and consequently for a long time term costs.

If instead we have a vision of artificial intelligence as an added value to the work of a worker then helping in the most repetitive parts we have an approach with artificial intelligence as we would with a new worker so we try to

understand where it can work better and an attempt is made to find a balance between the worker and the machine.

To conclude, each company interviewed, with its specific method to explain artificial intelligence technology to the worker and with its own way of introducing the worker to the use of technology, received many positive feedbacks and positive results in terms of work optimization and of product improvements.

The negative perception of these new technologies can be defeated through knowledge and training, in order to make people understand that artificial intelligence can bring something more inside the company and greatly improve the work of workers.

4.3. ANALYSIS OF OPPORTUNITIES

In this paragraph we will analyze the opportunities and advantages that the company has, have had, will have thanks to new technologies.

Opportunities do not mean only the increase in profit deriving from the use of new technologies but also all those opportunities that the company may have for example to acquire new market shares, new customers and new marketing strategies.

Analyzing the data deriving from interviews with the three companies, we cannot talk about the fact that all three companies had a substantial increase in profit at the end of the year.

Since the three companies are just entering the world of artificial intelligence, some of them are still under development.

For example, in Xelexia we are still trying to conquer a substantial portion of the market, however being a startup this is a common process in the sense that it is not easy to impose oneself within a market, perhaps already formed, easily.

Regarding this situation, Xelexia, a startup born a few years ago, has an advantage regarding the innovative product it offers.

The product is not unique, there are similar products on the market but unlike those already existing in the market, the software that Xelexia offers is very easy to use and not very expensive.

This can be considered one of the first advantages of the new artificial intelligence technologies in the sense that thanks to them it is possible to create and use technologies with enormous potential but that remain very simple to use.

In most cases companies think that to use artificial intelligence within a department they need very specific skills, in some cases this is true, but in general artificial intelligence technologies are designed to be simple enough to use for a worker who must support them.

Regarding the second company interviewed, Grottini Lab, one of the main advantages that has been noted, the company has been using artificial intelligence technologies for over a year so you can compare the increase in percentage of profits among those obtained before use of new technologies and after their use.

In just one year of use of new technologies, Grottini Lab found an increase in profits of around 40%.

Thanks to the new artificial intelligence technologies many companies have found a substantial increase in profits already from the first year of use, new technologies thanks to reducing processing times and optimizing work profits over the years will increase in large percentages.

Grottini Lab has also detected another advantage and opportunity that artificial intelligence is able to bring to the company, the optimization of the times which is one of the opportunities regarding the technologies used by Grottini Lab.

As explained in the previous chapters, thanks to the cameras it is easy to optimize the work and make the worker work faster and with less effort.

The advantage in this case is not only for the company but also for the worker who can work better and with less effort, but in the long term this will also bring an advantage to the company itself that will develop a lot thanks to the fact that the workers are satisfied with the job.

Another advantage that emerged from the interview with the manager of Grottini Lab is that concerning customer satisfaction that enters the point of sale and thanks to this satisfaction it is possible to acquire more and more regular customers.

Customer satisfaction for Grottini Lab, taking sales points or shopping centers as a reference, is one of the most important advantages.

This opportunity that the company has thanks to the use of new technologies is quite fundamental in the field of marketing and in the field of customer loyalty.

For a point of sale one of the objectives is to have many customers and thanks to these new technologies it is possible to do it more easily.

Considering instead the last interview made to the Benelli Armi company, one of the first opportunities encountered is the automation of a department.

The company, using artificial intelligence technologies to speed up the analysis of large amounts of data, has guaranteed the company a strong reduction in control times and an optimization of data analysis, greatly reducing the average error.

Thanks to this advantage, the final product is completed in less time and with a substantial cost reduction.

The opportunity that artificial intelligence has brought to Benelli Armi is to be able to analyze huge amounts of data in a very short time and a quality control with a reduction of the average error.

This opportunity was also detected during the interview with the first Xelexia company, also using a data analysis software.

Both stated that the opportunity can only be had if the company is willing to share the data, making it available for analysis and above all that the data is large and grouped together with a logic.

In the case in which the data are in large quantities and correct, the use of an artificial intelligence to analyze them brings to the company a huge opportunity to have less costs, fewer errors and a very rapid analysis process.

Obviously in the long term it will also have a huge increase in profits and an improvement in the final product.

The main opportunities encountered in the interviews conducted regarding the use of artificial intelligence technologies are:

- Optimization of work in the sense of improving the quality and quantity of work for the worker, limiting stress and creating a better work environment for the worker and managers.
- Reduction of processing time thanks to the speed and standardization of work resulting from the use of technologies.
- Increase in the long term of the profit thanks to the improvement of the final product and to the optimization of the times.
- Cost reduction, reducing errors thanks to technologies also saves costs for overtime and additional workers.

- Improvement of the finished product that is checked during the quality control through technologies and therefore more efficiently and quickly.
- Take advantage of data to be analyzed 100%, in this way you can optimize the type of data and have a more accurate analysis.

Obviously artificial intelligence technologies also have weaknesses, the most evident that was detected during the interviews is the type of data that will have to be analyzed that to be exploited to the maximum must be many and organized in a certain way and according to a logic specific.

One of the main problems of the type of data is that many companies still have the idea of having to keep secret data and not share it, but in this way it is not possible to use artificial intelligence technologies to analyze them.

To conclude artificial intelligence technologies bring great opportunities to the company but the company must be ready to welcome them and not have to close in front of them, so in order to have the greatest advantage through technologies it is necessary to have an open mind.

CONCLUSION

In these pages we have tried to explain how the new artificial intelligence technologies that are still developing can change the world of work and the structure of a company.

This was explained starting from the theoretical data to arrive at the study of companies located in the Marche Region.

It is concluded that these technologies being in development and completely new for small companies, like two of the companies interviewed, need an open mind on the part of the companies that will use them.

The perception that people have of new artificial intelligence technologies is generally negative due to the little knowledge one has of these technologies.

We tried to explain at first what they are but then the purpose of this work is to explain that artificial intelligence technologies are not necessarily a negative thing but on the contrary an added value that the company can have if it implements in the best way the use of technologies through for example training courses.

From the analysis of the companies it was found that even in different realities artificial intelligence technologies can bring numerous advantages and opportunities.

Furthermore, it has been noted that the perceptions that workers and managers have of these technologies are very different and depend on how the company is confronted with technologies and how they are placed and explained to the worker.

In this sense, if there was more training regarding artificial intelligence technologies, the general perception of people would also improve, given that one would no longer be afraid of something that one does not know but would have the desire to learn more about these new technologies.

To conclude artificial intelligence is currently present in many different realities and in different ways, from the simplest ones like Google to the most complex ones such as database analysis; but we cannot yet speak of a 100% implementation especially in Italy where still the development of these technologies is at the beginning and above all the mentality of the people is not yet ready to accept artificial intelligence technologies.

ACKNOWLEDGEMENT

The analysis carried out in this thesis was born to try to better explain how artificial intelligence technologies can prove useful within a company and how the worker himself can benefit from them.

A thank you for the inspiration of this thesis goes to the Department of Management of the Faculty of Economics and Commerce, inside it always tries to learn more knowledge and possible abilities to face the new challenges brought by the change that the market and the management are undergoing with the advent of new technologies.

Furthermore, within the department there is the will to look positively towards new technologies and the resulting change and this means that it is always at the forefront of new technologies.

Another thanks goes to Professor Emanuele Frontoni of the Department of Information Engineering, thanks to his help and his availability it was possible to contact the companies interviewed to carry out the analysis.

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