Ca' Foscari
University
of Venice

Master's Degree programme

in

International Management

Final Thesis

The impact of Artificial Intelligence on businesses
The case of Bluewind

Supervisor
Ch. Professor Stefano Micelli

Assistant Supervisor
Ch. Prof. Debora Slanzi

Graduand
Alessia Pascon
878475

Academic Year
2023 / 2024

Table of contents

Index of Figures

Ca'Foscari University

Abstract

Master's degree programme in International Management

by Alessia Pascon

Artificial Intelligence entered the world long before ChatGPT's debut and by now every single aspect of everyone's life is impacted by it: not only humans in their private lives are using it, but industries are experiencing major disruptive change due to its implementation inside business processes and those who are skeptical about it are risking falling behind. Undoubtedly, artificial intelligence is not impacting all markets in the same way: some have been impacted earlier than others, and some are still experiencing major challenges in adopting it, but what is for sure is that all companies are willing to keep up with such a powerful tool.

The main aim of this thesis is to deeply understand how artificial intelligence is shaping the business world, therefore after a brief introduction on what artificial intelligence is in the first chapter, the second chapter will delve into its impact on enterprises, how they are trying to face this new major challenge, their expectations together with what has already been done in the recent years. If artificial intelligence has not impacted all industries in the same way, neither has it affected countries equally: Europe has not reacted the same way the United States has, but neither have all European countries.

The third chapter focuses on understanding what use cases are and how they are built, focusing the attention on three main use cases on generative artificial intelligence chosen following previous findings presented in the first chapter. The final part of the chapter deals with the Design Thinking Method: what it is, which are its phases and why it is so useful.

After an introduction of the software industry, main data and differences among countries, the closing section presents Bluewind, an Italian company in the software industry that decided it was time to take the big jump and implement artificial intelligence in their processes: they did so with the help of UpSkill 4.0 and Ennova Research, taking part also in the StrAIght to Business project.

Keywords: AI, GenAI, use case, Software, Bluewind

Introduction

Artificial Intelligence entered the world long before ChatGPT made its debut back in late November 2022, however, that served as a wake-up call for enterprises to understand how far machine learning has come and to highlight the urge for them to do something to catch up.

2023 alone has been a landmark year: several releases followed one another, starting with GPT-4 in March, one of the most powerful AI systems able to surpass humans' capabilities and finishing with Meta releasing Gemini, one of most valuable ChatGPT's competitors.

The main aim of this thesis is to investigate how artificial intelligence is impacting the business world, which are the main functions within an organization being affected by it and trying to understand whether the world is ready for such disruptive force.

The thesis is divided into four chapters plus the conclusive one: the first deals with the definition of artificial intelligence and gives a glimpse into the AI industry, how much it is valued and points out the main players of the industry and in which sectors it has the most powerful impact.

The second chapter is the core of the thesis, in fact, it focuses on how AI and generative artificial intelligence are entering the business world, analyzing also risks and threads companies are facing, and identifying different geographical scenarios: countries have not had the same reaction toward it and neither had industries, what is certain is that the overall AI adoption inside businesses is luckily increasing.

To conclude the theory section, the third chapter deals with use cases and the design thinking method: the first is useful to properly address companies' problems, whereas the latter is among the most flexible and adaptable methodologies to find innovative and tailored solutions. Moreover, three use cases on generative artificial intelligence in business will be presented, which are sales and marketing, product and service development and lastly, code-generation software.

These first three chapters are the basis of the fourth one dealing with the Bluewind case study: Bluewind is a small-medium enterprise located in the north-east of Italy that decided it was time to take a big step forward and wanted to implement Artificial Intelligence in its processes, to do so they launched a challenge developed during the event *StrAIght to Business,* the conference that wanted to connect enterprises with artificial intelligence and students to develop ad-hoc strategies for new AI-powered tools.

The event took place in Venice in May 2024 thanks to the collaboration of UpSkill 4.0 and Ennova Research. However, before discussing the project, an overview of the software industry is given, trying to understand whether Italy is competitive in this field or at least it has the resources to grow in the next years.

To conclude, the last part of the chapter presents further development of the path Bluewind has decided to follow, after the Venetian event in May: with the support of the UpSkill team and Francesco Costa, director of engineering at Bluewind, who was kind enough to tell us more information on the attitude of the company toward AI and innovation in general, but mainly he told us the impact of generative artificial intelligence the company is experiencing, before guiding us through Bluewind's future goals and expectations.

Chapter 1

Overview of Artificial Intelligence

"Artificial Intelligence is not going to replace humans, but humans with Artificial Intelligence are going to replace humans without Artificial Intelligence"

- (Lakhani, 2023)

This is what Karim Lakhani said in one of his interviews focusing on Artificial Intelligence and its impact on the work world: he is a professor at Harvard Business School and a pioneer in identifying how technologies have reshaped the business world; the words reported in the Harvard Business Review magazine perfectly describe the impact that Artificial Intelligence will have and is currently having on our reality.

As evidence shows, the labor market is not suffering from the introduction of artificial intelligence in organizations, quite the opposite, it changed: new types of skills are required and new job positions arose. Starting from year 2015, the demand for AI specialists outpaced the demand for every other type of job and even if the latter increased as well during the years, the opening for specialists in AI jobs increased at a faster pace reaching its peak in 2022 and then turned to normal the following year (PwC, May 2024).

Number of Job Postings, relative to 2012
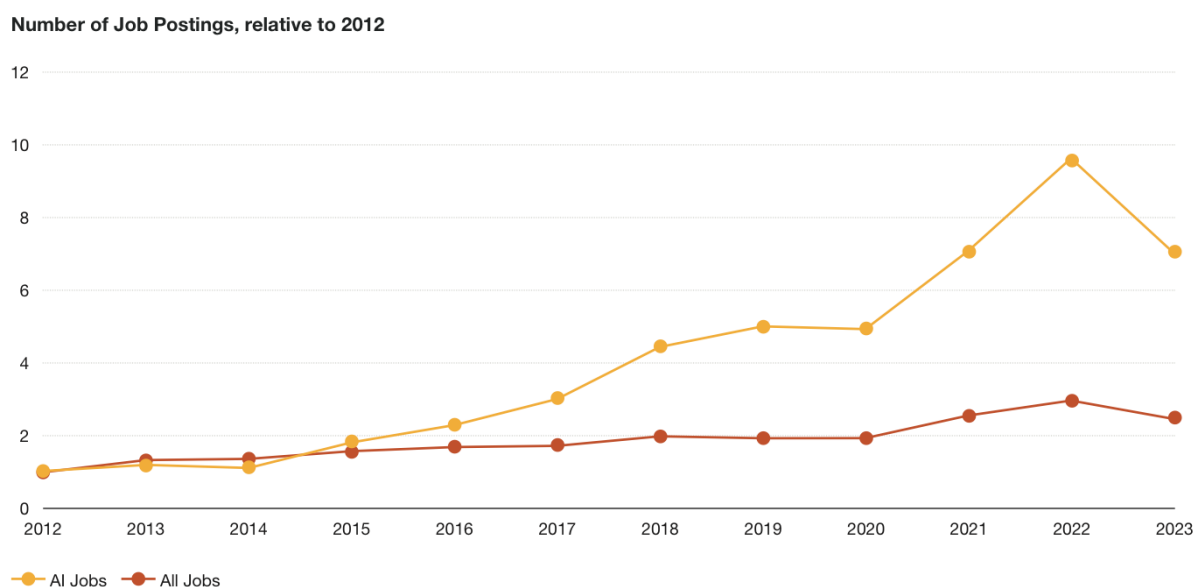
Source: PwC analysis of Lightcast data. The analysis represents six of the fifteen countries: US, UK, Singapore, Australia, Canada, and New Zealand. Nine countries have been excluded due to data prior to 2018 being unavailable: France, Germany, Belgium, Denmark, Spain, Italy, Netherlands, Norway, and Sweden.

Figure 1: Number of Job postings (PwC, May 2024)

In addition to that, wages are also changing: those with specialist skills in the AI field have an average wage premium of 25% compared to usual workers.

Before analyzing the scale of AI in business in more detail, it is important to understand what AI is and what its foundations are, which will be the topic of the next paragraph, together with an analysis of the AI industry and its leaders.

What is Artificial Intelligence?

Artificial Intelligence (AI) can be defined as human intelligence applied to machines and computers: the abilities and skills that once were only associated with human beings such as thinking, understanding and learning, and interacting now can be performed by technologies based on algorithms and codes (Gode & Kalkan, 2023).

The concept of AI developed much earlier than November 2022, when the first version of ChatGPT was released after major upgrades on previous tools to the whole world and quite everybody started understanding what it enabled; it was born even before late 2015, the year in which OpenAI was founded: AI roots back to the '50s, when a British polymath called Alan Turing introduced the possibility of machines performing human-like activities in his paper entitled "Computing Machinery and Intelligence" (Anyoha, 2017). From that moment on, several studies and theories followed leading to the era we are living in right now.

AI is a complex and broad field, which includes machine learning, deep learning and Generative Artificial Intelligence. Machine learning started developing during the '70s and thanks to the algorithms on which it is based, it can detect patterns and make predictions by analyzing a vast amount of inputs, such as synthesized data, historical data as well as human inputs; its potential is constantly increasing since the amount of data to be processed is too vast for humans (McKinsey & Company, 2024). As we move towards more advanced tools, deep learning can be found: it can process larger amounts of data, producing more accurate results with even less human interaction since it uses unsupervised learning. It is based on multilayered neural networks also called deep neural networks, which are able to simulate the decision-making power of the human brain: neural networks combine data inputs, weights and biases to detect, classify and describe objects within the data. As we already mentioned, deep learning consists of multilayered neural networks, meaning that each layer builds on the previous one to obtain always more accurate predictions and reduce errors (Holdsworth & Scapicchio,

2024). Finally, as a subset of deep learning, Generative AI takes a step even further, it enables the creation of original content in response to external prompts; in other words, GenAI is able to produce text, images, video and audio but also software according to single requests. Gen AI models would not be able to accomplish such tasks without being dependent on both machine learning models and deep learning models and it works following three phases:

a. Training phase: it consists of the creation of a foundation model, which is a deep learning model that can be common to multiple types of GenAI applications; this phase is expensive in terms of both time and money since the foundation model's creation involves training the algorithm on a large amount of raw and unstructured data so that it can predict the right answer;

b. Tuning Phase: since during the previous phase the algorithm was trained on various topics but it is not able to be as accurate as it needs on a specific matter, the model needs to be tuned to a precise generation task;

c. Generation, evaluation and retuning phase: to be as precise and up-to-date as possible, the model needs to be continuously updated.

    Retrieval augmented generation, commonly called RAG, is an option to enable foundation models to always be acquainted with the latest information by using sources outside the training data. (Stryker & Scapicchio, 2024).

After a brief introduction to the main features and components of AI, let's shift the attention towards some actual data: according to the Artificial Intelligence Index Report 2024, last year has been fundamental for AI since progress accelerated, marking 2023 as the year of breakthrough improvements for AI.

The graph below highlights the improvements of AI systems compared to the human baseline through the last decade: in greater detail, the vertical axis shows the performance of the AI benchmarks analyzed liken to the human baseline in percentage terms, meaning that if an AI benchmark records a value of 100%, it equals the human baseline, whereas if its value is higher, the AI benchmark is performing better than humans. To be clear, AI benchmarks are tests run to assess AI systems' capabilities: for example, ImageNet is an AI benchmark full of labeled images and the AI algorithm is asked to classify them. As the graph shows, the majority of AI benchmarks taken into account have outdone human baselines over the years: image classification exceeded human baselines already back in

2015, basic reading comprehension in mid-2017 and medium-level reading comprehension the following year, by 2022 also visual reasoning, English language understanding and Natural language inference surpassed human baselines.
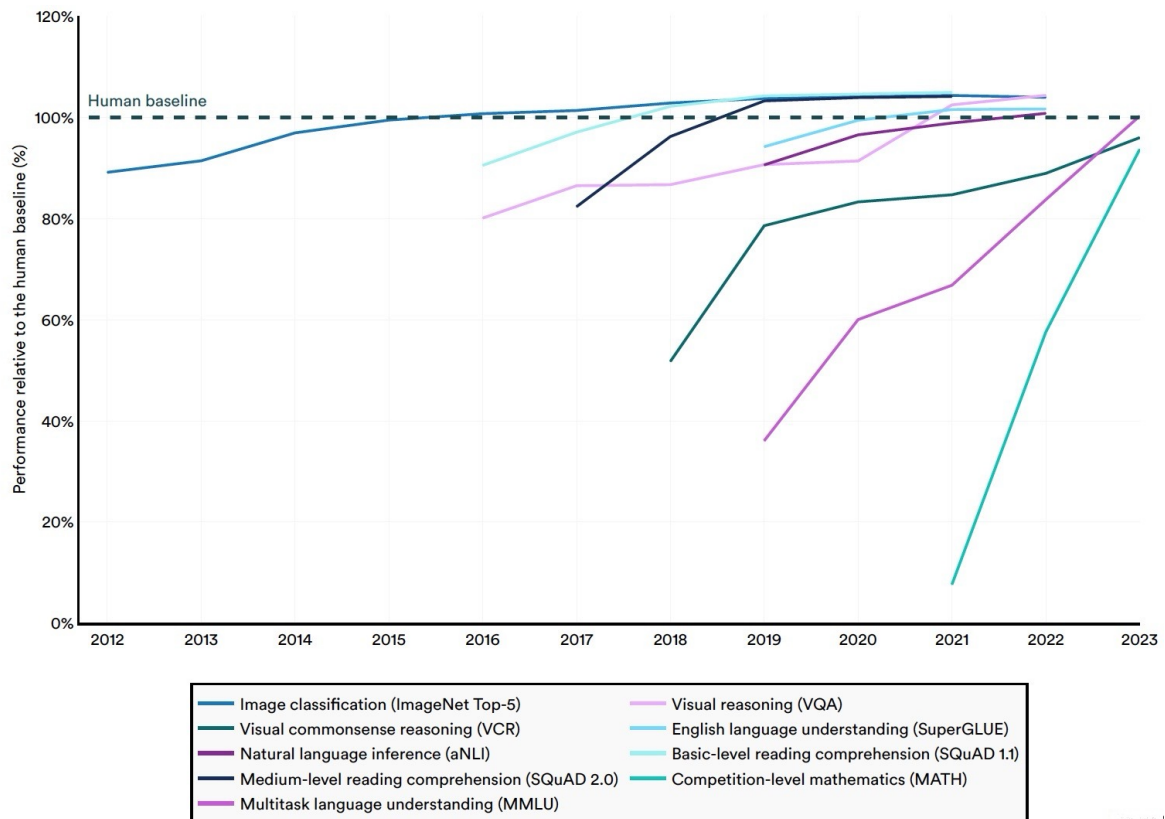
Figure 2: AI performance compared to human performance (Maslej, et al., April 2024)

However, there are still some benchmarks that have not reached or exceeded the human baseline, such as competition-level mathematics, visual common reasoning and natural language inference, even if the latter reached the threshold of 100% in 2023. The tasks just mentioned are more complicated than the other analyzed and these types of tasks are the main focus of today's researchers: in fact, from the graph, it can be seen that some AI benchmarks do not show any sign of improving performance during the last years, that can be because they have reached their maximum potential or whether because scientists have moved their attention towards more complex challenges (Maslej, et al., April 2024).

To better understand the path that Artificial Intelligence is following, keeping in mind that predicting the future is quite impossible and things change so fast these days, the Gartner Hype Cycle could be useful (Perri, 2023).

Figure 3: Gartner Hype Cycle for AI (Perri, 2023)

The Gartner Hype Cycle is a tool to comprehend the potential of new promising technologies and applications: it enables one to understand whether the innovation and the technology are just a hype phase or are gaining momentum and will result in disruptive changes; moreover, it is an important tool for businesses since it can help understand whether it would be smart to make an early move or is better to wait for further maturation. As for how it works, the Y-axis shows the expectations surrounding an innovation, whereas on the X-axis the value of the same innovation over time can be found; as we move from left to right, five phases can be tracked which innovative products usually go through within a three to five years span:

a. Innovation trigger: that is when an event like a technological breakthrough or product launch draws attention, usually start-ups emerge, venture capital investment skyrockets and first mover organizations start launching tests;

9

b. Peak of inflated expectation: this is when the excitement brings in more suppliers, people using the product increase, there is a lot of media coverage and hype, although there is still limited proof that the innovation can meet the expectation;

c. Trough of disillusionment: this happens when the original excitement wears off and early adopters report predictable performance issues and low returns on investment;

d. Slope of enlightenment: this is when the innovation starts to be deeply understood, initial products are upgraded with a second or third-generation of products but still conservative companies remain cautious;

e. Plateau of productivity: more users see real-world benefits as the innovation goes mainstream (Gartner, 2022).

As the Hype Cycle highlights, most AI technologies place themselves in the first two phases with Generative Artificial Intelligence paving the way to other innovations, such as Artificial General Intelligence (AGI), which is the capacity of a machine to accomplish everything a human can do, it is still highly unknown and it will likely reach the plateau within ten years. On the other hand, technologies that will empower Generative AI can be spotted as well: foundation models, neuro-symbolic AI and responsible AI just to name a few (Perri, 2023). In 2023 Generative AI reached the second phase of the Gartner Hype Cycle, the so-called peak of inflated expectation phase which suggests that in 2024 or the year after, it should enter the third phase, the phase of disillusionment; as data suggests AI is still going strong, still expectations are high and this is the year of truth.

The Artificial Intelligence industry

Artificial intelligence is clearly experiencing explosive growth, transforming the way people live and work, but before examining how it is entering the business world, disrupting companies' processes, market trends, key players and which industries are mainly impacted will be explored.

As proof of the growth that Artificial Intelligence is going through, the global AI market is booming, with its value projected to skyrocket from $538.13 billion in 2023 to $3.7 trillion in the next eleven years, fueled by a staggering annual growth rate of about 19%. In conjunction with this discussion, the following graph provides visual evidence of the positive trend AI market size will follow in the next decade: as highlighted, its value is

going to increase year after year, and no falls back are expected, as a consequence it highlights the high potential of such tool and its widespread adoption across several industries.
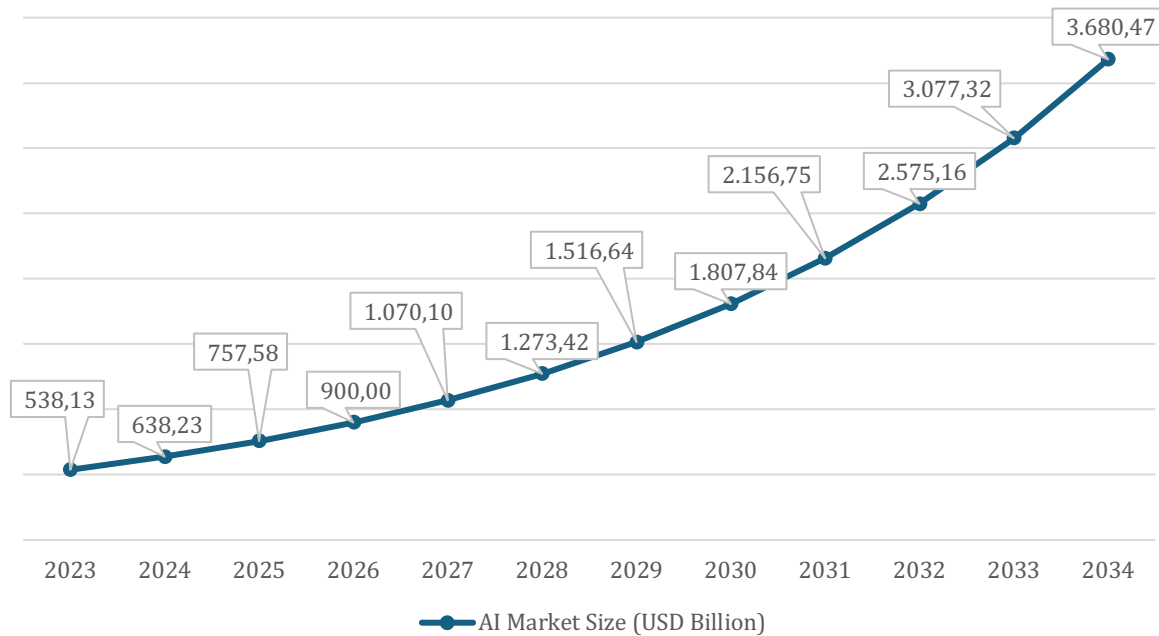
Figure 4: Artificial Industry market size in USD Billion (Precedence Research, 2024)

Undoubtedly, its steady increase is due to an always faster digital technology penetration, together with massive investments from tech giants in research and development and always more industries ready to welcome AI-powered tools in their internal processes.

A variable to consider when studying this industry is geography: geography matters, since different countries have different attitudes towards it but first and foremost they contribute differently to the total market share: in 2023 North America dominated the market accounting for almost 40% of the total share, followed by Europe and Asia Pacific with 25,47% and 24% respectively, fourth place for Latin America with only 13,63% of the total share (Precedence Research, 2024).

Different sectors, different AI impact

Geography is not the only variable to consider when analyzing the AI industry: as a matter of fact, not all sectors are equally impacted by artificial intelligence, some have already been highly disrupted, and some have a long way before being completely reshaped. To understand whether a specific sector has the potential to be completely transformed, PwC elaborated the AI Impact Index built upon five standards, which are the following:

a. potential for increased personalization;

b. potential to improve quality;

c. potential to improve consistency;

d. Potential to save customers' time;

e. Data availability to enable gains.

What emerged from this research is that the sector with the highest potential AI impact is healthcare with a score of 3.7 on a scale from 1 to 5, tied with the automotive sector, then comes financial services with a score equal to 3.3 and transportation and logistics with 3.2. Analyzing the data provided, the healthcare sector is one of the two sectors with the biggest potential impact: users could benefit from tailor-made medical care and reduced disease risks, simultaneously, privacy and security doubts on data arise lengthening the time for patients' approval. What AI could achieve in the medium-long term is not only being able to give diagnoses based on data but also developing drugs on its own, taking it a step further. The automotive industry is another area with great opportunities for artificial intelligence: the technology is quite ready, but what does not seem to be is the regulatory environment and potential clients, who are still skeptical about it. What seems to be the automotive next frontier are self-driving cars offering on-demand and flexible services tailored to individuals' needs, together with autonomous features to enhance driving safety, such as driver assist and finally, AI-powered engine monitoring and predictive maintenance to optimize performance and extend lifespan (S. Rao & Verweij, 2023). At the beginning of September 2024, a leader in the automotive industry, Pirelli announced its partnership with Bosh to create new software-based solutions and in-tyre sensors installed in cars tyres: Pirelli has pioneered a revolutionary system, *Cyber Tyre*, featuring integrated sensors that collect and analyzed data in real-time, transmitting in directly to the vehicle, more specifically to the ESP control unit (ESP stands for Electronic Stability Porgram, it supports the driver in every critical situation by stabilizing the car). The system developed by Pirelli and Bosh maximizes the performance and characteristics of each tyres, and at the same time ensures an optimal level of safety and personalized driving experience (Pirelli, 2024).

Despite the low level of consumer trust and a difficult legal landscape, which are two incredibly huge obstacles artificial intelligence needs to overcome, the financial market is expected to experience a game-changing impact due to AI tools implementation: considering factors like income, expenses and long-term goals, artificial intelligence can

tailor financial advice to individual needs, providing solutions regarding wealth management or retirement planning, but also suggesting investment strategies; furthermore, it can identify potential fraud and money laundering through quick identification of suspicious patterns (S. Rao & Verweij, 2023). JPMorgan Chase has recently implemented COiN, which stands for Contract Intelligence, an artificial intelligence tool that simplifies the review of legal documents: more specifically, it extracts data from commercial loan agreements, one of the most time-consuming tasks employees have to conduct. The introduction of COiN translates into higher levels of efficiency and accuracy, but it creates also opportunities for skill enhancement and professional growth (Medium, 2024).

According to a report published by the Burning Glass Institute in collaboration with SHRM, the Society for Human Resource Management, the financial and insurance sectors together with the professional service sector are the main areas of impact of Generative AI: its findings suggest that GenAI is poised to revolutionize a wide range of white-collar professions, rather than blue-collars one. To conduct the research, they have built the *GenAI Exposure Score* to assess the potential impact of generative artificial intelligence on occupations by analyzing tasks and skills associated with each occupation and determining how likely they are to be automated or augmented by it, the higher the score, greater the likelihood of the occupation to be significantly impacted by it. If the first ten scores are to be considered, they are all linked to the financial sectors and that of professional services, such as loan and insurance brokers, investment consultancy and marketing services and legal offices (Lohr, 2024) (Burning Glass Institute, 2024)

Namely, it is not only industry predisposition, the level of investment and many other variables mentioned to increase or decrease the chance for artificial intelligence to change the rules of the game, also skills requirements among industries differ and since some skills more likely to be acquired by artificial intelligence, the likelihood of the sectors where they are required is going to experience a higher level of AI impact. As it happens, marketing research and advertising agencies are among the first and most impacted industries: thanks to AI, deeply personalized customers' profiles can be created, their behaviors, preferences and motivations can be deeply understood using the vast amount of data available, without losing in efficiency and accuracy, since new tools revolutionized the whole process and they are able to find more valuable insights analyzing markets in less time (Forbes, 2024).

Main players

If we have understood something by far is that the artificial intelligence industry is evolving continuously, it never stops and looking at the growth expected in the next decade, it is not going to anytime soon. However, in this fast-changing and evolving environment, some companies have made their way and are now considered among the most powerful enterprises globally: some are already known tech giants, such as Google, Meta, Apple, Microsoft and Amazon, other businesses are uniquely specialized in artificial intelligence like Nvidia and OpenAI.

Nvidia was founded by Huang Jensen, who still is the company CEO and now it is featured in newspapers on a daily basis: known worldwide for its Graphic Processing Units (GPUs), Nvidia chips are used in the gaming industry and data centers and mainly in artificial intelligence, which makes it one of the most powerful players of the whole AI industry. As evidence of Nvidia's leading position in the market, in June 2024 its market value overcame that of Microsoft and Apple, becoming the world's most valuable public company: as of September Nvidia is not the leader anymore, the creator of Windows and Office and the Cupertino-based technology innovator are back at the top; what is surprising is its growth in the stock market which is one of the fastest ever, just two years ago its market capitalization was just above four-hundred billion dollars, whereas now within one year, the company has surged from one trillion evaluation to exceeding three trillion dollars. It is something that neither Apple, nor Microsoft have been able to do, the first reached the three trillion threshold last June, taking seven years to jump from one trillion dollars to three, whereas the latter made it possible in five years. Undoubtedly its growth is proof of the importance AI is gaining in the market and the increased demand for AI-related technologies boosts it (Mickle & Rennison, 2024). The fluctuations in Nvidia's value throughout the summer 2024 have sparkled initial concerns about the company's future trajectories, whether the growth phase has already come to an end with the same ease it has risen in the last five years: according to researchers its growth is not stopping anytime soon; however, even if they had to suffer any fall, they would still be lucrative (Sommer, 2024).

The AI market is highly competitive and apart from well-known companies excelling in the field of AI, Forbes draws up the *Annual AI 50*, a list of the most promising companies in the sector: it was first launched in 2019 and showcases innovative companies across

various sectors such as healthcare, finance and robotics currently leveraging artificial intelligence in significant ways. Startups present in the list have altogether raised more than thirty-four billion dollars from investors, even if quite one-third of the total funding is attributed to OpenAI, which secured around ten billion dollars from Microsoft; additional significant funding comes from other rising AI firms, including Antrhopic with more than seven billion dollars, Cohere raising $445 million and Mistral AI securing more than five-hundred million dollars. The latter, Mistral AI, is regarded as Europe's answer to OpenAI and it focuses on developing open-source AI models available free of charge, creating smaller but efficient models requiring less computational power. It is only one year old, but its value already reached the two billion threshold and raised more than five-hundred million dollars in venture capital from investors like Andreessen Horowitz, Microsoft and Nvidia as well (Cai, April 2024).

To be concise the competitive landscape of the AI industry is really complex and changing fastly, new startups emerge every now and then and as quickly they emerge, they receive fundings from investors and other giants of the industry. This fast-paced environment does not come without problems and difficulties which is the main topic of the next section: risks and biases wrapped around artificial intelligence and therefore the importance of explainable AI.

Risks and biases

Artificial Intelligence is experiencing unprecedented growth, no other previous technology has grown as AI has been doing recently and still is: due to its profound disruptive potential, risks should be taken into consideration to limit potential negative effects.

Ethical dilemmas, security risks and privacy concerns are just some of the threats that pushed in the early months of 2023 tech leaders like Steve Wozniak to write and sign an open letter to stop, or better pause, the development of AI being till the downsides are known and ready to be addressed, as it could be a threat to the society (Metz & Schimdt, 2024): AI development has not stopped or either paused, but neither have risks.

As already mentioned, Artificial intelligence highly relies on training models and data therefore it sounds logical to admit that the possibility of the results being biased decreases: however, AI biases exist and happen when artificial intelligence's results are mistaken due to biases affecting training data or the algorithm (Holdsworth J. , 2023). The

main reason behind biases is the data used to train algorithms, it could contain previous biased decisions taken by humans, or methods through which data have been gathered could be biased. That said, understand whether the result obtained is fair is not that simple, as we enter the world of fairness which has several definitions and measures, engineers are currently working on finding solutions working on the algorithm or on the set of training data, but however what continues to have a central role is human judgment; moreover, explainable AI, which is the topic of the next paragraph help in reducing biases and the impact of it on results (Silberg & Manyika, 2019). The majority of AI biases share the name with human biases such as cognitive bias and confirmation bias, but there are many others that deserve to be analyzed. The measurement bias occurs when data is not complete and it does not represent the entire population as it should, often it is the consequence of exclusion bias that happens when crucial data is omitted; the out-group homogeneity bias arises from the lack of awareness of the unknown, as a matter of fact developers may create algorithms that are less effective at differentiating between individuals outside the majority group in the training data and usually it goes along with the prejudice bias, that occurs when stereotypes are embedded into algorithms leading to racial bias or misclassification. The list of biases could continue but results remain the same, the risk of biased solutions is to be considered while using AI-powered tools but actually explainable AI could help.

Why AI should be explainable?

As everyone understands, the potential of AI is impressive and the scale of its application is truly remarkable: however, to really unlock its full value, it needs to be well-explained. Explainability seems to be a straightforward concept, but it is not when the concept to describe is becoming more complex day after day. At the heart of explainability is the creation of a process that enables any expert to understand the outcome of the AI implementation and the process that led to the final output: to do so companies should focus on making explainability a key point of the strategy and involve cross-functional professionals from business leaders to technologists and risk professionals so that to understand whether explanations are intuitive despite anyone's knowledge. One should not forget that to accelerate that process, companies need to invest in hiring and training their workers.

After understanding how AI can be explained to everyone, let's come to the main focus of this section, which is why it should be explainable. If AI is explainable, it will not be only the company to benefit from it but also technology professionals along with risk and legal professionals. Technologists could detect inaccuracies and areas where there is room for improvements more easily; by doing so they could monitor and maintain AI systems in an efficient way. Business professionals are the ones who benefit the most from it: by being so complex and always different because of continuous enhancements, often lack of trust is the reason behind low level of AI adoption, but if users understand the foundation of the systems, they are more likely to trust AI suggestions and actions, increasing the probability of customers following their recommendations. At the same time, if users understand how the system thinks, they can understand why it came to a specific conclusion and that could be even more valuable since they could explore paths that otherwise would not have been considered; in addition to that, by comprehending what AI specialists explain on how the system function, business professionals can confirm that they are reaching the goal and so that AI applications are providing the expected value. Last but not least, legal and risk professionals could isolate potential risks more smoothly and understand whether the implementation is compliant with regulations and laws (Grennan, Kremer, Singla, & Zipparo, September 2022).

The Potential Future of AI

Having understood where artificial intelligence is today, it is important to look at what the future holds in order to assess which path to take. What now can be taken for granted is the magnitude of Artificial Intelligence's impact which is huge, but its future development is expected to be even greater: by the end of the decade, Artificial Intelligence's contribution to the world economy is expected to be up to 15.7 trillion of dollars, in other terms the global GDP is expected to be up to 14%, as a result of both productivity increasing and consumption-side effects as the graph below shows (S. Rao & Verweij, 2023).

The increase depicted in *Figure 5* can be broken up into four components: in fact, the rise is due primarily to more efficiency in labor productivity, in terms of freeing workers from routine tasks and letting them focus on higher value-adding activities, but other three elements can be identified, which are personalization, time saved and quality of products

and services and they all show to be increasing steadily indicating a positive correlation between AI tools implementation and the growth of global GDP.
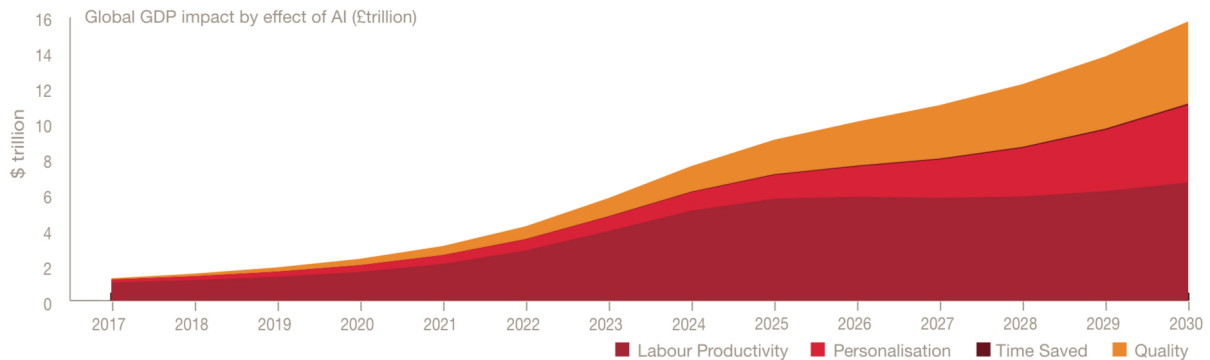
Figure 5: Artificial Intelligence's gains (S. Rao & Verweij, 2023)

It is interesting to notice that a virtuous cycle creates: people get to manage their time better, since some activities are conducted by artificial intelligence, while they value more personalized and high-quality products and services with consumption increasing as a consequence, this results in more data and insights and therefore more consumption.
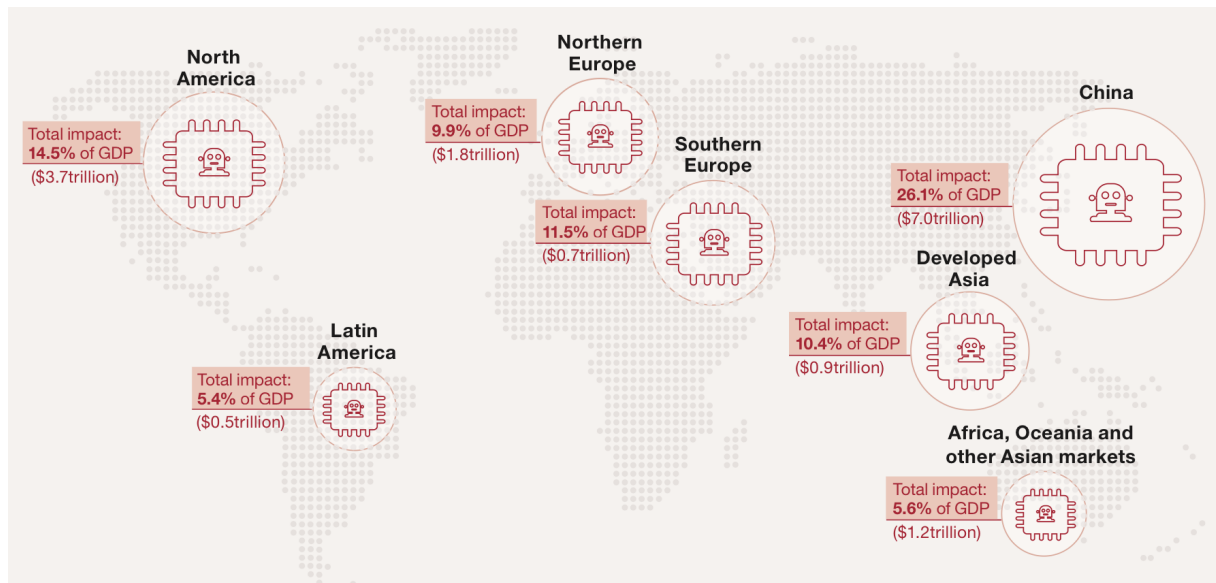
Figure 6: Artificial Intelligence's gains by region (S. Rao & Verweij, 2023)

Considering the level of present investment in artificial intelligence, the future gains differ if different regions are considered: as the map above shows, all economies are going to benefit from artificial intelligence implementation, however China and the United States together with Canada will probably be the most affected, indeed China is expected to contribute to the global GDP by 26.7%, whereas North America is expected to contribute by 14.5% by 2030. On the other side, we have Europe and developed Asia which will also

contribute to the global GDP, while less developed countries are also benefiting from AI usage but recording a lower increase mainly due to lower levels of AI technology implementation. It is not difficult to see why North America and China are more likely to experience major changes, or at least before any other region: the first is helped by the high level of technology already adopted and how ready potential users are, the latter will be helped by the high level of manufacturing enabling huge opportunities for faster technologies. What is true is that China is not as ready as North America as for what concerns technology and expertise, which is why GDP will not increase as fast as the US; at the same time, China is highly focused on re-investing in its economy and it is second in AI patent filings, just behind the United States of America (S. Rao & Verweij, 2023).

In defining roles that each country will play in the near future, the Middle East should not be forgotten: in fact, it is projected to account for two percent of the total global benefits from AI by 2030, which, as previously stated, are expected to reach 15.7 trillion dollars, and therefore amounting to an estimated $320 US billion. Among the states that are part of the region just mentioned, in relative terms, the United Arab Emirates (UAE) is expected to experience the most significant impact from artificial intelligence, with its contribution nearly reaching 14% of its GDP by 2030; meanwhile, in absolute terms, Saudi Arabia is projected to see the largest economic gains (Jain, 2018). Despite the large investment of the government in AI, UAE became a serious player in September 2023 when it released Falcon, a generative large language model (LLM), which was surpassing top models from Meta and Google in performance; moreover, the country has several advantages on its side, starting from substantial cash reserves to invest in high-end computing hardware, continuing with reliable electricity supply powered by oil, natural gas and solar energy and an appealing environment for data center construction compared to energy-constrained regions like Europe and part of Asia, and also the attractiveness of the country for top AI researchers is expected to increase mainly thanks to absence of the income tax (Perrigo, 2024).

In the next chapter, the application of AI technologies in companies will be analyzed, which are the expectations after its implementation, which is the global level of AI adoption in businesses and in which functions within a company AI is mostly used. Is Europe falling back or it is able to keep up with other countries? How Europe is reacting toward this new technology is another topic of this section, where weaknesses and

strengths will be taken into account; last but not least risks that businesses face when introducing AI-powered technologies will be analyzed.

Chapter 2

Generative AI in businesses

The Artificial Intelligence entrance into businesses has been debated a lot over the years with researchers asking whether it is just a bubble ready to explode anytime, others questioning if it enables companies to be more productive allowing enhancing salaries as the economist of London Business School John Van Reenen affirms, or whether it just substitutes workers. After years of debating, the majority have come to a common answer: no one sees a future with only humans or either only machines working, AI has the potential to improve anyone's life, they only need to understand how to make AI work for them (Frick, June 2024). Before analyzing data on AI implementation in enterprises, let's dig deeper into how artificial intelligence and generative AI have been reshaping business models, businesses strategies and decision-making processes.

New business models and strategies

Artificial intelligence is not a futuristic concept anymore: as examined in the first chapter, it has been transforming industries forcing them to rethink their operations: if on one hand, it has the power to offer unprecedented growth and innovation opportunities, on the other hand, AI pushes towards revolutionized business models and to new strategies that companies must implement to deal with it.

Let's start from scratch by saying in a few words what a business model is so as to go smoothly in highlighting which aspects artificial intelligence influences: business models represent how a company is going to create value for clients as well as for itself, meaning how they plan to make profit. To build a clear business model, identifying the value proposition and revenues and cost sources are not enough, but it has to be clear how value is created and who the target is; therefore, key activities and resources have to be identified, without forgetting how important relationships with customers and key partners are and how they are going to be reached (Ovans, 2015).

It comes as no surprise that artificial intelligence impacts all the key aspects just mentioned, transforming business models into self-learning and self-improving models allowing businesses to react promptly to market fluctuations and customer demands. AI-driven business models leverage artificial intelligence technologies to enhance, innovate

or create entirely new processes, products or services: the approach towards processes is much more dynamic, data-driven and customer-centric and often it requires strategies to be redefined; there are other two key aspects to consider which are the balance between humans and artificial intelligence, they have to be seamlessly integrated, artificial intelligence insights gained from data analysis have to be fully combined with creativity sphere of humans mind, and secondly artificial intelligence should be integrated also with already present digital systems like ERP and CRM.

Both how and to who businesses are supposed to create value are going to change due to AI implementation: thanks to the insights, AI is able to detect new trends, potential customers are going to be engaged with highly personalized communication and advertising, furthermore, artificial intelligence can provide much more efficient customer support through chatbots and virtual assistant that are available in every moment. This translates into a higher level of satisfaction in clients and therefore higher retention rate, which is known to be highly valuable, even more than reaching a new customer base (Farayola, Abdul, Irabor, & Okeleke, 2023). Stated otherwise, artificial intelligence-driven business models have four major features: data are the fuel of the whole system, it can be gathered from different sources starting from interactions with users or market research, and all of it is needed to gain insights on preferences and needs but also to train the algorithm the business choose to use; the latter is necessary to identify trends, forecast outcomes and take action on it. Automation is another key characteristic: employees have the chance to focus on more valuable jobs instead of losing time on repetitive tasks, therefore AI automation does not turn into job losses but in more satisfied and valued employees; lastly innovation, which has to be the guiding light of the whole organization (Gibson, 2024).

If business models are to change, so are strategies that businesses should follow and consequently data and technology are not the only challenges enterprises go through, but there are managerial ones as well that need to be overcome. Firstly, to correctly implement AI-powered tools, executives should have a clear idea of how artificial intelligence could drive advantages to their business, and this is linked to what has been previously analyzed while studying explainable AI; then what the majority of companies ignore is that they should structure the organization for AI arrival, and by doing so the importance of soft skills and adaptability will be emphasized, fostering new types of collaboration, even among humans and machines.

MIT Sloan Management Review in partnership with Boston Consulting Group interviewed more than three thousand executives, managers and analysts from companies located all over the globe and from different industries to examine what businesses are actually doing to deal with a force of such magnitude. According to the level of AI adoption and understanding, the research identified four categories of companies, which are pioneers, investigators, experimenters and passives. Pioneers are organizations that both comprehend and are at the forefront of integrating it into their value proposition and internal operations; investigators are companies that grasp the AI concept but have not moved beyond the pilot phase; experimenters, as the chosen name itself suggests, are businesses experimenting AI without having a clear vision on it and lastly, passives are those who lack both artificial intelligence implementation and understanding. The following graph demonstrates how attitudes towards AI differ among companies, more specifically, this graph illustrates in blue the percentage of interviewees that understood the urgency to build a strategy to deal with artificial intelligence, whereas in orange the percentage of organizations that have a plan in place: on overall only half of the surveyed has a clear path to follow to deal with artificial intelligence, even if more than sixty percent feel the urgency to develop one (Ransbotham, Kiron, Gerbert, & Reeves, 2017).
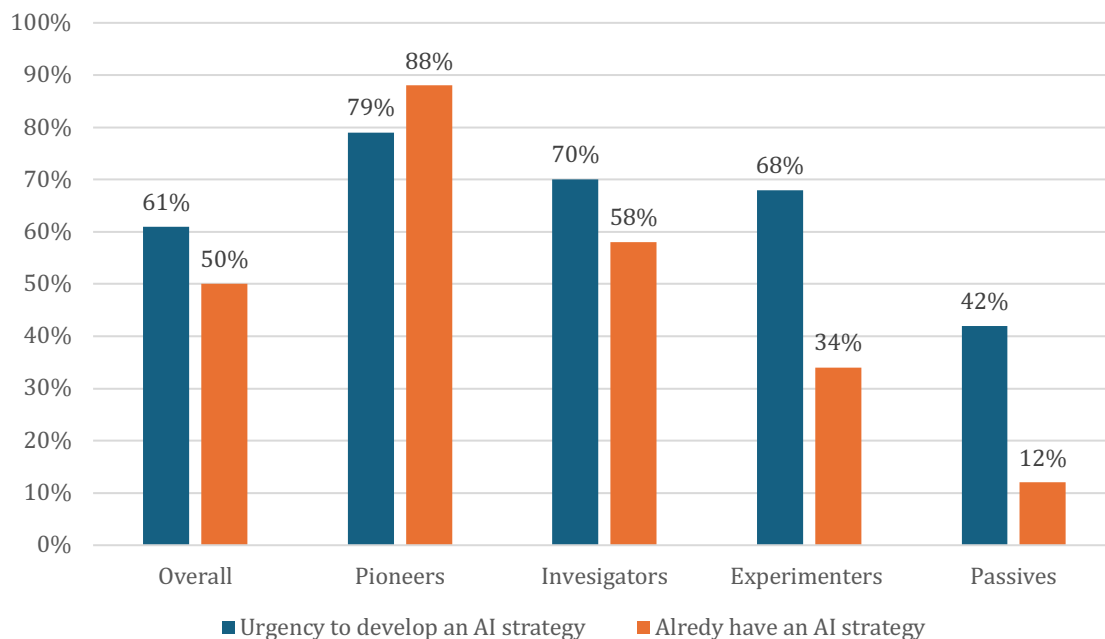
Figure 7: Necessity for an AI strategy (Ransbotham, Kiron, Gerbert, & Reeves, 2017)

Taking into account single categories of the surveyed, as expected, the percentage of those who already have clear procedures to follow is high in pioneers (88%) but it decreases as

the understanding and the level of adoption decreases, with just twelve percent of passives having a strategy in place; a similar trend can be observed in the perceived need for having a plan, even if percentages are higher, they decline as understanding and adoption diminish.

Developing a strategy is essential to leverage artificial intelligence's potential and align AI initiatives with the business goals: it defines actions to transform AI concepts into impactful solutions and involves decisions on multiple aspects like data management, talent acquisition and technology infrastructure, however if well-crafted, it optimizes resources, prioritizes high-impact projects and ensures seamless integration between AI and the organization, driving it to success.

Are companies implementing GenAI?

PwC conducted the 27th edition of the Annual Global CEO Survey involving 4.700 enterprises worldwide, 200 of which are Italian: from the results collected, the urgency towards technological innovation is high, 61% of the CEOs in Italy and 56% if we take into account the whole world admit that changes in the technology field will have an impact on their business and on how they create and distribute value *(PwC, 2024)*. Innovation in the technological field is believed to have a higher number of consequences than both changes in consumers' preferences and instability of the supply chain, which was the main cause of concerns during and after the pandemic caused by COVID-19.
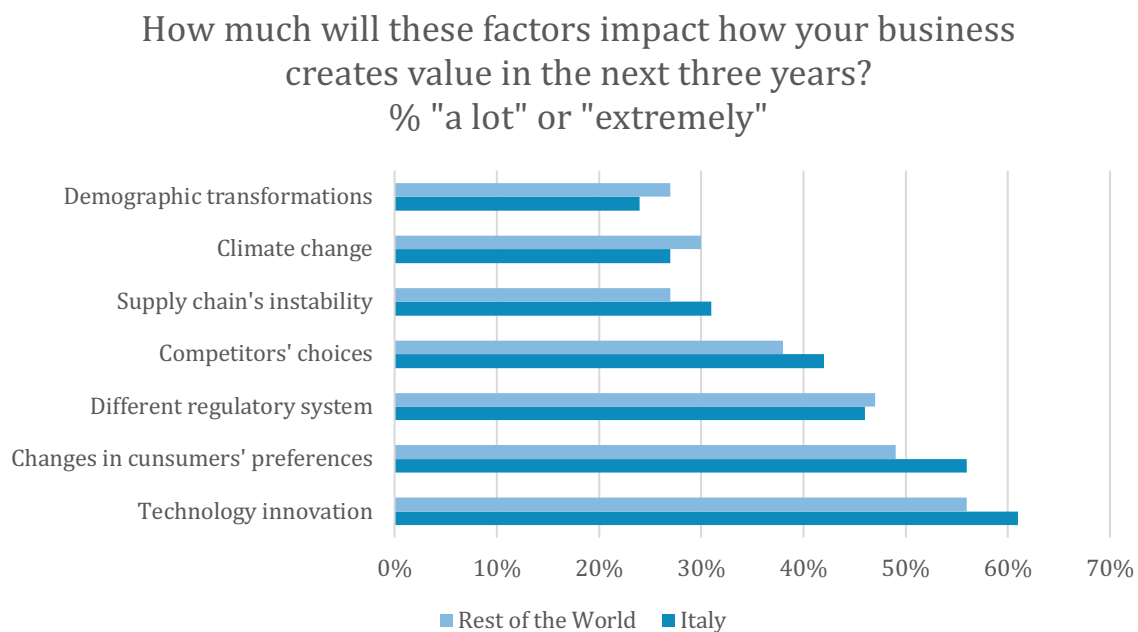
Figure 8: Factors that will impact businesses' activities in the next three years (PwC, 2024)

Businesses leaders understanding that technological innovation will have a massive impact on how they create value does not mean they are willing to change their enterprises to remain competitive straight forward: however, statistics collected suggest that CEOs are aware that without change, their business will not be viable in ten years and therefore ready to go through a transformation process. Their willingness to accept innovation and change became clearer after the release of ChatGPT when entrepreneurs began to understand the potential of Generative Artificial Intelligence and any technology that could somehow speed up tasks: this is what comes to light when analyzing the data gathered in the underlying graph.

To what extent will generative AI increase or decrease
the following business factors in the next 12 months?
% of "increase"
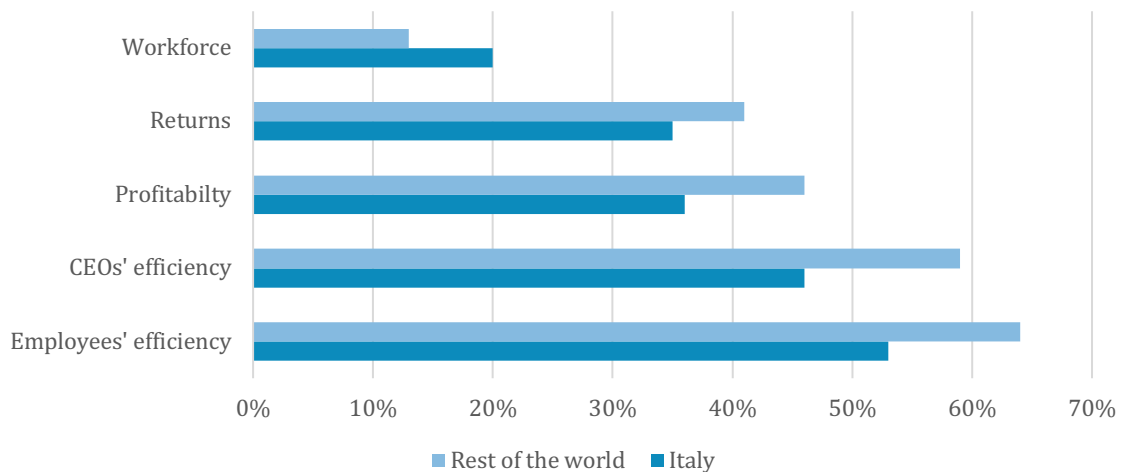
Figure 9: Factors that will be improved by GenAI (PwC, 2024)

CEOs were asked to what extent generative AI would increase or decrease some business factors in the following twelve months and the diagram displays the data only if the answer given is "it will increase": what emerges immediately is that 64% of worldwide respondents affirm GenAI will result in employee efficiency in terms of time, whereas as for what concerns Italy, the score is lower by eleven percentage points. GenAI is believed to save time not only for employees but also for workers with greater levels of responsibility. Undoubtedly, as a direct consequence of efficiency, by applying AI returns and profits are expected to be higher; what they do not believe to be highly influenced is the workforce, meaning that AI will not replace people, but people will need to learn how to use the new tools in a way to create value (PwC, 2024).

Understood that 2023 was the year people find Generative AI out, 2024 is when businesses started using and taking advantage of it. McKinsey conducted a survey on the usage of GenAI inside enterprises in February and March 2024: they interviewed 1.363 participants coming from different industries, different countries and with diverse levels of responsibilities inside their company (Singla, Sukharevsky, Yee, Chui, & Hall, May 2024).

Organizations that have adopted AI in at least 1 business function,[1] % of respondents
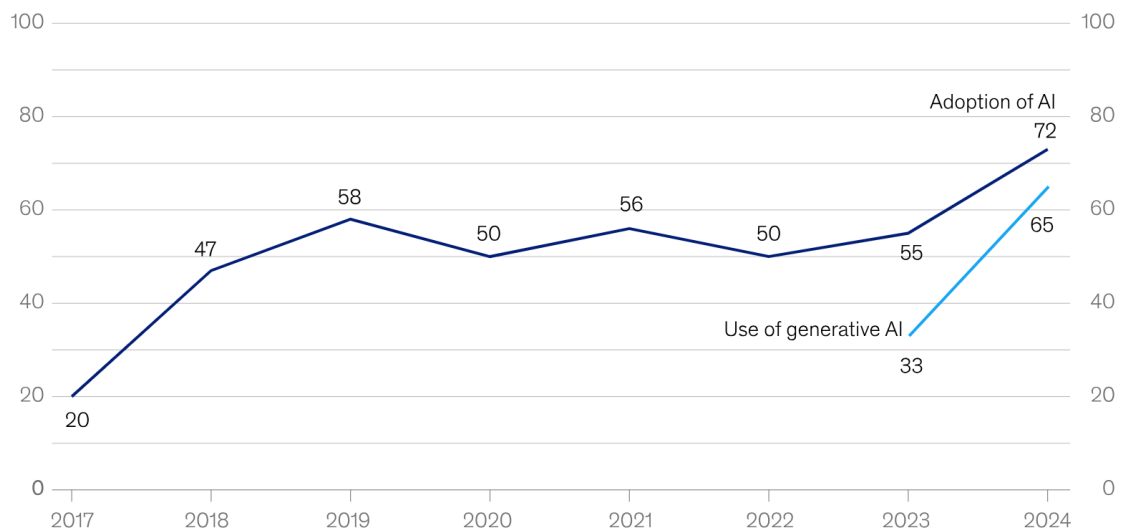
[1]In 2017, the definition for AI adoption was using AI in a core part of the organization's business or at scale. In 2018 and 2019, the definition was embedding at least 1 AI capability in business processes or products. Since 2020, the definition has been that the organization has adopted AI in at least 1 function.
Source: McKinsey Global Survey on AI, 1,363 participants at all levels of the organization, Feb 22–Mar 5, 2024

McKinsey & Company

Figure 10: AI adoption and Gen AI usage around the world (Singla, Sukharevsky, Yee, Chui, & Hall, May 2024)

As can be observed from the graph above, from 2017 on the adoption of AI has been increasing rapidly, with 72% of respondents admitting that AI is adopted at least in one function of the company and 65% of respondents using GenAI during their job, basically GenAI users have doubled if compared to the previous year.

Most respondents (72%) say their organization has adopted AI in one or more functions, with 50% of respondents saying AI has been adopted in two or more functions. In any case, what is noteworthy is the trend of such percentages: from the year 2022 businesses have increased the adoption of AI and 2023 marked a switch gears, with a higher increase as compared to the increase recorded from 2022 to 2023 (Singla, Sukharevsky, Yee, Chui, & Hall, May 2024)

Business functions at respondents' organizations that have adopted AI,[1] % of respondents

Legend:
- 1 or more functions
- 2 or more functions
- 3 or more functions
- 4 or more functions
- 5 or more functions

Values at 2024: 72, 50, 27, 15, 8

Figure 11: Businesses adopting AI in one or more functions (Singla, Sukharevsky, Yee, Chui, & Hall, May 2024)

Respondents' organizations regularly using generative AI (gen AI), by function, % of respondents

34	23	17	16	16	13	12	8	7	6	4

Marketing and sales · Product and/or service development · IT · Other corporate functions · Service operations · Software engineering · Human resources · Risk · Strategy and corporate finance · Supply chain/inventory management · Manufacturing
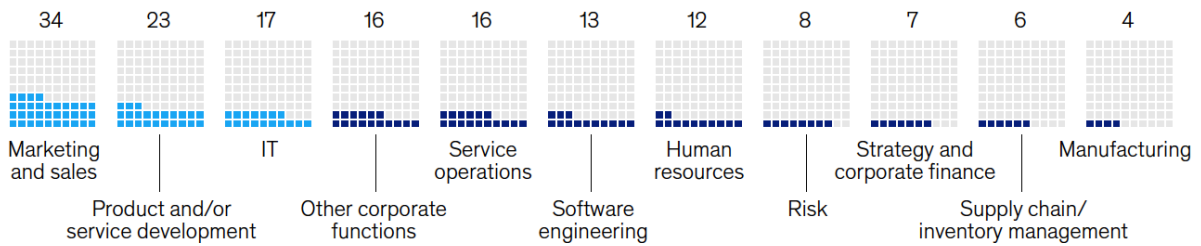
Most commonly reported gen AI use cases within function, % of respondents

Marketing and sales

16	Content support for marketing strategy
15	Personalized marketing
8	Sales lead identification and prioritization

Product and/or service development

10	Design development
6	Scientific literature and research review
6	Accelerated early simulation/testing

IT

7	IT help desk chatbot
7	Data management
6	IT help desk AI assistant[1]

Figure 12: Functions where GenAI is adopted (Singla, Sukharevsky, Yee, Chui, & Hall, May 2024)

Within the function where GenAI is mostly employed, the Marketing and sales function is on top with 34% of respondents saying that GenAI is regularly utilized, followed by

27

product and service development and IT, respectively with 23% and 17%. These functions were also identified in a previous study conducted by McKinsey & Company as those in which GenAI might have the greater impact as it can be seen in *Figure 13*: by applying AI to the functions just mentioned together with customer operation alone, they are responsible for 75% of the total value created, which is impressive considering they are not even half the functions of a business (Chui, et al., June 2023). By analyzing more in-depth, the first three functions where AI is mostly adopted, one can see that Generative AI is mainly used to create content for marketing as well as for personalized marketing; in the case of product and service development, AI is primarily utilized to develop new design and lastly AI helps also by providing real-time assistance to desk employees (Singla, Sukharevsky, Yee, Chui, & Hall, May 2024).
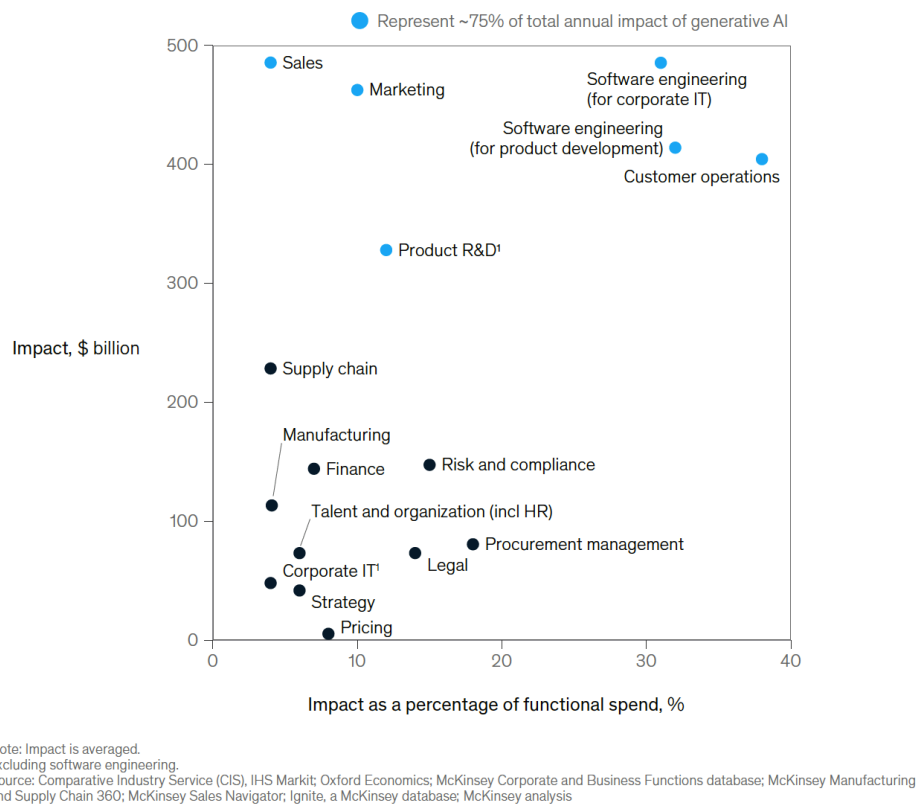
Figure 13: Business functions where GenAI might have a greater impact (Chui, et al., June 2023)

Having several companies perceived the potential of artificial intelligence, it has come time to take stock and see whether the results exceed or at least meet the expectations: to do so Deloitte conducted a survey interviewing 1.982 leaders in January and February 2024 from different parts of the globe, more specifically from the United States of America, United Kingdom, France, Germany, India and Australia and from six different

industries; all participants work in an organization which has at least one AI implementation and uses it on a daily basis. Once they have decided to put AI into effect in their company, leaders have also set some goals they want to achieve: the data below refers to respondents sustaining they have achieved the benefit described to a large extent or more, moreover there is a distinction between the average data and that resulting from enterprises with a high level of GenAI expertise (Mittal, Perricos, Schmidt, Sniderman, & Jarvis, April 2024).

Percentage of respondents achieving the benefit to a large extent or more
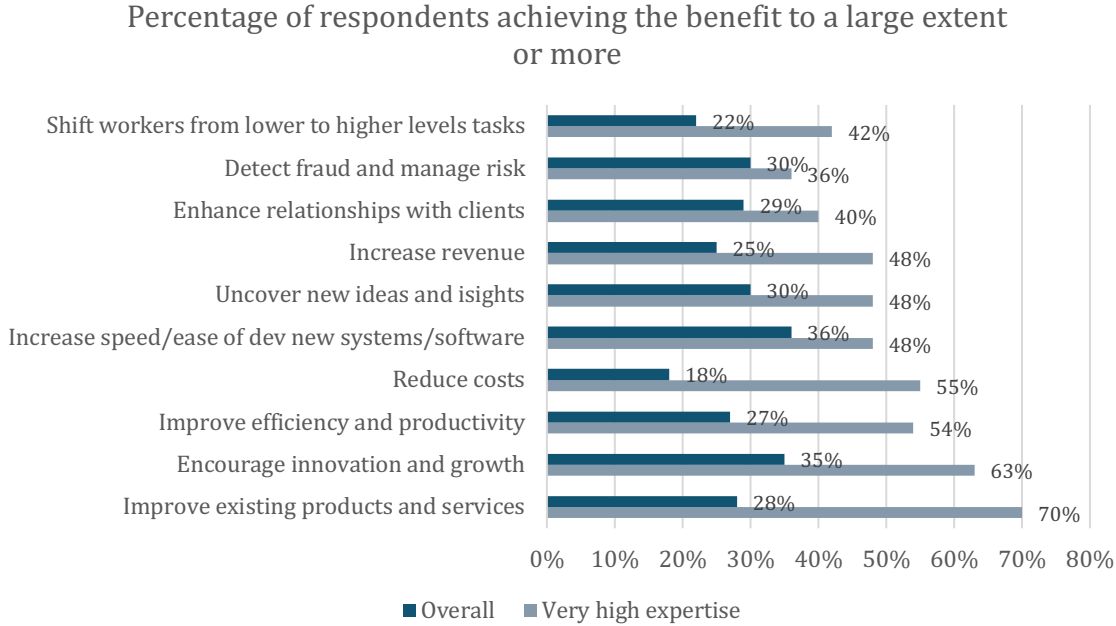
Figure 14: Are businesses achieving benefits to date? (Mittal, Perricos, Schmidt, Sniderman, & Jarvis, April 2024)

Interviewees expect a broad range of benefits from utilizing GenAI in their everyday activities and some of them have already begun to benefit from it, still the number varies as the type of benefit changes. If the overall statistics are taken into account, most respondents have seen an increase in the speed and ease at which systems and software are developed. Though, organizations that have rated themselves as having high level or very high levels of GenAI expertise are not experiencing the same process as other companies: in fact, they are gaining greater benefits mainly in two other areas which are the improvement of existing products and services (70%) as well as the encouragement to innovate and grow (63%). In any case, organizations with high levels of GenAI expertise outperform others in every category, meaning that they are more likely to achieve their goals and benefits (Mittal, Perricos, Schmidt, Sniderman, & Jarvis, April 2024).

Even if they are experiencing such enhancements, it is still too early to have a sharp measure of the benefit of GenAI: speaking of financial return on investment right now could be misleading since it is still very new, furthermore its impact depends on the industry, on the use case and this is the moment where experimenting and learning deliver much greater value, otherwise the risk of getting lost and forced out of the market is too great.

Among the advantages of adopting GenAI, the reduction of costs and increase of revenues are two of the main objectives at least in the short term, however, what companies wish to do with the time and money they save cannot be taken for granted. Fortunately, a long segment wants to reinvest the savings in innovating activities: 45% of leaders plan to send the savings into driving innovation opportunities, followed by 45% of them wanting to improve operations and 29% developing new products and services. What they plan to do is so important since it creates a cycle of continuous research and growth (Mittal, Perricos, Schmidt, Sniderman, & Jarvis, April 2024).

Areas to reinvest time and cost savings
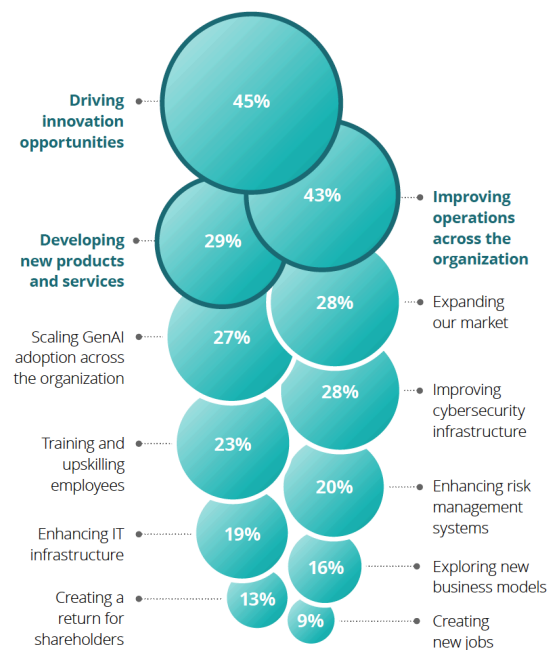
Figure 15: Where to reinvest? (Mittal, Perricos, Schmidt, Sniderman, & Jarvis, April 2024)

A comparison between different geographical scenarios

Despite GenAI and AI gaining momentum and as already seen analyzing the whole AI industry in the first chapter, countries are not having the same reaction towards it, this depends on multiple factors such as the level of investment, the regulatory system as well

as the talent pool available and the attitude towards risk; all the mentioned factors are directly impacting countries' readiness and openness towards such tools. This paragraph will mainly focus on analyzing how European businesses are dealing with AI.

Deloitte ran a research from October to December 2023 interviewing 2.800 directors from Europe, Asia and the Americas, whose companies have at least one AI implementation: what they were able to do is highlight how different AI is perceived and the reasons behind it (Winters, Horton, & Corduneanu, 2024).

Interest in GenAI
% of respondents selecting "high" or "very high" interest
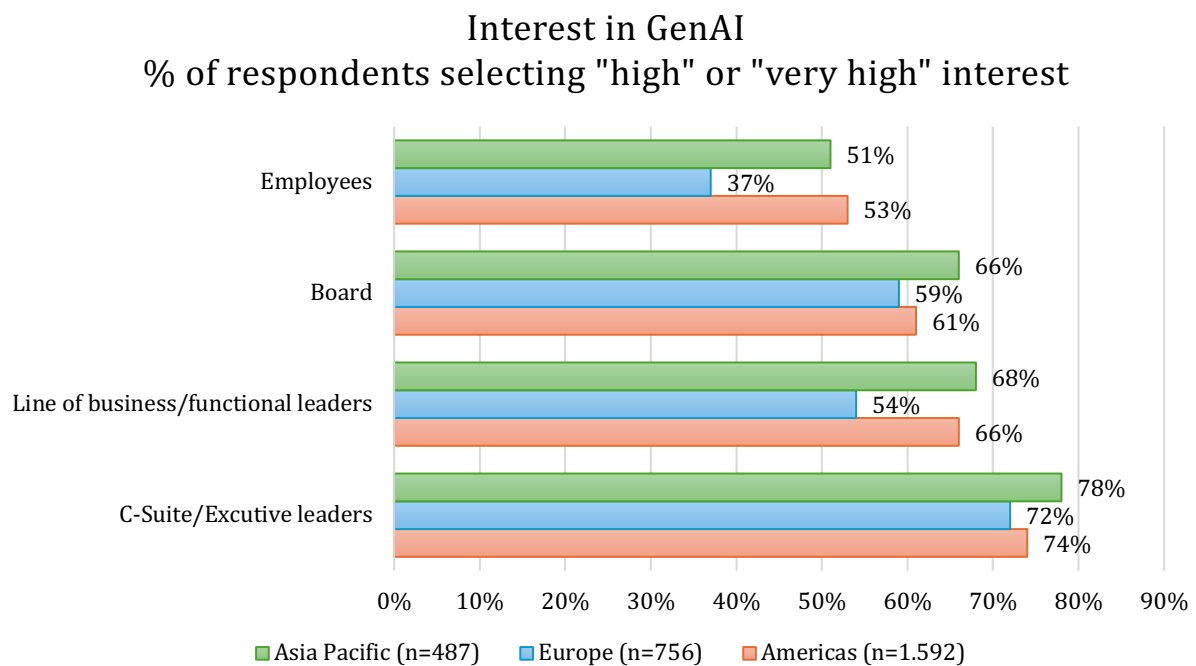
Figure 16: Interest in GenAI by country (Winters, Horton, & Corduneanu, 2024)

First of all, it is important to mention that Europe is always showing less keenness toward AI than any other country: as the graph above demonstrates, Europe's level of interest always scores lower than both the Americas and Asia despite the level of responsibilities interviewees are covering. On the other hand, Asian countries are recording the highest level of interest, immediately followed by the Americas. This outcome might also be influenced by leaders' perceptions of the time frame in which AI will impact their businesses: even if data do not differ that much, a higher proportion of leaders coming from European countries believe that GenAI will transform the organization over a longer period of time, more specifically 50% of respondents believe it will impact their company in the next three years and only 9% thinks it already is. (Winters, Horton, & Corduneanu, 2024). This perception might lead leaders in the wrong direction, postponing choices that

should be done immediately: the main risk of waiting too long is to fall behind and not be able to catch up with those who moved earlier.
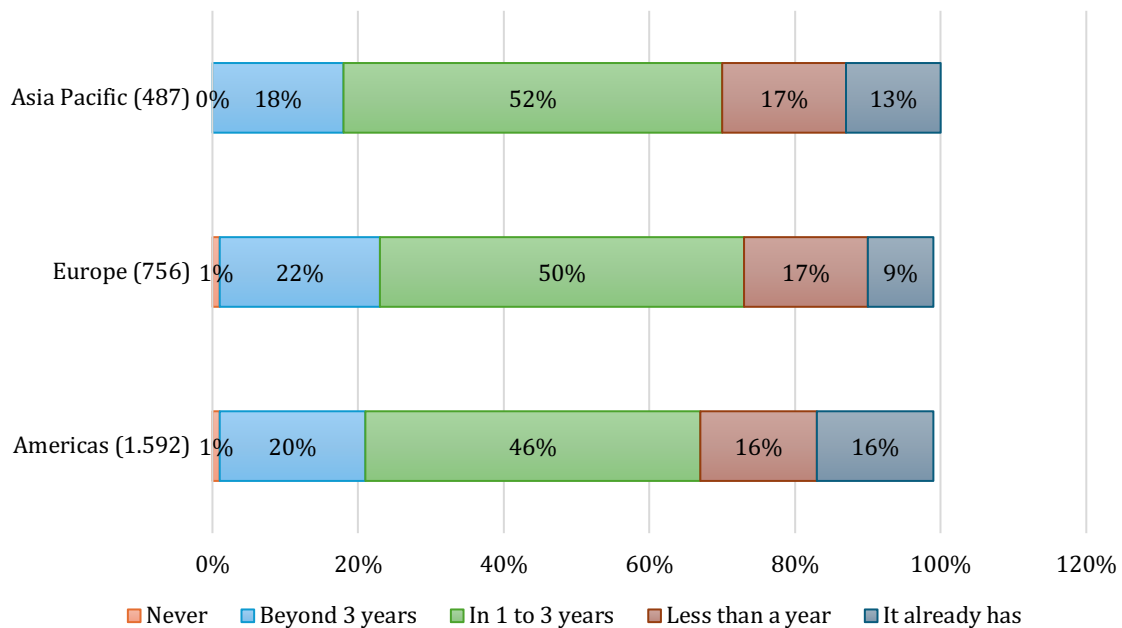
Figure 17: Expected timeline for GenAI to transform businesses (Winters, Horton, & Corduneanu, 2024)

What is highlighted in Deloitte's survey is consistent with what highlighted in the first chapter while analyzing AI market share and with the level of AI investment divided by geographical area: as the Artificial Intelligence Index Report 2024 suggests, the United States is the one leading investments in Artificial Intelligence with more than 67 billion dollars invested in 2023, Germany, Sweden and France are the only European countries appearing among the first ten nations with respectively 1.91 billions of dollars, 1.89 billions of dollars and 1.69 billions of dollars (Maslej, et al., April 2024).

Unfortunately, only three European countries made it to appear among the first ten nations to invest in AI but this was to be expected: Europe has always spent less than the USA and other countries in R&D activities; furthermore, companies in the US have always adopted advanced digital technologies in larger number than European companies, even if Covid-19 accelerated digitalization and the gap has narrowed, this influence directly their readiness in front of such disruptive force enabling them to be far more prepared than Italy and quite any other European countries.
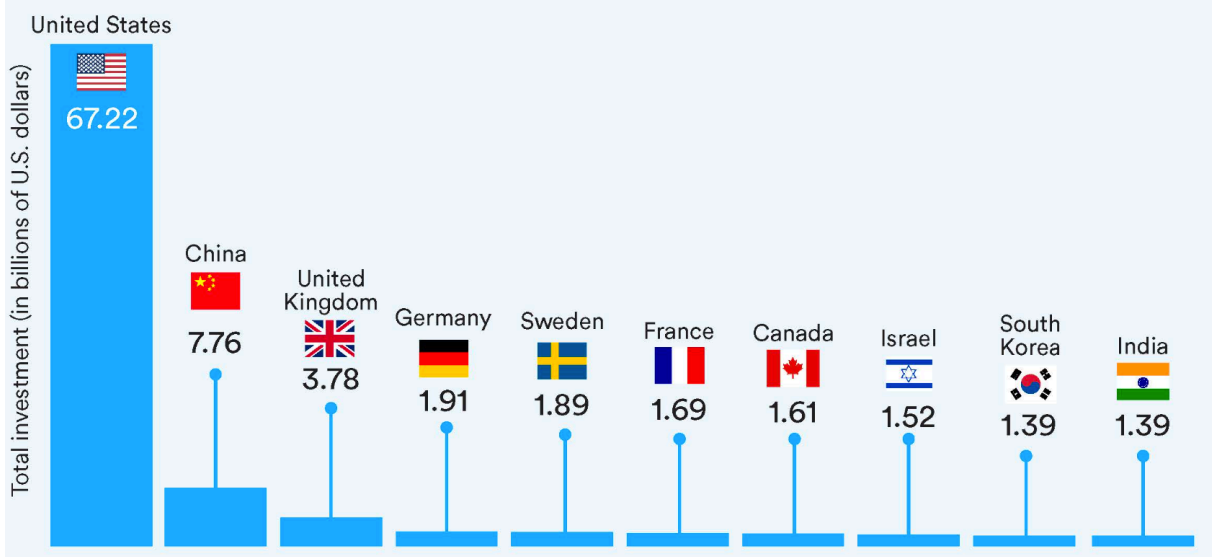
Figure 18: Investment in AI by country (Lynch, 2024)

When it comes to what European executives expect from AI adoption, the results are in line with global findings: as a matter of fact, they believed in the increase in efficiency and productivity, along with the reduction of costs and the increase of innovation. The same is true for the area where AI is mostly applied, meaning that, even if the level of GenAI adopted in Europe is lower than in any other countries considered, there are similar tendencies as to what concerns which functions within the organization are using AI. 41% of European organizations use GenAI in the IT and cybersecurity functions against 48% and 47% registered respectively in American and Asian countries; to follow are product development and R&D, and marketing, sales and customer service both with 40%; the largest differences between the nations analyzed can be found in finance, human resource and legal and risk compliance, where the difference in percentage points is at least of ten points (Winters, Horton, & Corduneanu, 2024). As has already been mentioned earlier, such dissimilarities are the result of multiple factors, however, what plays a central role is for sure the more regulated environment where European organizations operate and have their headquarters: the EU AI Act should make the rule of the game clear to everyone so that fear or doubt should not be an obstacle anymore.

Another reason countries respond differently to AI implementation is the pool of workers they have at their disposal: lack of technical talent and skills is one of the main hurdles as it prevents organizations from applying it and quite 40% of European respondents selected it. Europe has never been an outstanding performer when it comes to digital skills: more than 30% of the European workforce does not have the required level of

digital expertise and only 54% of people aged between sixteen and seventy-four can perform basic digital tasks (European Union, 2024). Moreover, Europe is not as active in training the workforce and recruiting people with the right expertise: as the data in the graph underneath indicate, Europe is the last in line in all the activities listed, from recruiting people with the level of AI knowledge necessary to drive GenAI proposals to educate and reskill workers. This is something to keep an eye on, as the implementation of GenAI will not lead to the replacement of humans, but to an increase in the required skilled workforce (Winters, Horton, & Corduneanu, 2024).
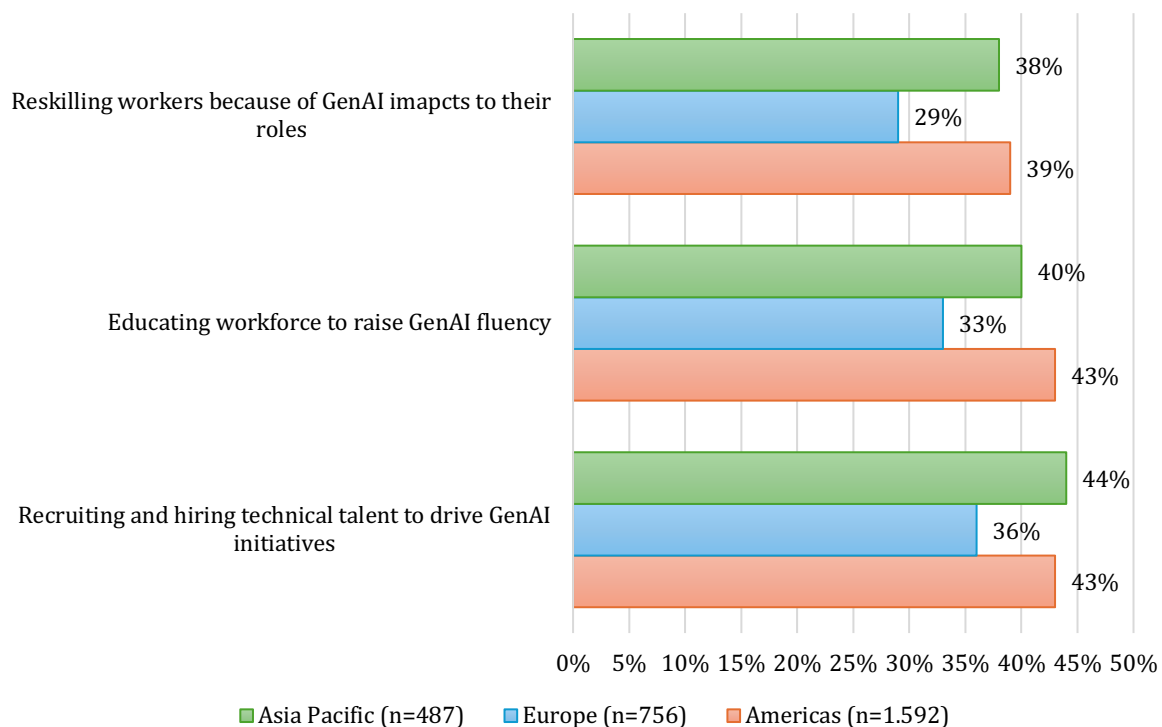
Figure 19: Activities to reskill workers (Winters, Horton, & Corduneanu, 2024)

Considering how important is for organizations to act before it is too late, especially for Europe since from the analysis conducted it is a step backward and it must not fall behind, the next two paragraphs will examine in depth why Artificial Intelligence should be explainable and the current risks associated with it.

GenAI's risks enterprises are facing

Artificial intelligence is one of the greatest innovations ever, but big opportunities do not come alone: by being so disruptive, fears and uncertainties concerning its usage and the results it leads to are the focus of debates on a daily basis. Basically, in simple but effective

terms, AI has to face the same challenges that any technological innovation has to face at the beginning of its employment, from hacking to skepticism toward its outputs.

As PwC's report on the results of its 27th Annual Global CEO Survey shows, executives are not only concerned about cybersecurity but also about the spread of false information within their companies. When asked if cybersecurity is perceived as at risk in the next twelve months by implementing AI tools, 64% of respondents agreed, while only 18% disagreed, with the remaining 15% being neutral; in addition to that, more than half of the interviewees are concerned with the spread of false information within the company, 52% of leaders worry about outputs' reliability, they do not trust the process all the way. What leaders fear the least is the prejudice of the technological tool toward a group of customers or of employees: only a third of respondents agreed, whereas the remaining are split between those who disagree and those who are neutral; in other words they do not think clients or users will be excluded by such innovation (PwC, 2024).

Will AI increase these risks in the next 12 months?
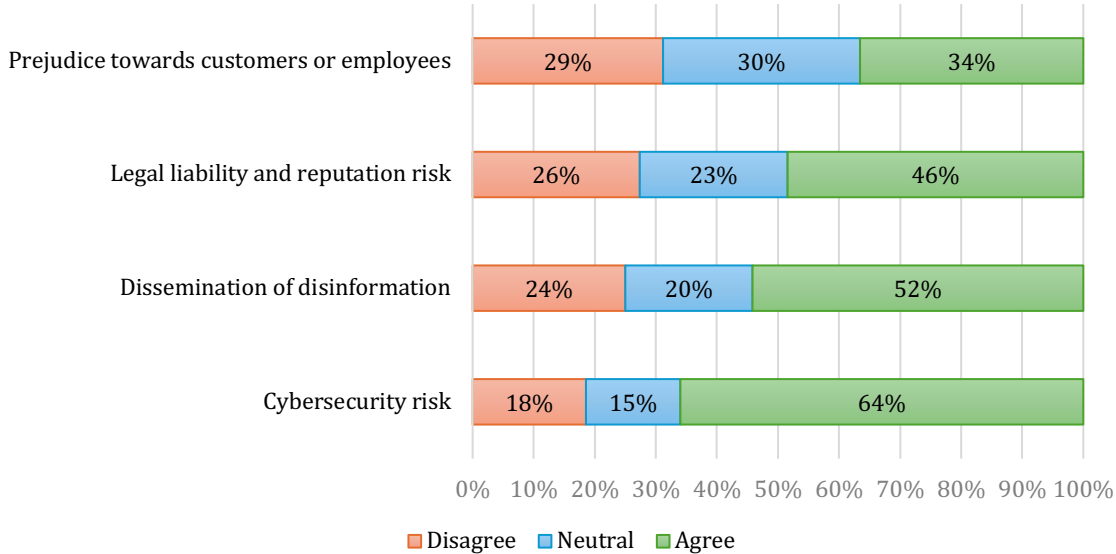
Figure 20: Factors influenced by AI (PwC, 2024)

Actually, risks and doubts are not a surprise since AI implementation inside businesses is boosting these last years, moreover, being always updated, some risks are not even known yet. The data depicted in the Artificial Intelligence Index Report 2024 show how AI incidents increased from the year 2012 till the year 2023: if, in the first case, the number of incidents was less than twenty, the scenario changes in 2023 when one

hundred and twenty-three incidents are counted, whereas in 2022 there had been less than one-hundred cases (Maslej, et al., April 2024).

In line with the findings of the survey conducted by PwC, the risks associated with incorrect AI results are one of the main threats when adopting artificial intelligence, but it is not the only one: the risks taken into account can be inbound, meaning that they affect the company independently of the use of AI, or risks consequential to the implementation of AI tools, the latter depending on which use case artificial intelligence is deployed. First, inbound risks will be examined:

a. Intellectual Property Infringement: unintentional loss of control over intellectual property due to copyright infringement or public disclosure;

b. Malicious use: potentially harmful content created by AI, such as fabricated news, manipulated media and hateful language;

c. Security threats: security gaps in Generative AI systems having as a consequence, for example, manipulating open-source models;

d. Third-party: the potential for third-party AI tools to compromise the privacy of your proprietary data, as it may be used to train public models.

To manage these risks, organizations need to focus on understanding their environment and their ability to control and manage such threats: in other words, they need to analyze their vulnerabilities and calculate the potential return on investment from risk mitigation activities. One thing companies should not do is carry out the understanding only once when it should be done quite frequently due to the fast-changing nature of artificial intelligence. With regard to the risks directly associated with the implementation of AI, these vary according to the purpose for which artificial intelligence is used, but it is essential to recognize them in order to ensure long-term and valuable achievements; these types of risks are:

- Impaired fairness: this can arise from unrepresentative training data leading to skewed model performance and biased results, or from the misrepresentation of AI-generated content as human-created;

- Data privacy and quality: it refers to the potential misuse of personal data and the impact of poor data quality on AI performance;

- Performance and explainability: it refers to the difficulty in understanding how models arrive at their outputs, making it hard to identify and address errors like factual mistakes, outdated information, or even completely fabricated responses;
- Strategic: it alludes to the potential violation of rules and laws, putting also the organization's reputation at risk.

These risks can be summarized in a word as inaccuracy: according to McKinsey findings, respondents to their survey, during which 1.363 participants coming from different industries, different countries and with diverse levels of responsibilities inside their company have been interviewed, identified inaccuracy (63%) and intellectual property infringement (52%) as the most relevant risks of AI implementation, recording also an increase if compared to last year result of 7% and 6% respectively; also explainability increased by one point percentage reaching 40% of respondents declaring it as one of AI implementation risk (Singla, Sukharevsky, Yee, Chui, & Hall, May 2024).

If not taken into account and acted on, risks will impede AI from scaling and result in a serious lack of trust: being lack of confidence one of the artificial intelligence barriers, companies with high AI expertise are investing a lot in activities to build trust around AI, from transparency with employees to control over both input and output data (Mittal, Perricos, Schmidt, Sniderman, & Jarvis, April 2024).

To keep risks under control when an organization is using AI, it should start by mapping potential risks connected to each use case and have an understanding of its potential severity; if this step is skipped, they might leave some risks uncovered due to individual comfort with risks. An example of the heat map is provided in *Figure 21,* where all the risks previously identified are connected to each use case example and the intensity of color refers to the risk severity level, from light blue when it is low to midnight blue when it is high.

As the graph below shows, not all risks are present in each use case, some are more common in specific scenarios, while other seems to not have an important impact. For example, the risk of gaps in the GenAI system resulting in manipulation of open-source models presents high level of severity only in coding use cases; or the strategic risk does not have high level of severity risk in any of the use cases provided. Complete opposite scenario for the risk of performance and explainability, which is present with a high level of risk severity in six out of eight use cases, while the remaining two have a medium risk

severity level: this is proof that explainable artificial intelligence is something firms should take action on, as explained in the previous paragraph, have a clear vision of how AI thinks and acts is a must to understand its output, eventually spot the mistake or bias and comprehend whether it is helping achieving the goals of the company. Once potential areas of risks are identified, companies have to develop strategies to govern them: as a matter of fact, artificial intelligence should not only be explainable but also responsible, in the sense of principles and ideals that the board and the company as a whole should follow (Bevan, Chui, Kristensen, Presten, & Yee, March 2024).

Risk severity: Low / Medium / High	Impaired fairness	IP[1] infringement	Data privacy and quality	Malicious use	Security threats	Performance and explainability	Strategic	Third party
Customer journeys — AI financial advisers for individualized advice	High	Low	High	Low	Low	High	Medium	Low
AI bot for businesses (eg, SMEs[2]) to track targets	Medium	Low	High	Low	Medium	High	Low	High
Concision — Mining financial reports to derive important insights	Low	High	Low	Low	Low	Medium	Low	Low
Detect/prevent fraud by aggregating/interpreting payment documentation	High	Low	High	Medium	Low	High	Low	High
Coding — Model risk management (eg, testing, review, documentation)	Low	Low	Low	Medium	High	High	Low	High
Reduce tech delivery timelines via automated coding and testing	Low	Medium	Low	High	High	High	Low	Medium
Creative content — Personalized content offerings (eg, credit card offers)	High	Low	Medium	High	Low	Medium	Low	Low
Automate contract drafting	Medium	High	Medium	Low	Low	High	Low	Medium

[1]Intellectual property.
[2]Small and medium-size enterprises.

McKinsey & Company

Figure 21: Heat map of potential risks linked to AI (Bevan, Chui, Kristensen, Presten, & Yee, March 2024)

Responsible Artificial Intelligence proposes itself as the solution to mitigate risks within the business: applying the pillars on which responsible AI is founded helps companies build the trust needed and reduce risks where possible. IBM built a framework to guide organizations in their AI implementation based on five cornerstones, which are explainability, fairness, robustness, transparency and privacy. If explainability has already been explained in the previous paragraph, fairness refers to biases that can arise from distortions in training data, which is why training data should be diverse and representative of the population; moreover, creating multidisciplinary teams during the

development of AI could reduce the probability of biases. At the same time, the AI model should be robust enough to avoid attacks and protect the data used by being compliant with any rule in terms of privacy (Stryker, IBM, 2024).

After the analysis conducted in the first two chapters, the question to ask is not when to start, but how: technologies might not be there yet and nor is the people's consensus but despite the sector they are in, for businesses, the time to act is now, otherwise the risk to fall behind is too high, higher than risking it all on artificial intelligence.

Now companies have to decide which model they want to follow to implement artificial intelligence inside their companies: they can choose between being takers, shapers or makers. The taker model is based on implementing solutions that are at the disposal of anyone; moving to the shaper archetype, the personalization of the solution increases and they move towards a model with proprietary data and lastly, the maker, which is based on building the AI model from scratch (Singla, Sukharevsky, Yee, Chui, & Hall, May 2024). However, acting fast does not mean doing it without considering where the business is at right now, considering a company's needs and how problems could be solved is mandatory to effectively achieve expected goals, that is why use cases are to be examined since they are one powerful tool to assess obstacles and create value.

Chapter 3

Use cases: where to start

The previous chapter was all about Artificial Intelligence and its application within organizations, together with a view on how different countries have different perceptions of it with a particular focus on Europe, which seems to face more barriers than the United States or China, just to name a few. When the implementation of Artificial Intelligence was analyzed, use cases started to be mentioned: this is the focus of this second section, the definition of what a use case is and how to build one properly is particularly significant when dealing with any innovation but with AI in particular since by being so complex, specific tools should be used and use cases helps to center the attention on the problems to solve and how to resolve it properly so to satisfy people's needs and bring them value. After an introduction concerning the definition of what a use-case is, three out of the most common use-cases concerning artificial intelligence and generative artificial intelligence will be analyzed: all three have not been chosen randomly, but sales and marketing and product development have been selected following McKinsey's findings on the most common departments adopting AI previously presented, as for what concerns the code generation software use-case, it is connected to Bluewind, the case which will be analyzed in the third chapter.

Moreover, a method to build a strong and innovative strategy to achieve any goals organizations want to reach by implementing AI will be introduced: the design thinking method has long been proven to be one of the greatest methodologies to redefine problems and find answers in a singular way through various phases that will be analyzed.

Definition of a use case

The concept of use case is not as familiar as case studies and sometimes they are mistaken: business case studies are the response of companies and organizations to a specific issue, they can be successful stories or total failures but anyhow they can be taken as examples by other companies for future application and incentivize discussion among scholars, competitors and so on. On the other hand, use cases are different: as defined by Kurt Bittner and Ian Spence in their book entitled "*Use Case Modeling*", use cases "allow the description of sequences of events that, taken together, lead to a system doing something

useful"; in addition to that, it describes all the requirements needed as to how to obtain the final result and by doing so any type of ambiguity and uncertainty decreases and all stakeholders can understand and behave as they should. In summary, use cases are narrative, they tell the story of how actors achieve something valuable for them.

Use cases alone are not enough to comprehend how systems behave, in fact, actors and their relationship with the system need to be considered as well, this is what is called the use-case model: actors are not inside the system, they interact with it, and actors can be people, users or other systems as well but more than people themselves, actors are roles that users play while interacting with the system. Usually, diagrams are used to describe the connection between actors and systems, like the one depicted in *Figure 22.*

A use-case model is a model of a system defined in terms of use cases, actors, and the relationships between them.*

A use-case model can contain, and is often represented by, a set of use-case diagrams.
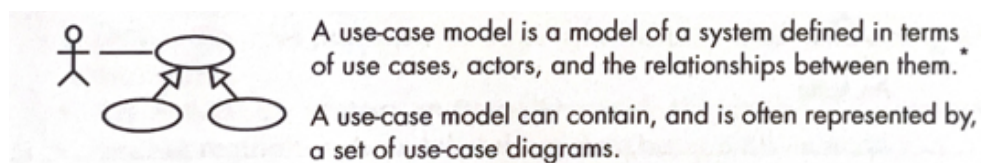
Figure 22: How use-case models are depicted (Bittner & Spence, Fundamentals of Use-Case Modeling, 2002)

As the picture attached highlights, a stick person represents actors, whereas circles stand for use-cases and arrows symbolize the relationship between the two: if they are arrowheads, it aims to highlight who starts the interaction first.

Use cases cannot be explained without considering a series of factors grouped in what they are commonly called preconditions: they sum up conditions under which the use case analyzed can be applied, but more importantly, they are necessary conditions but not sufficient ones, since an actor still has to initiate the process. When the use case ends, the situation that results from the event of the use case is described in postconditions: what is interesting about postconditions is that they should be true no matter what path was taken during the use case, that is to say, that besides the flow of events, postconditions should always be valid (Bittner & Spence, Fundamentals of Use-Case Modeling, 2002).

Having identified which are the components of the use-case model, the obvious question of where to start to build one properly arises: undoubtedly key aspects are the definition of actors and of the use-case, but even before identifying them, a clear vision of who the project affects, that is who the stakeholders are, is a must so to understand their needs and to be sure that the use-case captures the essence of the issue to solve. Following this last definition, stakeholders include users and therefore actors, however, it is not limited to them: the first group of stakeholders is composed of sponsors, people who spend money on the development of the system, from managers to shareholders, even if they are

not directly affected by the system itself but by the company's results which in turn are influenced by the system. Moreover, it also includes developers who take part in the creation of the system, as well as authorities and customers. When all stakeholders are identified, the shared system's vision can be created: it summarizes the problem to solve by taking into account all different points of view provided by the stakeholders considered, bottom line is that it has to be shared otherwise there is a high risk of not solving what stakeholders perceive as a problem and the use-case lose its meaning (Bittner & Spence, Establishing the Vision, 2002).

Among stakeholders, actors are to be found: it is useful to start by identifying those who will use the system and who will benefit from it the most and then proceed by describing the role they play; these are called primary actors and they differ from other types of actors that can characterize use-case modeling which are for example, supporting actors, who do not use the system directly but they are needed to deliver value to users.

Having identified actors, building the use-case should be easier since it aims at solving their problems: at this step, the main focus is on highlighting the relationship between actors and the system, this way not only does the focus remain on the issue to be solved but you are sure to consider all the possibilities.

Actors' problems and needs to fulfill are the starting point to build the use-case: every use-case should come with a brief description that explains first of all the value it aims at creating and who the stakeholders are, keywords are transparency and straightforwardness towards every stakeholder involved (Bittner & Ian, Finding actors and Use Cases, 2002).

The reason why use cases should be used more frequently lies in the benefit they offer and to whom: starting from the latter, managers are those who should be more interested in use cases than anybody else, as a matter of fact, use cases enable them to plan first, monitor later their project step by step, not losing the focus of the system; at the same time, use cases are useful also to developers and testers to understand the system they will develop and test whether its performance is aligned with expectations. Last but not least, customers and users should also care as well since by analyzing use-cases they can understand if the solution provided answers to their needs or if there are still improvements to do.

Generative Artificial Intelligence use cases

The previous section helped us understand what use-cases are and their usage, together with who benefits from their implementation the most, in this following paragraph the attention will be rerouted toward AI and GenAI since use cases where Artificial Intelligence and Generative artificial intelligence are implemented will be explored.

As already previously discussed, Artificial Intelligence has the potential to disrupt every single aspect of human life as well as every industry and business: PwC has spent their effort in demonstrating the value GenAI can create in each sector, which has been previously discussed and analyzed, moreover in early 2024 PwC created the "GenAI value-realization flywheel" to guide companies in creating value with this breakthrough tool. The flywheel they have created is composed of various stages, starting from assessing the pros and cons of adopting AI in the company, from the second step on, it already deals with use-cases since it is about identifying them and focusing on those that enable to maximize the value created, it then continues by selecting tools that help the responding to issues identified; from that moment on everything revolves on the solution found and future development. However, at the moment the second phase should be the target of our attention: researchers estimate that the top five GenAI use-cases are projected to deliver a massive impact, potentially contributing between 50% and 80% of the technology's total worth, that is the reason why it makes sense to focus on them first. Said that, everything seems easier since five use cases seem all that is needed, but relevant use cases are not the same for every company, sometimes not even for the same industry, therefore some considerations need to be made indeed. Considerations can be gathered according to which impact GenAI will have once applied: it is well-known that one of the first main areas to be impacted by Artificial Intelligence is the financial one, considering which line of the profit and loss statement is mainly affected by its implementation is crucial to adapt properly and act in time; another key point to consider is the level of disruption that AI will bring on, several aspects are expected to be hugely changed and at what extent should be taken into account as well, moreover changes could translate in a transformation of the business model and of the operating model, in fact, it could result in a revolution on the nature of the product or service, together with changes in people skills and requirements, another thing to consider is also whether moving before other competitors is an advantage or there are too many barriers to enter that waiting for the market to mature is better. Lastly, companies should consider the effort needed to

implement these breakthrough technologies: right at the beginning, the importance of always having up-to-date training data was highlighted, but also consider weighting whether the industry first and customers then are ready to face such change and if not how to properly prepare them. These are just a few variables that companies need to evaluate when choosing the use case (Greenstein, Light, & Likens, The path to generative AI value: Setting the flywheel in motion, April 2024).

Even if different industries have different attitudes towards AI and engage differently with it despite its advantages in any field, in the next pages, some use-cases where Artificial Intelligence can release its huge potential will be examined. Indeed, the following section of the chapter will analyze the three use-cases, the first two, sales and marketing and product and service development, have been previously identified as those departments inside a company where artificial intelligence is used the most, whereas the last use case considered is code generation software, which is the field in which Bluewind works.

Sales and marketing

Thanks to the adoption of AI in businesses, sales and marketing are totally being revolutionized since it enables high levels of personalization and engaging more customers along different and various touch points, in fact, artificial intelligence is able to detect patterns in consumer behavior making it easier to drive engagement and conversions. Moreover, suppose AI analyzes and generates high-quality content on its own: in that case, marketers are free to better focus on the creation of strategic initiatives, tailoring them to the audiences they aim to reach, and AI comes back into action to find high-potential leads and optimize campaign performance (Mucci, 2024).

According to research conducted by Bain & Company in 2023, it will be companies in the B2B market mainly affected by AI in the marketing and sales department at first, to the point that about 40% out of the five hundred seventy-one organizations interviewed by B&C have already adopted or at least are evaluating to adopt generative artificial intelligence in the field: still, there is a smaller group planning to consider its adoption in the next two years, indicating a growing interest in the field, while a smaller portion does not have any plan about it as depicted in the graph below.

Furthermore, the graph highlights areas where AI adoption is more relevant which are customer communications and contact center, knowledge assistant and management,

marketing material development and IT administrative automation, with the first three functions being most relevant to sales and marketing, emphasizing the strong connection between these departments and artificial intelligence (Bicanic, Bushy, Friis Hjortegaard, & Thappa, 2023).

Share of business-to-business companies adopting or evaluating foundational models and generative AI
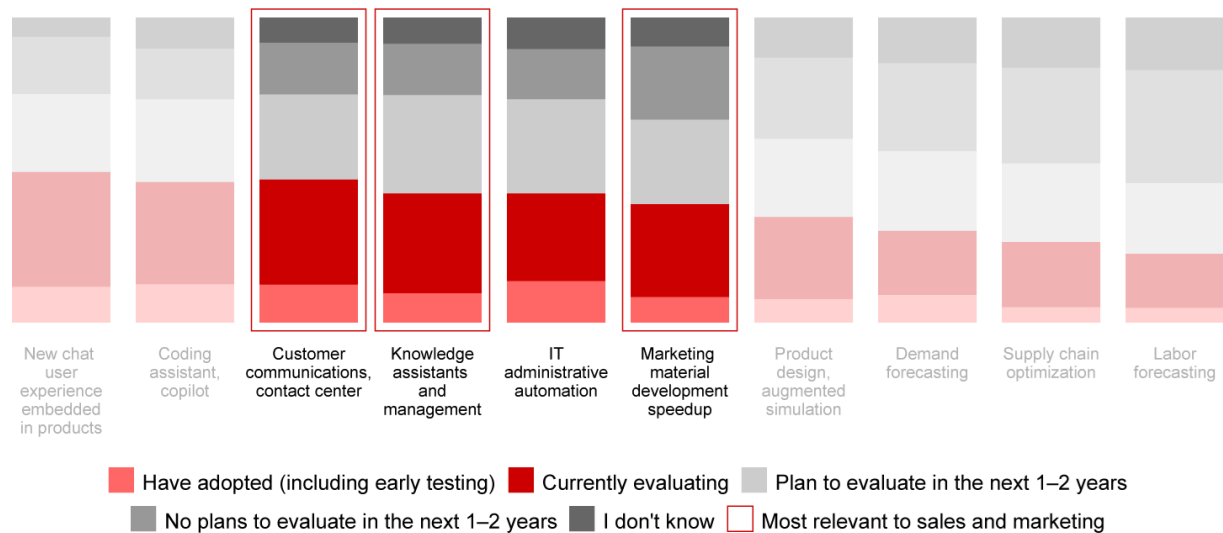
Figure 23: Adoption of AI in B2B companies (Bicanic, Bushy, Friis Hjortegaard, & Thappa, 2023)

Even if the B2B market has the potential to be highly impacted at first, organizations in the B2C market are far from being immune to this disruptive change, to the contrary they are being hit as hard. More precisely, GenAI has the potential to reshape three parts of this function, meaning that customer experience, growth and productivity are the ones expected to go through major changes. Levels of personalization achievable with the help of GenAI have never been that high, thanks to the amount of data collected and analyzed, this in turn results in increased revenue since sales efforts are optimized and customer satisfaction improved. Various use cases are impacting the customer journey: as already mentioned, GenAI revolutionizes lead generation thanks to its advanced algorithms and it excels at uncovering hidden patterns in customers and market data, enabling precise audience segmentation and targeting, which in turn leads to a higher volume of qualified leads and improved performance. By taking it a step further, marketers could even ask the algorithm to generate target media content without even knowing every detail of the segment and after reviewing them, other campaigns could be generated such as outreach templates. In addition to that, GenAI can generate value across all different stages of the customer journey, from the beginning to the end: 24/7 chatbot support acts like personal

virtual assistants, offering support at any moment and recommending products and services based on their preferences and previous behavior, thereby enhancing overall engagement and achieving better results. But that is not all: Generative artificial intelligence can revolutionize customers' onboarding experience by providing personalized welcome packages and instant support through the chatbot, accelerating customer satisfaction and therefore customer acquisition and retention as well. At the same time, real-time insights and predictive analytics empower sales leadership to make data-driven decisions, while dynamic customer journey mapping helps identify opportunities to deepen engagement and retention. McKinsey surveyed commercial leaders coming from companies serving different industries in both B2B and B2C markets to delve into their perspectives on the potential of AI in marketing and sales: while cautiously optimistic overall, they expressed particular excitement for its role in the early stages of the customer journey, exactly the main focus of the use-case previously analyzed.

Estimated impact of use cases,[1] % respondents answering "significant" or "very significant"

Use case	%
Lead identification (real time, based on customer trends)	60
Marketing optimization (A/B testing, SEO strategies)	55
Personalized outreach (chatbots, virtual assistants)	53
Dynamic content (websites, marketing collateral)	50
Up/cross-selling recs (via usage patterns, support tickets)	50
Success analytics (continuous churn modeling)	45
Marketing analytics (dynamic audience targeting)	45
Dynamic customer-journey mapping (identifying critical touchpoints)	45
Automated marketing workflows (nurturing campaigns)	35
Sales analytics (predictive pricing, negotiation)	30
Sales coaching (hyper-personalized training)	25

[1]Senior executives in significant global B2B and B2C sales and marketing organizations across a wide range of industries and company maturity levels were asked: *Please share your estimated ROI / impact these tools would have if implemented in your organization.*
Source: McKinsey analysis

McKinsey & Company

Figure 24: Perceived impact of GenAI use-case on sales and marketing department (Deveau, Griffin, & Reis, 2023)

The data presented in the graph above shows the impact of GenaAI use-cases in the marketing and sales function measured as a percentage of respondents who answered "significant" or "very significant" when asked about the return on investment of such tools. Among the use cases proposed, three of them are the areas where they see the greatest promise, which are the identification in real time of potential customers, the optimization of marketing campaigns and the delivery of personalized outreach. However, they see potential in other areas as well: the creation of dynamic content in various applications together with recommendations to increase up and cross-selling follow the three areas that lead the ranks (Deveau, Griffin, & Reis, 2023).

All these new techniques need both time and effort to be put in place, training for models and more data lakes[1] are required for the system to be successful, but opportunities and potential results are much bigger, and not jumping on that could translate into being left behind in a year or even months.

Code-generation software

GenAI is becoming an indispensable tool for software developers as well, programmers are leveraging it to accelerate complex coding processes; but beyond code generation, with the help of AI also code maintenance, updates and testing are being automated therefore improving efficiency without reducing code quality. Moreover, it is streamlining documentation creation, and producing technical manuals and user guides to support the development life cycle (Mucci, 2024).

Thanks to GenAI, the software development life cycle is being revolutionized and automating several tasks increases both efficiency and quality. From the outset, artificial intelligence can quickly generate detailed product features based on specified parameters, furthermore, given its ability to standardize and automate solution architecture and system design, the time-to-market reduces significantly. The testing phase is enhanced through the automatic creation of a wider range of test cases that result in improved software quality, while data management is optimized as artificial intelligence synthesizes information for testing and prototyping without compromising sensitive data. To further speed up the development process, AI can generate user acceptance test scripts to streamline quality assurance, and automate software updates

---

[1] Data lakes are spaces where all types of data can be stored regardless of their nature and size: data could be structured or not and it can be stored in the original form (Google Cloud, 2024).

and root cause analysis to speed up troubleshooting. If these tasks are automated, development teams can focus on innovation and problem-solving, ultimately delivering higher-quality software products more rapidly (Greenstein, Petry, & Carlson, 10 ways GenAI improves software development, 2024).

Given the magnitude of the impact of AI in this sector, it is crucial for developers to understand that AI is not replacing them, artificial intelligence remains a tool to use to enhance the value resulting from their activities, otherwise, biases and security risks might prevail.

GitHub, a platform founded in San Francisco that groups together millions of developers intending to build up secure software, conducted a survey on five hundred U.S. developers working in large-scale organizations exploring managerial perspectives on developers' productivity, teamwork and the role of AI coding assistant. Out of the five hundred developers interviewed, a substantial majority which translates to 92% utilizes artificial intelligence in either professional or personal contexts; moreover, a third of them report significant productivity enhancements attributed to these tools. Results collected highlight how AI coding tools can contribute to fulfilling existing performance expectations by enhancing code quality, accelerating development timelines and minimizing production issues. But if the software development process is to change, so should performance metrics: as data depicted in the following graph suggests, approximately one-third of developers reported that managers evaluate performance based on code volume and the same proportion anticipates this metric persisting even with AI implementation. However, it is crucial to note that a correlation between code quantity and value is not necessarily true given the increasing prevalence of AI in this sector, undoubtedly resulting in increased code output, what should be given more importance is code efficacy as a productivity indicator and the time spent to complete the task (Shani, 2024).
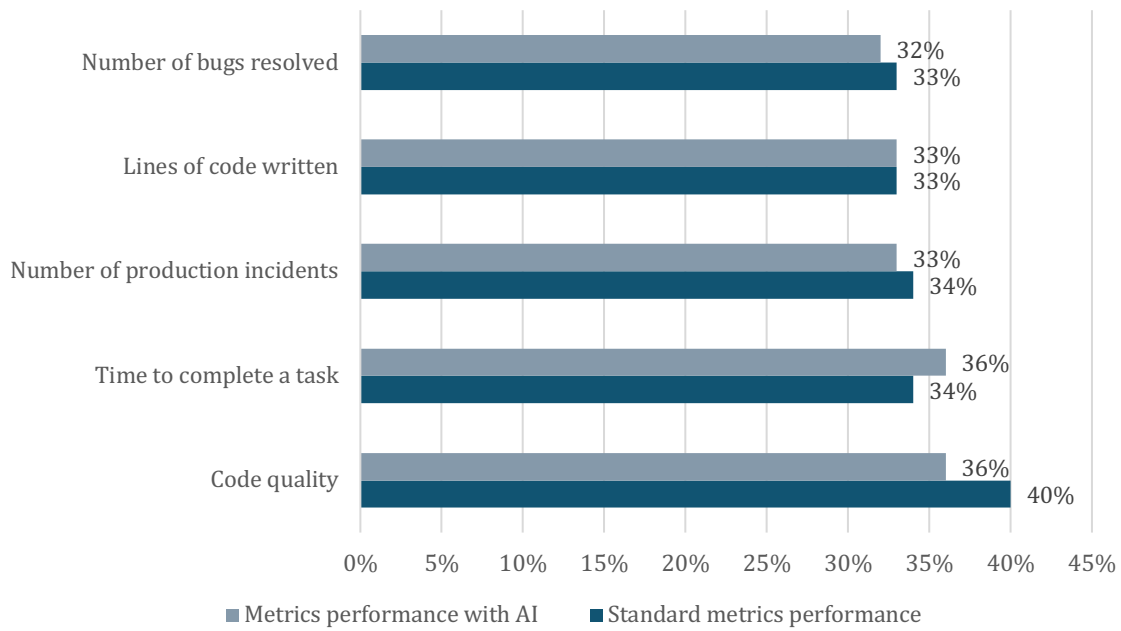
Figure 25: How performance metrics should change following AI implementation (Shani, 2024)

The same research highlights that beyond enhancing individual developer productivity, 81% of surveyed developers anticipate that AI coding tools will foster increased collaboration within teams and across the organization: as a matter of fact, key collaborative activities such as security reviews, planning and pair programming are identified as prime areas for AI tool application. That said, it is impossible not to notice that these findings underscore the importance of human interaction, code and security review, even as developers increasingly leverage AI in their workflows.

As already explained, AI implementation has a huge impact on overall productivity but it also serves as a catalyst for single-workforce upskilling thanks to the time saved to complete tasks: the accompanying graph illustrates the main benefit of AI according to developers' feedback, and 57% of respondents cite coding language proficiency as the primary benefit; another advantage that has gained importance, especially after Covid-19 spread is burnout, as a matter of fact these tools mitigate cognitive load and 41% of interviewees believe that AI can help in preventing it by reducing cognitive load and facilitating on-the-job learning, transforming skill acquisition from a burden to an integrated part of their workflow (Shani, 2024).
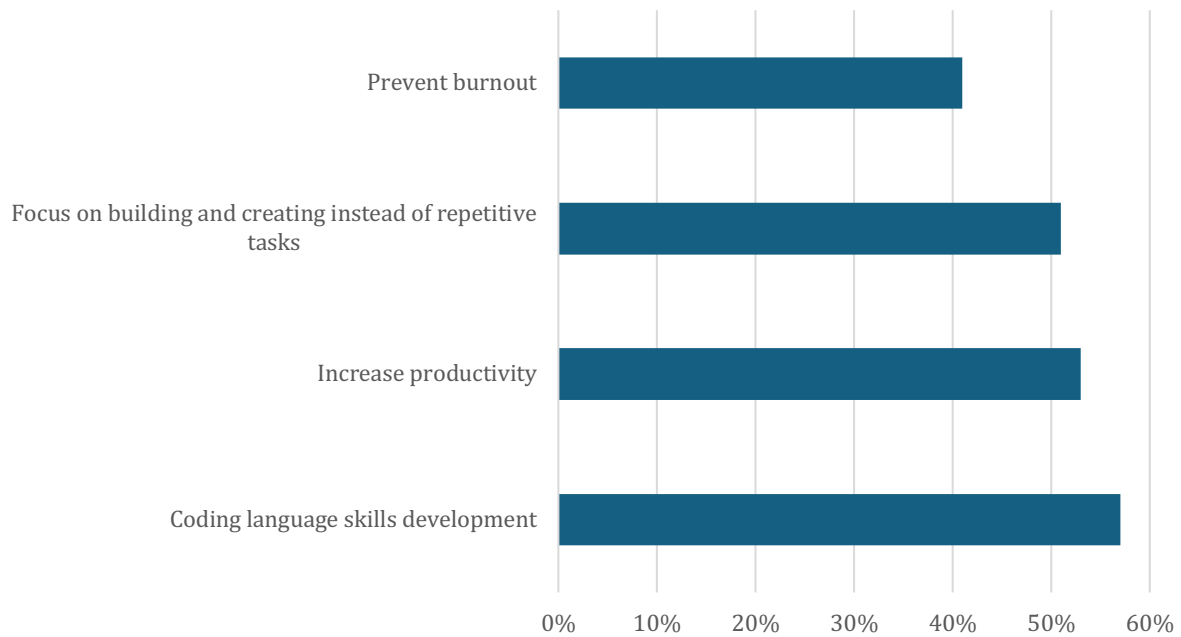
Figure 26: Benefit of AI implementation in the software development sector (Shani, 2024)

Besides the clear advantages AI brings, developers tend to remain skeptical: as the Stack Overflow's Annual Developers Survey[2] of 2024 shows that the vast majority is eager to try AI in the field, in fact 76% of respondents plan to use or are already using such tools, but at the same time 57% of surveyed do not trust AI tools believing they lack of accuracy and 55% believe they are not able to handle complex task (Yepis, 2024).

The data just presented highlight the importance that explainability gains nowadays to fully exploit artificial intelligence potential; moreover, if anyone still doubts AI's potential in this field, or in any other field, they should at least trust what CEO of Microsoft Satya Nadella thinks about it and how he acts toward it. In a recent interview given to WIRED, he admitted he cannot imagine a world where artificial intelligence does not exist and he is not sitting on the sidelines watching others do the work and waiting, on the contrary, he is doing his part by partnering with OpenAI: the release of Copilot, an AI tool capable of automating coding tasks, was one of Microsoft's initial steps in its partnership, it was a groundbreaking move that captivated the developer community. In a subsequent surprise announcement that shook both the general public and its rival, Google, Nadella integrated

---

[2] Stack Overflow is the largest platform where developers can gather and collect knowledge on coding through the help of other developers and members of the community. In May 2024 it conducted a survey and collected responses from sixty-five thousand four-hundred and thirty-seven developers coming from all over the world but mainly from the United States, Germany and India. (Stack Overflow, 2024)

OpenAI's advanced large language model into Bing in February 2023. Nadella was able to understand the potential of what OpenAI was doing and he admits he started believing in it when he noticed that even if AI was not strictly trained in coding, it was just really good at it anyway (Levy, July 2023).

Product and service development

Generative AI also enables a revolution in product design through rapid and large-scale optimization: designers can swiftly iterate and refine concepts, significantly accelerating the design process. Beyond aesthetics, it contributes to structural efficiency, identifying designs that maximize strength and durability while minimizing material usage, resulting in substantial cost savings. To fully harness its potential, generative design should be integrated seamlessly throughout the product life cycle, from initial conception to manufacturing and testing. Furthermore, by analyzing user feedback, product managers can leverage AI to create designs that precisely align with customer preferences, driving products' success.

After this brief and concise introduction to the main advantages of AI applications in this field, let's delve into the topic at hand, starting with the understanding that product development is a process built on different stages and therefore artificial intelligence can bring benefits at each step of the way. Usually, four phases can be identified when developing a new product or service: as always everything starts with research to identify gaps in the market that need to be fulfilled, which leads to the idea development and refinement phase, ending with the testing step; these stages are very similar to those identified while analyzing the design thinking process, that will be examined later in this chapter. Artificial Intelligence's effects can be seen right from the start: it influences how designers analyze vast amounts of market and consumer data, in fact, these tools can uncover hidden insights that otherwise might be missed; in addition to that, by drawing from a wider range of sources, they can identify untapped opportunities and understand their target audience more deeply (Booth, Donohew, Wlezien, & Wu, 2024).

Going forward, AI serves as a colleague also in ideation process of both products and services, when just through a prompt, GenAI can spark innovative ideas by providing fresh perspectives on traditional brainstorming and help teams explore new and unexpected solutions. But it does not stop here: prototyping has become more rapid and democratized thanks to AI-powered tools, which allow anyone to create high-quality designs from

simple text prompts. It also offers suggestions on optimizing the design, streamlining the process, and ensuring a seamless user experience. As a matter of fact, one of the key benefits of generative AI in this field is its ability to democratize the design process and on one hand, it is a game changer for experienced designers, AI automates tedious tasks and frees them to explore new creative possibilities and develop groundbreaking solutions; on the other hand, GenAI breaks down any type of barrier in design, anyone can contribute to the process and see their ideas come to life, as a consequence, democratization fosters cross-functional teams collaboration. As it can be understood, blurred boundaries between experienced designers and non-designers result in a series of consequences that have just been explained, but actually there is one more: if boundaries do not exist anymore, as collaboration among employees grows, a new approach toward innovation arises, with designers and non-designers providing the best customer's experience (Torabi, 2024). However, it does not mean that designers' knowledge and experience are losing value, on the contrary, they have to ensure that results obtained through AI are valuable to the business

Hyper-personalization is another key-word when analyzing GenAI's main advantages of product and service development use case: it comes as a consequence of the revolution that traditional digital interfaces are experiencing, as a matter of fact, chatbots and digital assistants are changing what users expect when surfing the internet, they expect a highly tailored service, they do not want to spend hours searching for the answer to their problem, they want someone to do that for them, they want someone to advise what could be best for them in multiple occasion, someone that can give answers and suggestions to questions they did not even know they had, which is exactly the role that chatbots are playing, they are virtual assistants available 24/7 (Torabi, 2024).

Gartner conducted a survey in 2023 to discover AI impacts on products and their growth: they engaged with sixty-six product manager professionals from companies located all over the world; among the whole population, half of it has implemented AI or is experimenting with it in some products. As the graph shows, they found out that among those using AI in their processes or are at least trying to implement it, generative artificial intelligence is highly used in user experience personalization, 30% of respondents identified it as the use-case that best describes how their company is integrating AI, which is in line with previous findings but a higher percentage of interviewees that translates to 40% has implemented Generative artificial intelligence in predictive analytics, while the

remaining 30% is split between process automation (24%) and chats and chatbots (6%) (Gartner, Inc., 2023).
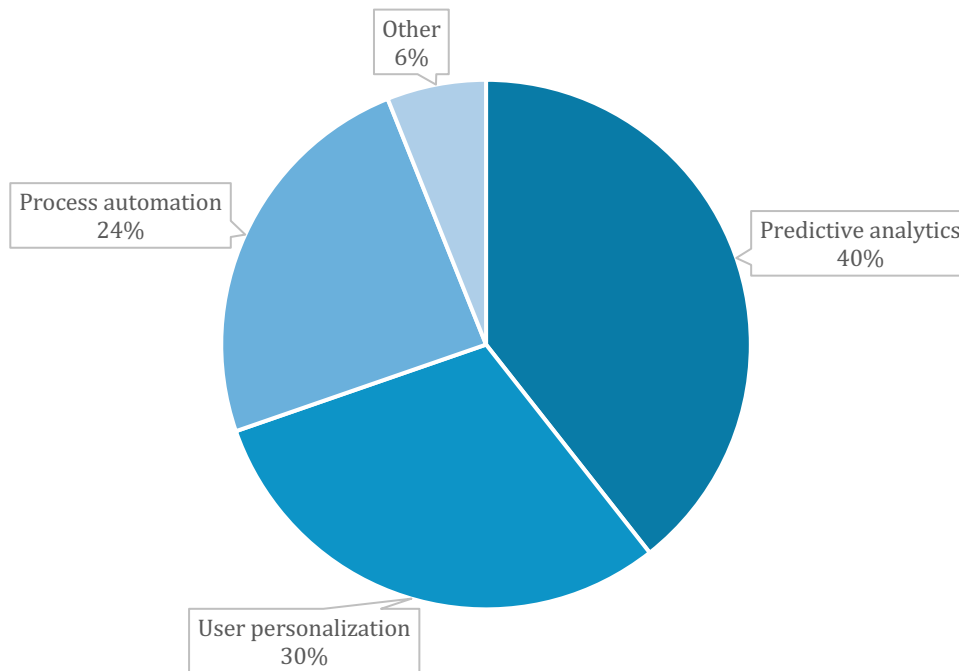
Figure 27: Area where GenAI is used in product development (Gartner, Inc., 2023)

Specifically, predictive analytics groups various tasks that GenAI excels at accomplishing, which are personalized user experience and user behavior predictions: as for what concerns the first, personalized recommendation is the most popular feature, followed by virtual assistants, such as chatbots, and advanced search and filtering (Gartner, Inc., 2023).

The design thinking method

Design thinking is a methodology useful for solving challenges in an innovative and sharp but not superficial way, enabling organizations to deliver value in an always faster environment with researchers always looking for new ways to solve challenges and drive innovation in any field.

Before analyzing its structure and its potential value, let's take a look at its roots and origins. As with artificial intelligence, the roots of the Design Thinking method can be traced back to the 1950s and 1960s, when Horst Rittel, a design theorist started talking about "*wicked problems*" whose detailed description is given in Rittel's paper entitled "*Dilemmas in a General Theory of Planning*" and they are defined as complex and

multidimensional problems that can be resolved using design techniques; basically, they are at the center of the design thinking method and these two concepts were connected for the first time later in 1992 when Richard Buchanan wrote "*Wicked problem in Design Thinking*" examining the development and evolution of Design Thinking. Actually, there are a number of other steps that led to the birth of Design Thinking: its principles, which will be presented later in this chapter, appeared in the early 1970s with Herbert Simon's book "The Science of the Artificial", later on during the decade Robert McKim discussed visual thinking in relation to humans capacity to understand and answer to problems, which is where Design Thinking is founded. During the following decade, various studies were conducted: Nigel Cross made a comparison between how designers deal with problems and the process they follow to solve them and how non-designers conduct the same process, whereas Bryan Lawson set up some tests to compare how scientists and architects solve the same problem: what he found out is quite singular since the first are more focused on the problem, while the latter on the solution, in other words, scientists were losing time by analyzing in deep the problem, making hypothesizes and therefor possible solution but not navigating all the possible answers, whereas designers were more in favor of producing all the solutions and then do not consider those which were not in line with the expectations (Dam & Siang, The History of Design Thinking, 2022). Since the 1990s IDEO has been recognized as the one inventing the Design Thinking Method and its practice: IDEO is a company helping organizations build their strategy and their future by designing exactly what they need, from products and services to brands and experiences, they highly believe on teams made of people with different backgrounds to deliver to their clients the best possible solution (IDEO, 2024). Considering the time when this new and innovative methodology was born, design thinking is pretty young and in the last years it has seen a boost in the number of publications with always more books in the last decade dealing with such matter and fields in which it is applied, but what is more noteworthy is that management and school have started using it as a tool inside their organizations. *Stanford Design School* is an example of an institution that highly believes in the methodology presented and therefore decided to rely on the design thinking method in their educational program and use it during their classes, they are an example for every other reality and helped to spread knowledge on it (Stanford d.school, 2024).

Design Thinking Phases

After this brief introduction concerning Design thinking's origins, let's switch the attention toward the process itself: what are the steps to follow to come up with an innovative solution? Is there anything to be careful of? Let's find out.

Firstly, a definition of what the Design Thinking method is should be given and the executive Chair of IDEO Tim Brown helps us here by defining it as:

"... a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology and the requirements for business success."

Tim Brown – Executive Chair of IDEO

Thanks to this method, organizations are able to see problems from different perspectives and it brings together three distinctive concepts that are desirability, viability and feasibility, in other words, design thinking seeks to find the perfect solution that people want, can be built, and is profitable at the same time (IDEO, 2024).

The Design Thinking method is built upon different stages whose number varies from three to seven depending on the school of thought one decides to follow, in this section the one followed by the Stanford Design School will be presented that counts five steps, each with different objectives and meaning:

    a. Empathize: this is the first step of the entire process, and it is its heart. During this first approach, people's desires and wishes to solve a problem need to be understood together with how and why they behave in a certain way. Comprehending clients' needs and the environment they live in is not optional, if not done there is a high risk that real reasons behind the problem they want to solve might not be perceived and therefore the optimal solution not reached. There are some activities to perform to empathize better with people: firstly, observation, by observing what people do and how they act, one can grasp some details that otherwise would not come up; then engagement, which is not achieved only through strictly programmed interviews, to the contrary the conversation should be loose enough to bring unexpected details on, the secret is to find the right balance between the two. Lastly, do not forget only to listen but also to watch: body language reveals far more elements than any word can. An empathy map is a useful tool for collecting all the information, all Post-it notes should be attached to create

a visual map of the environment and how people live it, it even facilitates next phase's activities.

b. Define: after collecting all the points in the previous phase and sharing them with the rest of the team, the define phase comes up. Keywords during this stage are clarity and insights: the challenge to solve must be very clear based on the insights collected during the empathize step, moreover, it serves as a guiding light to tailor the best strategy. Even if it seems to be a simple task given all the information collected in step number one, choosing the path to follow is not as immediate as most people think: focus on the insights that are more valuable and needs that are perceived as more urgent remembering to take into account users' points of view.

c. Ideate: following the understanding of which is the challenge to take on, the ideation process can start. A useful tool to better highlight the challenge and be sure to truly respond to it is the "*How Might We*" question (HMW) which is a statement that summarizes the challenge in the form of an open question: thanks to its format, it leaves room for thinking without boundaries exploring unexplored fields (Newman, 2023). This is the starting point of the ideate phase, during which innovative solutions start to emerge; during this stage, multiple ideas should be considered as a result of a brainstorming activity, after which the solution that best answers the original HMW question should be brought on. What is relevant to remember during the brainstorming is that there is no right or wrong, the idea can be described with anything, from words to drawings to sketches, the important thing is that it can be understood, and it is possible to build on others' ideas, to take them a step further.

d. Prototype: when the brainstorming is over and different ideas have emerged, the team should choose some criteria to select two or three potential solutions to proceed to the fourth phase, which is prototyping. Even if developing more than one idea might seem expensive not only in terms of money but also in terms of time, it is essential not to lose the innovation factor and see which one better suits users. Prototype mode is a cyclical process of building and refining prototypes to answer critical questions and reach the optimal solution: prototypes can be anything, especially in the early stage they do not need to be perfect but anything with which users can interact so that it can be tested, and improvements are possible till the final version.

e. Test: this is the final step but, actually, this phase and the previous one should be considered in tandem and not in transition since test results might highlight aspects to improve and therefore the need to modify the prototype and come back to test again, that is the aim of the test mode. As one can imagine, the test phase depends on feedback received by users, why a specific feature is appreciated or not should be the focus so as to enhance the knowledge of users' needs and wants (Stanford d.School, 2010).

Even if the Design Thinking method is composed of different steps that seem to be one the direct conclusion of the previous, each phase should not be considered individually: as a matter of fact design thinking is not a linear process, it is flexible and some phases could also happen simultaneously, for example, the reviews collected while prototypes are being tested might reveal new users' insights leading to a new session of brainstorming to ideate something more adequate or while creating the prototype, designers might notice that something does not work as they thought it would, new issues arise and they need to go back to the ideation phase (Dam, The 5 Stages in the Design Thinking Process, 2024).

As revealed by the history timeline shown previously and mentioned earlier, the Design Thinking method is quite young and only in recent times have companies and institutions such as universities and schools started showing interest in it, and an obvious question comes to mind as to why their interest grew over time, the answer could be summed up in few words: it works, it focus on innovation and it is human-centered. What humans tend to do is stick by what is known which is the so-called "status quo bias" and in addition to that there are other tons of bias that impede innovation from thriving, design thinking is the solution. Right from the empathize phase innovators are immersed in users' experience and they have the chance to collect a huge amount of data to deeply understand which are users' feelings, and the reasons behind the way they act, whereas if they stuck to previously collected data, they would be trapped in others' biases without even noticing; at this point, the risk is to feel overwhelmed by the quantity of data but if organized in clusters by theme, it can be mitigated. Furthermore, most of the time companies believe that prototypes should be quite perfect, whereas design thinking shows us that it should be far from perfect, at least in the early stages: the whole process should be a cooperation between innovators and users, and by presenting these low-cost

artifacts the value of the novelty grows as it is shaped through users' feedback. Lastly, it reduces organizations' fear in front of change: indeed, design thinking is not a linear process but it has steps to follow, it has guidelines so it serves as a guardrail for people to drive change and innovation reducing the fear that usually comes with it (Liedtka, October 2018).

Coming to the future perspectives on the implementation of Design Thinking methodologies, it is predictable to say that its implementation within organizations of any type will increase: the urgency for a holistic approach to capturing innovation is growing, and design thinking emphasizes the value creation for the community while achieving commercial success (IED Istituto Europeo di Design S.p.A., 2024).

Is design thinking going to change due to AI?

The design thinking process is a human-centered approach to innovation and originality, highly reliant on creativity and intuition but the advent of artificial intelligence is altering its landscape: with artificial intelligence becoming a collaborator, human capabilities are augmented and new dimensions to the design process are introduced. Artificial intelligence is included right from the first step of the process, from the emphasize and define phase when it becomes useful to gather and process all the data to gain insights into users' preferences and wants: there is no doubt that AI is able to analyze vast quantities of data, identifying patterns and trends that otherwise would be difficult for humans to discern. Furthermore, AI is also transforming user observation and analyses: a more scientific and objective understanding of users' behavior is provided by enlarging the data source and analyzing data from social networks, websites and mobile apps. What is important to mention is that the data collected are not biased: the main risk while conducting interviews or observing directly behaviors and situations is to be biased by personal points of view and thoughts, AI on the other hand does not run the risk since it is based on algorithms (Cautela, Dell'Era, Mortati, & Gastaldi, July 2019). Moreover, as analyzed in the product and service development use case, Artificial intelligence plays a central role also in the ideation and prototyping phases by fueling creative ideas during the brainstorming sessions and sparking innovative potential solutions interpreting users' needs and wants in ways that humans could struggle with, and by bringing concepts to life in a faster way allowing also efficient changes (Kaplan, 2024).

What has been long under scrutiny is artificial intelligence's ability to engage in creativity processes, however, with GenAI's arrival this doubt has vanished: Generative artificial intelligence can create every type of result through text prompts, but it does not stop here and with further development, it can also get to the solution by interpreting voice recording and images, what is next in line is thoughts' interpretation, AI is in fact expected to be able to read and interpret brain waves and represents thoughts visually.
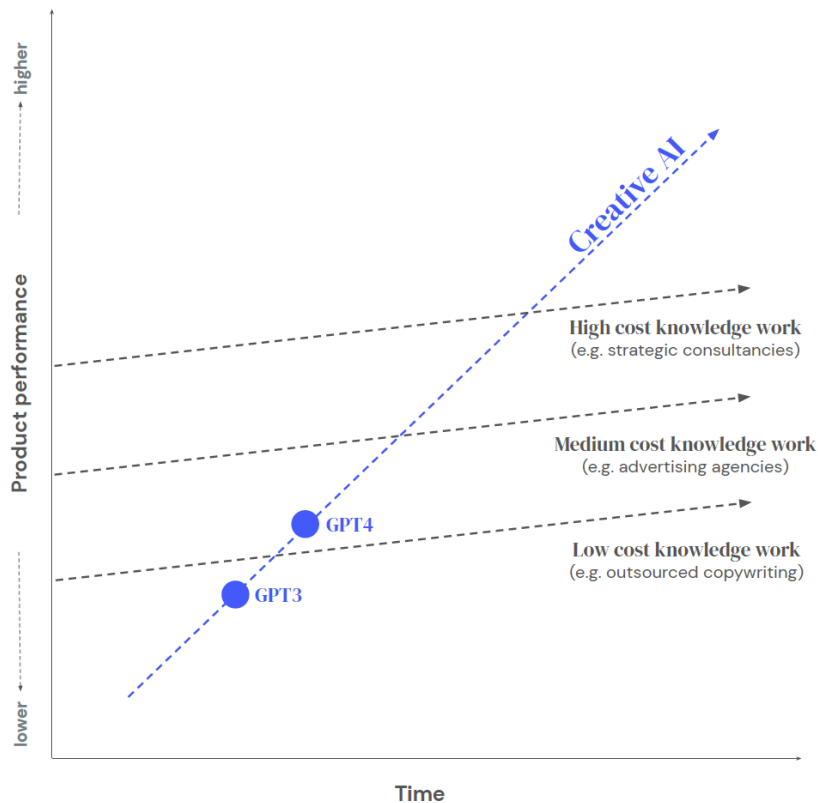
Figure 28: Adaptation of Clayton Christensen's disruptive innovation framework (De Ridder & Bogaert, 2023)

An adaptation of Clayton Christensen framework on disruptive innovation perfectly catches the potential of artificial intelligence in creative works over time: as the graph above shows, the creative AI line trajectory is going to surpass even the highest cost knowledge work, translating in challenges for those companies relying on services based on human expertise and creativity. Understanding that there is no chance for humans' capabilities to keep up with it, it is best to grasp how to cooperate and exploit it to achieve the best possible collaboration (De Ridder & Bogaert, 2023).

So the answer to the initial question is yes, artificial intelligence will have an impact in the design thinking process and more specifically in each of its stages, but if considered as a colleague, it has the potential to improve teams ideas, prototypes and final solutions.

Chapter 4

Bluewind case study

This final chapter aims to present Bluewind, an Italian enterprise operating in the engineering software field, and more specifically its engagement with Artificial Intelligence. Before analyzing in depth the process Bluewind has decided to go through to implement AI in their tasks, an introduction to the software industry market will be provided, trying to take into account the global perspective first and delve into the European and Italian landscape later, highlighting differences and similarities and the challenges and new trends the industry is going through, routing our attention to how artificial intelligence and GenAI is shaping it.

Bluewind has decided to include artificial intelligence tools in their operations getting the help of UpSkill 4.0 and Ennova Research, participating in the StrAIght to Business project which was at its first edition and took place in Venice on the 17th and 18th of May 2024 engaging not only businesses but students as well to find the perfect solution that could fit companies' needs and desires. Further details on the event and the outcome we have reached will be provided in this chapter, before analyzing how Bluewind has decided to move forward and what their future plans and goals are through an interview with them.

The software industry

"In short, software is eating the world" is what Marc Andreessen affirmed more than ten years ago, back in 2011 in one of his articles for The Wall Street Journal and believe it or not, he was not wrong. An increasing number of industries were being run on software, the Silicon Valley's companies were thriving and he expected them to lead the disruption in most cases in the following ten years, which is exactly what has happened (Andreessen, 2011).

Over the last few decades, the software industry has gone through major changes with software becoming an indispensable component of every single industry but also of every aspect of our lives, in other words, it has a central role in our society as a whole, therefore, it does not come as a surprise the growth path it has been going through since its central role in the digital transformation our world has been experiencing. However, before giving some data concerning this industry, let's find out in detail which areas can be traced

back to this field: the software industry involves not only the development and the creation of the software, but also its distribution and sale, moreover, it covers a wide range of software types, from operating system such MacOS or Windows, to specialized industry tools, such as business applications like ERP or graphic design software or banking systems. In fact, the software does not concern only laptops and Microsoft, but it is embedded in any device we interact it, from the platform used to watch films and TV series, to home security systems, ATM and online banking services and so on and so forth. Adopting a global perspective, in the last decade the software industry has followed a positive trend and according to the report on the software industry evolution written by Precedence Research, its market size in 2024 is estimated at 736.96 USD billion with a growth of 11% if compared to the previous year and this positive trajectory is expected to continue in the next decade. The following chart illustrates its value starting from the year 2023 when the market share of the software industry was less than seven hundred billion dollars, and forecasts it till the year 2034 when it is expected to reach a value higher than two thousand billion dollars. Overall, the graph suggests a positive outlook highlighting steady growth for the next ten years at a Compound Annual Growth Rate (CAGR) of 11,8% (Precedence Research, 2024).
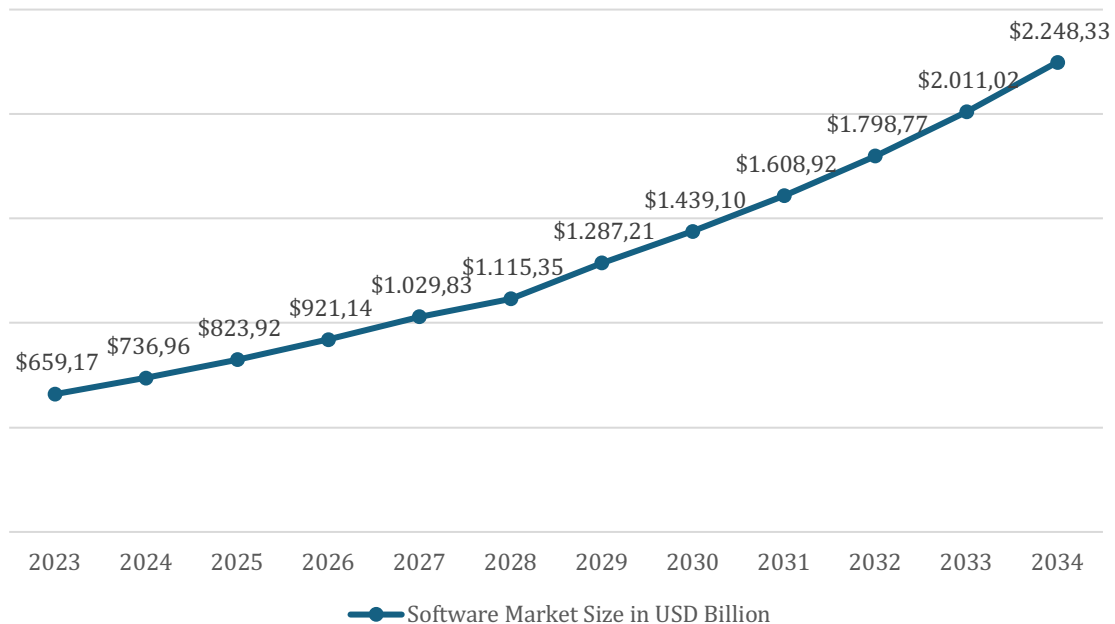
Figure 29: Software Market Size from a global perspective (Precedence Research, 2024)

Among the main reasons behind the steady growth highlighted in the chart, the shift to cloud computing[3] and software-as-a-service models[4], together with the increase in smartphone and tablet usage and internet access are to be found. The SaaS model has become the dominant delivery method since its introduction at the beginning of the millennium thanks to the long list of advantages it brings to both providers and customers: the firsts have a more stable and predictable revenue stream, whereas the latter can benefit from regular updates and lower upfront costs. To be more specific, vendors have the chance to introduce various updated features more rapidly and answer to clients' needs more quickly, scaling the market and lowering barriers to entry, at the same time customers can start using the software right away and there is no risk of being stuck with an obsolete version thanks to continuous updates, moreover, they face lower upfront costs since they pay a subscription fee instead of a significant single payment and by doing so they are able to predict their expense stream. However, there are some downsides as well: software developers could face lower switching costs as a consequence of subscriptions instead of an on-premises model and delayed revenue recognition, on the other hand, users might have trust issues cause of the data collected (Romanoff & Shetty, December 2023).

To sum up, cloud computing and SaaS have changed how the software industry creates value, software is more accessible and affordable for clients and at the same time scalable and flexible from vendors' point of view.

As already mentioned, the software industry covers multiple fields as it is highly diversified and market leaders reflect this: as the Morningstar research highlights, as of December 2022 Microsoft, Oracle, SAP, Salesforce and Adobe were the first five companies in this industry. If Microsoft is known worldwide for providing Windows computers with the software, it also manages applications such as Office, cloud computing services and game consoles; Oracle is renowned for its database management systems and enterprise software solutions, meaning ERP and CRM, but if business software leader is to be considered, that is SAP for sure, which is specialized in ERP whereas Salesforce is the main provider of customer relationship management software; last but not least,

---

[3] Cloud computing consists in offering the possibility to access IT resources by paying a fee, instead of owning the infrastructure and data center as a whole.

[4] SaaS is one of the three types of cloud computing together with IaaS (Infrastructure-as-a-service) and PaaS (Platform-as-a-service) and it enables users to access platforms and apps through the internet.

Adobe is the must-have tool for designers, marketers and artists since its products are industry standards for graphic design, video editing and digital publishing.

All together they covered 42% of the total industry sales and still remain leaders as of now, even if, as the data depicted in the following tab highlights, their market cap has slightly changed in this period, in fact, except for Adobe, the value of all their outstanding share of stock has been growing, sign of optimism for the future of the companies.

	Revenue Market Share as of December 2022 *	Market Cap as of December 2022 (in Billions) *	Market Cap as of August 2024 (in Billions) **
Microsoft	26%	2.757 USD	3.101 USD
Oracle	6%	309 USD	389 USD
Adobe	2%	277 USD	255 USD
Salesforce	4%	241 USD	242 USD
SAP	4%	172 USD	256 USD

* Source: (Romanoff & Shetty, December 2023)

** Source: (TradingView, last visited August 2024)

When analyzing market leaders, it is impossible not to notice that besides SAP, that is a German multinational company, the remaining four have all American roots: therefore, it is not unexpected that in 2023 the United States dominated the global enterprise software market, propelling North America to the top registering 44% in software market share, followed by Europe with a score of 28% and Asia in third place with 22% of market share, which is expected to grow at a faster CAGR in the next years (Precedence Research, 2024). Even if Europe covers second place, sixteen percentage points put European countries far behind the United States and Canada, highlighting the profound regional differences that arise when analyzing the software industry. This is in line with regional ICT spending and investment as a share of countries' gross domestic product: as data depicted in the graph below highlights, the United States spends 3,71% of its GDP on information and communication technology investment, which is an above-average percentage if only OECD countries are considered, which is 2,96%. The majority of European countries register a lower percentage of spending: Italy allocates only 2,35% of its GDP in ICT, a lower percentage than Spain (2,54%), Portugal (2,61%) and Belgium (2,87), but higher than Germany (1,4%). Besides the United States, among those countries spending above

average, as for what concerns European countries, Denmark, Lithuania, the Netherlands, France, Sweden and Austria are to be considered, with respectively 3,13%, 3,17%, 3,6%, 4,63%, 5,25% and 4,08%. Observing the data OECD gathered, northern European countries spend more in ICT than southern Europe, they are more focused on research and development and home for innovative products and services; considerations do not change even if the European average spending in ICT and not the OECD's one, since it is at 2,97%, only one point percentage higher than the latter (OECD, 2024).
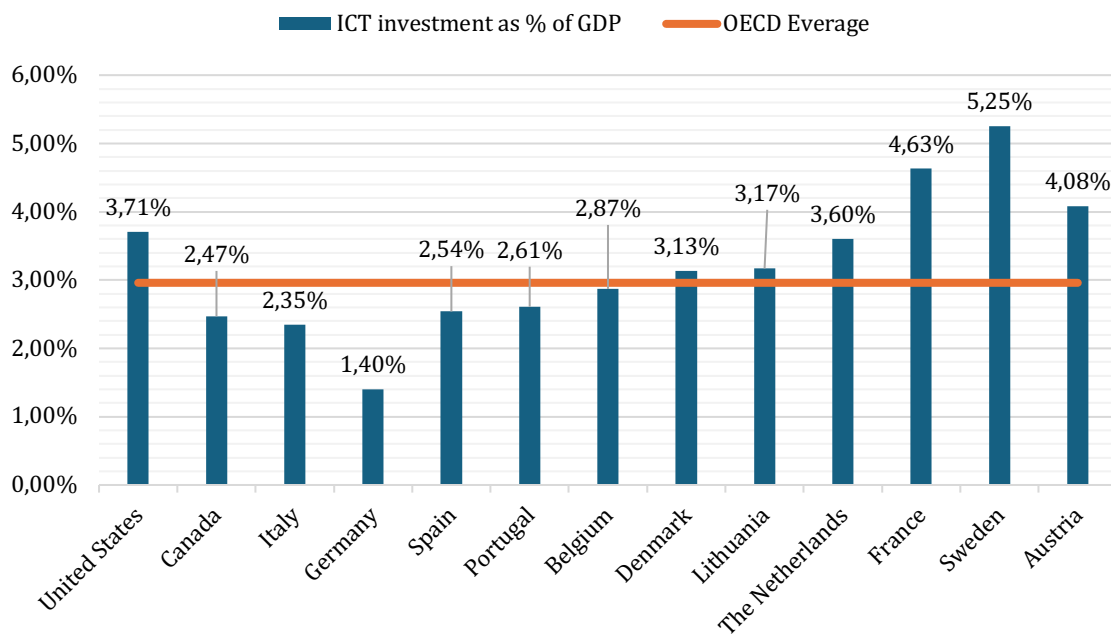
Figure 30: ICT spending by country (OECD, 2024)

While Europe has made strides in software, it still faces challenges in competing with the US on a global scale: if a hundred of the most valuable companies are to be considered, in 2020 the US thirty-nine of them were software companies or software-enabled, doubling the numbers recorded ten years before; if Asian countries are to be taken into account, their growth is even bigger, only seven out of one hundred companies were software related in 2010, whereas in 2020, the same data has triplet and 25% of businesses plays a central role in the software market. As for what concerns Europe, the growth is not as big: in 2020, only 7 industries out of the one hundred most valuable companies of the region played in this market, with a growth of less than 2% if compared to 2010. Taking this into account, plus all the typical dynamics of this industry where the bigger the player, the bigger the advantages it gets, which could be summed up with the winner-takes-all rule, Europe must act and do it fast before losing all its power in the industry.

Mirroring what US software giants have made or waiting for government help are not options to consider if we are looking for a long-term solution, Europe on the other hand should transform its peculiarities into opportunities and act on three main points that McKinsey was able to pinpoint after interviewing key people in the software world which are vertical B2B software, software enabling SMEs digitization and horizontal software platforms. The first suggestion consists of replicating what Europe is excelling at doing in other markets such as the automotive and pharmaceuticals industry: build tailored software solutions to meet the specifics and requirements of a specific sector. Some industry giants have already started acquiring startups doing so, but Europe could exploit its presence in other markets and use that knowledge to ensure its spot among the giants, and perhaps establish collaborations and partnerships with them. What could be seen as a weakness from a global perspective is the most common type of business in European soil which is small-medium enterprise, however, they could be the perfect customers for European-based software companies focusing their efforts on meeting their needs during the digitization process, which everyone knows not to be something at which these companies excel at. Last but not least, it has come time for Europe to extract value from its excellent position in research and development activities in the educational and public sectors, which is the total opposite of what is happening in the private sector: building a collaborative approach already seen in tech clusters such as Austin or the Silicon Valley between European universities and the business world could transform research into economic benefits and market dominance (Behrends, Di Mattia, Shulman, & Torres, February 2022).

What is important to notice is that Europe seems to be taking action to gain competitiveness, and the 2024 software industry outlook is promising: Europe is expected to spend more than one trillion dollars in the ICT sector, with software being the main area of spending. Northern European countries are those gaining more momentum, Finland, Norway and Sweden's software market value is expected to grow faster than any other country (Zsolt, 2024).

Is Italy competitive in the software industry?

Unfortunately, Italy does not stand out for its involvement in the software industry: again, it does not turn out to be a surprise given also the ranking concerning the DESI Index, which sees Italy ranked 18th out of twenty-seven countries (European Commission, 2023).

DESI stands for Digital Economy and Society Index: since 2014, the European Commission has used it to track the digital progress of Member States. Annual reports include countries' profiles and thematic chapters to provide insights into digital policy areas and help Member States identify priorities to act on. Moreover, all countries are ranked according to their digitalization level and compare their progress over the past five years, taking into account their starting point. The Index is built upon different indicators connected to human capital, connectivity, integration of digital technology and digital public services and all together, they help to build the overall situation. From 2023 the DESI index is part of the Digital Decade Country Report. Italy is well aware of its struggles and at the same of its potential and it is eager to contribute to European goals in terms of digitalization: its commitment can be seen in infrastructure advances but still its performance on various indicators such as digital skills, ICT training and many others are lower than the European average, even if improving if previous year's data are considered (European Commission, 2024).

According to Gartner Market Databook, in 2020 the Italian software market was valued at six billion US dollars: it was not an excellent result, with Germany and France standing way ahead of Italy respectively with a value of more than twenty-two billion and fourteen billion US dollars; what is true is that 2020 was not a normal year, data are in fact affected by Covid-19 effects which have negatively impacted the Italian software market, causing a contraction of 4,5% compared with the previous year (Gartner, 2021). In 2022 the value generated by the sector was 56,3 billion euros, 22,4 billion of which related to connected services: the trend considering the two previous years is positive, in fact, it grew by 9% compared to 2021, slightly less than the increase of the previous year which was higher by six percentage points (ASSOSOFTWARE, 2023). *Figure 31* takes into account the industry revenue stream as far as Italy is concerned, making a distinction between system infrastructure software, productivity software, enterprise software and application development software: the first provides the foundation for operating and managing organizational processes and services on hardware, productivity software is more focused on collaboration tools, office suites and design software instead, enterprise software supports essential business activities such as managing resources so it includes ERP and CRM, and last but not least, as the name itself suggests, application development software provides all tools needed to develop an application. As the graph highlights, the Italian software market has experienced steady growth from 2016 to 2023 and it is

expected to maintain such a trend in 2024 and on as well: if in 2016 its revenue stream stood at 6,68 USD billion, in 2023 it grew by 13% reaching 7,49 USD billion, in 2024 the market is expected to register more than 8 USD billion in revenues and its growth is not expected to stop in the next years. The enterprise software is the category accountant for the largest share of market revenue indicating its importance in the industry, whereas all the other categories have grown steadily through the years, even if fluctuations can be detected from time to time mainly due to economic conditions and technological advancements (Statista, 2024). As a matter of fact, years where no growth is registered correspond to years of black swans and political tensions: the COVID-19 pandemic first, the war between Ukraine and Russia then, have created a time of instability and uncertainty, with delays in many industries.
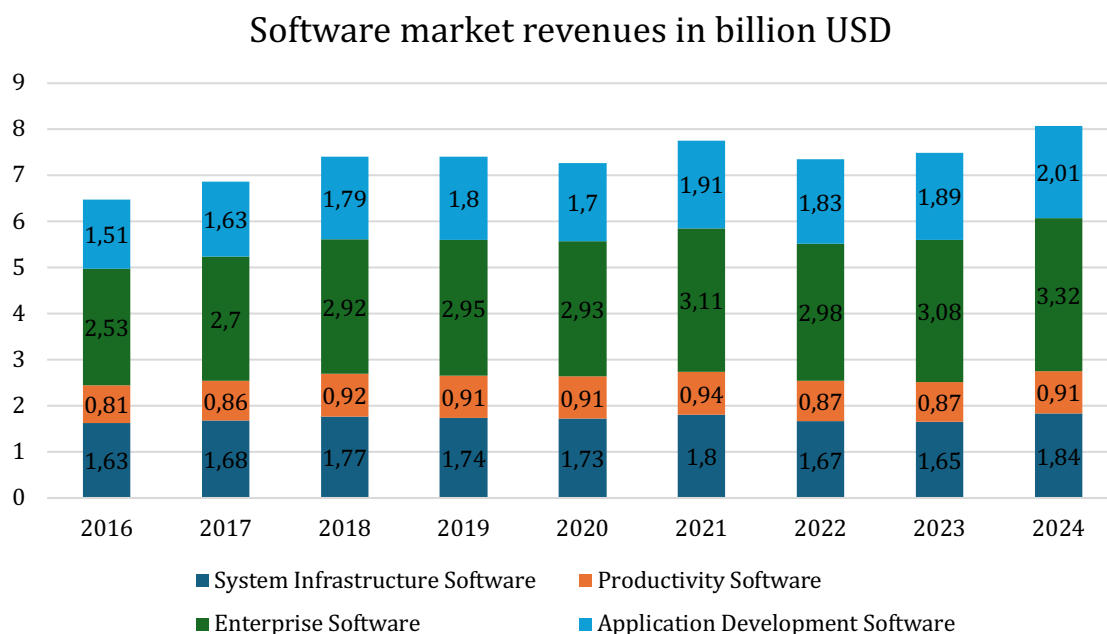
Figure 31: Software market revenues (Statista, 2024)

AssoSoftware together with Italian Tech Landscape and Software Italiani have conducted research on software entirely made in Italy and mapped more than a thousand Italian software to create a map to understand which are the areas where software is created: it is not surprising finding Lombardy in the first place with 36,62% of software created there, followed by Piemonte and Emilia-Romagna respectively with 11,14% and 9,41%, fourth place for the Veneto region with 8,26%. The chart does not substantially change even if we consider where the software companies are located, even if Lazio region comes up in third place, whereas Piemonte falls back in fourth place (Italian Tech Landscape, 2024).

In light of the data collected and presented, at the moment we cannot say that Italy is one of the main competitors in the software industry otherwise we would be lying, however, considering the digitalization process the majority of enterprises have undertaken and the resources Italy has, given also growth rate in the software industry, Italy has the potential to gain competitiveness and engage with some European countries.

New trends and challenges

Artificial intelligence has an impact on all kinds of industries, no market is immune to such disruptive forces, nonetheless the software market: by the end of 2024 foundation models are thought to become a commodity, driving down training costs, real profits will go to those companies able to lock costumers into their specific implementations and proprietary data. Moreover, businesses will prioritize security and privacy in their foundation model choices (Medium, 2024). It is just a matter of time until the software industry is completely disrupted like every other market by AI, but the first impacts are already to be seen and it is challenging to predict what the future holds since everything is changing and moving so fast: just think about the fact that it took four years to SaaS to reach the same level of market adoption that AI reached in half of the time.

There is no doubt that the software industry will be boosted by Generative artificial intelligence, the question is to what extent: even if, as already said, it is difficult to make exact predictions, following McKinsey's research on its impact on the industry, the most profound one will be a surge in vendor switching. This turnover comes as a consequence of several factors: new entrants may leverage GenAI to challenge established players, as lower costs for data integration and training make switching easier and buyers will also scrutinize legacy products more closely to stay competitive with the latest AI solutions. If software development costs are lower, enterprises could start reallocating their spending by building it in-house instead of buying it: even if the shift's initial impact will be moderate with about two to four percentage points over the next four years, the total dollar amount involved is still significant, ranging from thirty-five to forty billion dollars. However, this trend is likely to accelerate as enterprises gain more in-house expertise and demonstrate their ability to tailor applications to specific needs.

As McKinsey's analysis found out, GenAI is going to have a significant, yet uneven, impact on the industry: all categories will experience shifts in value creation and switching costs, but the relative consequences may vary, since this disruption could also lead to a redefinition of existing software categories. As of now, three main areas will be impacted

the most, which are Information service and data aggregation, content creation and customer service: as for what concerns information services, incumbents might explore new business models by offering data-driven insights, while the focus on novel methods for data consumption, discovery and ingestion is expected to increase; the transformation of the core product will disrupt the content in creation area, that together with the increased accessibility and the reach of a wider audience will influence how costumers utilize the software and their propensity to switch. Lastly, GenAI assistants will change how to engage with customers and enhance their engagement; nevertheless, fewer expert users, along with growing in-house development will partially offset these benefits. A lower but still high impact is expected in the enterprise automation process, where artificial intelligence offers established companies the chance to rethink their approach to traditional tasks and explore more comprehensive AI solutions; moreover, within Customer Relationship Management and Enterprise Resource Management, the adoption of cloud-based solutions will accelerate due to the automation of tasks that are labor-intensive, coupled with low switching rates and the emergence of semi-experts users (Schneider, Shah, & Abraham, 2024).

With AI playing always a more central role in the software development life-cycle, even if there is still a lot of work to do for all the tools to be integrated, engineers have to pay attention to two major consequences: first of all, the industry is facing a pressing need to enhance compliance and build trust in response to rising legal and security concerns surrounding software tools. Another significant outcome of AI implementation is engineers being able to reallocate their time from routine coding tasks to higher-level activities, but this shift is not only transforming engineers' mindsets but also impacting how companies approach talent acquisition and onboarding: companies are investing in distinct upskilling strategies to retain and cultivate talent, they are assessing candidates' proficiency in utilizing and adapting to these advanced tools in their day-to-day roles. In essence, what we are looking at is a change in the talent market as well: the demand for software engineers reached its peak in 2022 and the year after declined by thirty-seven percent, mirroring the layoffs that have been concentrated in the technology sector.

The shift the industry is going through does not come without uncertainties to deal with, as a matter of fact, excessive reliance on automated testing can result in increased errors and diminish user trust, which is one of the main reasons why human check is still essential, at the same time quality and security concerns remain, especially if AI models

are not regularly updated and trained with latest standards (Yee, Chui, Roberts, & Issler, July 2024).

Bluewind

Small medium enterprises (SMEs)[5] are the dominant force in the European business landscape, accounting for more than 99% of all enterprises, to be exact, in 2022 there were more than twenty-four million small-medium companies located in Europe, representing a staggering 99,8% of all non-financial businesses. Within the SME sector, micro-SMEs are the smallest, employing less than ten people, small SMEs employ between ten to forty-nine people, while medium SMEs have more than fifty employees but less than two hundred and forty-nine (Di Bella, et al., 2023). Italy is perfectly aligned with the European landscape since small-medium enterprises form the backbone of its economy, with our country boasting the highest number of this type of organizations among all European Member States, counting more than four million SMEs (Valentini, 2024). Among these businesses, Bluewind is a notable example of a small-medium company, that besides its dimension wants to keep pace with changes and innovation, and it is proactive in embracing the path of transformation to implement artificial intelligence in their operations.

Bluewind is an independent engineering company founded in 1998 and currently serving clients in the Automotive, Industrial, Home and lights and Medical industries mainly throughout Europe and the United States: it specializes in innovative product design, offering solutions in Electronics, Energy efficiency and connected devices, moreover, what is peculiar and at the same time the main strength of the company is that Bluewind does not focus on one single phase of the product life-cycle, on the contrary, it covers it as a whole, from the strategy to production, through hardware and software development, testing and CE certification[6]. Let's delve deeper into the industries that it serves: Bluewind started serving the automotive sector just from the beginning, more than twenty years

---

[5] Based on the European Commission's official definition, SMEs are businesses with fewer than two-hundred and fifty employees and either an annual turnover below fifty million euros or a balance sheet total below forty-three million (Valentini, 2024).

[6] The CE certification indicates that products sold in the European Economic Area have been assessed to meet rigorous safety, health and environmental standards, benefitting both businesses and consumers as well (European Commission, 2021).

ago and its expertise is evident in the work of its engineers on software for automatic gear ECUs, LGP injection ECUs, GSM and GPS-based navigation systems and automotive safety applications. When serving the industrial sector, Bluewind is committed to developing green and smart technology solutions: they invest both much money and time in research for innovative design techniques for Power Conversion Efficiency, PV-Photovoltaic control and energy management; the home and building automation is a complex industry, intersecting with various technology domains, including software, hardware, wireless design and IoT and therefore it requires expertise in all these fields, which is one of the main points of strength of Bluewind. Lastly, in the medical industry, it offers cutting-edge medical sterilization equipment tailored for the dental sector: its expertise in power electronics, user interfaces, touch screens and high-precision sensing ensures that its products meet the highest standards for medical sterilization.

As previously mentioned, Bluewind takes care of the product life-cycle as a whole, from its strategies to its development and testing being compliant with CE certifications: as the Design Thinking method, Bluewind adopts a human-centric approach, or what is better called a customer-centric approach, prioritizing customers' needs understanding and satisfaction; they dedicate substantial effort in identifying clients' specific use cases, ensuring the design perfectly align with their requirements and this approach is the key to their success, as a matter of fact, through empathizing with potential clients, Bluewind helps in developing the best innovative products. Software and hardware development are part of Bluewind's core business: product design begins with a thorough analysis of use cases to create a comprehensive User Requirements Document, which is the document that serves as a roadmap throughout the product development process, guiding design and final testing; as for what software is concerned, its development typically constitutes between seventy to eighty percent of the total electronic product design effort, moreover, as technology progresses software's role in managing complex hardware becomes critical and usually these systems demand for a combination of specific features to be fulfilled. To ensure smooth integration of electronics and mechanical components, Bluewind collaborates with trusted and qualified experts, to never leave the customer alone during the process that starts with translating initial concepts into sketches and mock-ups that highlight the product functionality, appearance and usability. Along with the testing phase, the prototyping stage is essential to offer a comprehensive design solution: it is especially beneficial when speed to market is a priority and Bluewind can

offer fully functional and complex electronic prototypes to their clients in a short timeframe. During the whole development process, there are specific standards they need to respect to be compliant with European certifications. In addition to that, thanks to its extensive engineering expertise, it offers a suite of products available as off-the-shelf software or hardware components ideal for both small-scale and large-scale complex systems (Bluewind, 2024).

Bluewind offers a wide range of services and supports clients along the long journey of finding the best solution to their problems, let's now find out whether it creates value from the economic point of view as well. To better understand Bluewind's profitability, let's examine the graph provided below, comparing EBITDA and revenues over the last ten years starting from the year 2013 till 2022, the last report available as of September 2024 from the AIDA Database *(All financial statements available on AIDA Database can be found in Appendix 1)*.
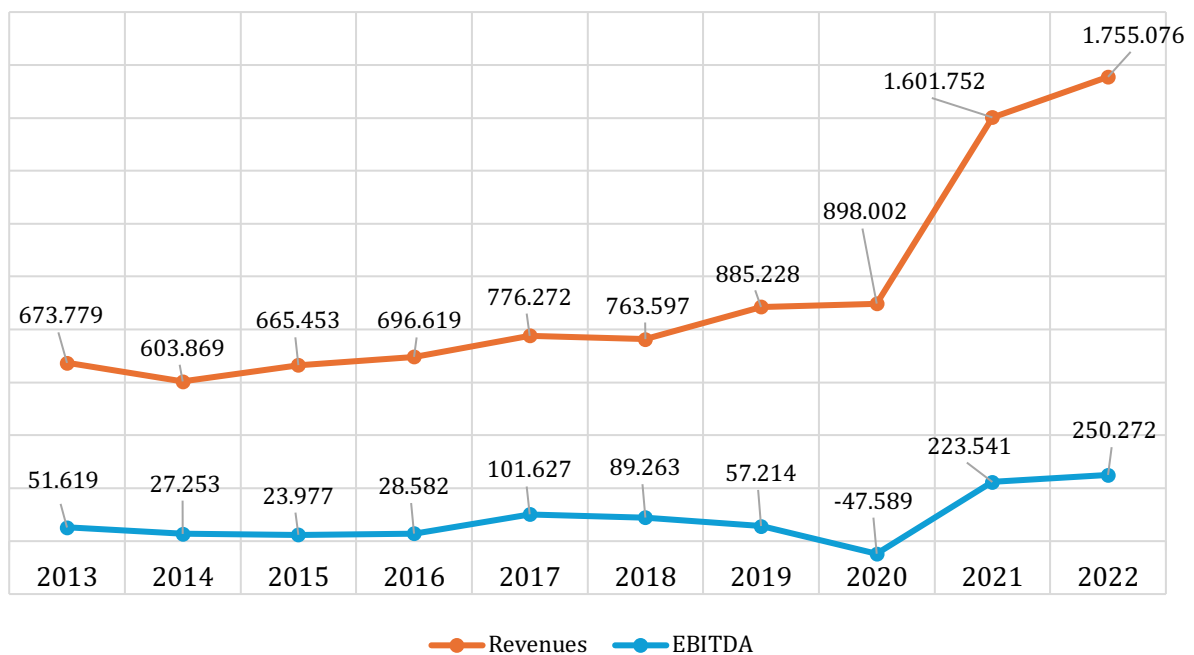
Figure 32: Bluewind's revenues and EBITDA over the last ten years (AIDA)

Examining the graph, both Revenues and EBITDA generally show an upward trend, signaling growth in either revenue generation and operational efficiency: as a matter of fact, revenues were at 673.779 euros in 2013 and doubled by 2022, reaching 1.755.076 euros; EBITDA followed quite the same path, with a value equal to 51.619 euros in 2013 and reaching 250.272 euro in 2022. However, despite the overall positive trend over the last decade and a quite steady increase as far as revenues are concerned, EBITDA has

experienced initial growth, reaching its peak in 2017 but then a notable decline occurred in 2020: one of the reasons behind such decrease is the Covid-19 pandemic for sure, challenging every company and every industry. Moreover, looking at the company's financial statement, starting in 2020 there has been a significant increase in the cost of raw materials, experiencing an increase of 151% and therefore undoubtedly having a significant impact on EBITDA: in 2019 the cost of raw materials stood at 116.048 euros, whereas in 2020 it stood at 290.079 euros, raw materials' cost increased even the following year but this time by 71%. Despite this fallback and challenging economic conditions, EBITDA recovered right after in 2021, and it continued to increase in 2022 as well, demonstrating Bluewind's resiliency and ability to adapt to challenging conditions and environments. Revenues, on the other hand, have steadily increased throughout the time horizon considered with a significant jump between 2020 and 2021, with an increase of more than 78%. All the data analyzed suggests that the company is in good health and undergoing a phase of growth.

Before switching the attention towards StrAIght to Business initiative, to better understand Bluewind's position in the market, let's analyze its competitive environment by identifying three competitors and key actors in the industry, which are Engineering Ingegneria Informatica S.p.A., TXT Group and Datalogic.

Engineering Ingegneria Informatica is an Italian company founded in the '80s and with multiple offices located around the globe: during the years the Group acquired numerous companies to broaden its expertise and be present in all market segments, ranging from healthcare and finance to utilities and manufacturing. It specializes in creating digital solutions covering the whole products' and services' life cycles, moreover it places a strong emphasis on research and development initiatives and projects related to cybersecurity, the metaverse, cloud computing as well as on artificial intelligence (Engineering Ingegneria Informatica, 2024).

TXT group defines itself as "the global digital enabler" specializing in engineering software solutions dedicated to supporting customers in the high-tech markets across the whole life cycle of their products. Born in the late '80s as well, it has been listed in the Italian Stock exchange since the beginning of the millennium, and it has never stopped reaching new markets, from fintech and telco to aerospace and military, supporting also public administration and governments (TXT Group, 2024).

Lastly, Datalogic an Italian company that has been leading the market of automatic data capture and industrial automation: it specializes in the design and production of barcode readers, mobile computers, sensors for detection and vision systems. Its cutting-edge solutions have been enhancing efficiency and quality across various sectors such as retail, manufacturing, healthcare and logistics throughout the whole value chain for over fifty years now, and thanks to its presence across various markets, Datalogic is able to meet all their needs with technology (Datalogic, 2024).

All the companies analyzed are able to serve their clients across different industries and markets through their breakthrough and innovative technological solutions, but now let's talk about numbers: all three competitors considered are bigger in terms of revenues in comparison to Bluewind, in fact as far as Ingegneria Informatica is concerned, in 2023 revenues amounted to 1.683,5 million euro, in other terms it surpassed the one billion threshold, with an increase of more than seventeen percent compared to 2022, when revenues stood at 1.422,6 millions of euros; the EBITDA reached 257,3 millions of euro, with an increase of 23,3% compared to 2022 (Engineering Ingegneria Informatica, 2023). During the past year, as the following data highlights, TXT Group recorded revenue growth: in 2023 revenues stood at 224,4 million euros, whereas in 2022 revenues were at 150,8 million euros, so they basically doubled within a year, more precisely revenues increased by 48,8%; the EBITDA increased as well from 22,3 million euros in 2022 to 31,6 million euros in 2023, with an increase higher than forty percent (TXT Group, 2023). Datalogic is the only one recording a decrease in revenues in 2023 with respect to 2022: sales revenue stood at €536.6 million at the end of 2023, with a reduction of eighteen percent compared to 2022, when revenues were at €654.6 million. EBITDA diminished as well from €80.3 million in 2022 to €49.5 million in 2023, the reduction is mainly due to a reduction in volumes (Datalogic, 2023).

Despite dissimilarities in revenues, all the competitors have similar EBITDA-to-Revenue ratios and therefore similar levels of profitability: in fact Bluewind in 2022 recorded a ratio equal to 14,1%, which is the same level of profitability on net revenues reached by TXT Group in 2023, but a bit lower than that achieved by Ingegneria Informatica, which stood at 15,3%; Datalogic had lower levels of profitability since its ratio stood at 9,2%, lower than that recorded in 2022 when it was at 12,3%.

The project: StrAIght to Business

On the 17th and 18th of May StrAIght to Business took place in the beautiful venue of Venice, the event aimed at bringing together Italian small and medium-sized companies, artificial intelligence and management students to develop strategies and projects to innovate and increase companies' competitiveness through the implementation of Artificial Intelligence and Generative Artificial Intelligence in their processes. The project is a collaborative effort between Upskill 4.0 and Ennova Research, two realities whose core business differs, but with more than one thing in common, starting from their attention towards innovation and the main approach used to deliver value to their clients, the Design Thinking method. Upskill 4.0 is a Ca'Foscari University spin-off headed by Stefano Micelli focusing on the digital innovation of small and medium enterprises accompanying them in this long process using the Design Thinking Method. By facing new challenges with the help of Design Thinking methodology and with students, they develop tailored strategies to answer to clients' priorities transforming business processes and boosting their competitiveness in the digital world (Upskill 4.0, 2024). Ennova Research is a company chaired by Raffaele Andreace highly focused on solving companies' issues using the latest research, design and technology: they are so invested in developing new technologies that they spend fourteen percent of their revenues on research and development concerning artificial intelligence, Internet of Things, machine learning and robotics (Ennova Research, 2024).

During these two days in the middle of May, several speeches took place to highlight the importance of innovation and artificial intelligence within companies, especially within Italian companies that as previously analyzed are running the risk of falling behind competitors which on the contrary highly rely on AI and other tools powered by it. As Stefano Micelli affirmed during an interview with *Corriere della Sera*, he wanted companies to engage with students and specialists to find ad-hoc solutions based on AI, to start their transformation towards more digitalized processes (Tuzil, 2024): Stefano Micelli wanted StrAIght to Business to be a training ground where students, specialists and companies could create together the future, answering back to the profound revolution AI has triggered (Micelli, 2024).

Besides specialists, students and relevant speakers such as Gulli Antonio, senior director of Google Cloud, StrAIght to Business engaged ten Italian companies that wanted to take the big jump, all competing in different industries and having different needs to fulfill and

goals to achieve and therefore, according to the kind of objective they wanted to reach, they have been split among five different use cases, which are insight and validate, unlock GenAI's data potential, Content for everyone, Vision to Insight, Knowledge distillation: the following tab summarizes which companies have taken part in the project, to which case study they were assigned and few words on the solution presented during the event. As for what concerns Bluewind, it will not be present in this chart since the next section of the chapter will examine it.

Company	Use case	Company description
MANNI Group	Insight and validate	Manni specializes in the process of steel for construction. What they needed help with was a tool to verify orders' confirmations coming from their suppliers.
VEGA Carburanti S.p.A		One of the most important companies in the Veneto region offering a wide variety of petroleum products. They were looking for an AI implementation to easily interpret land registry maps.
Medicasa Italia	Unlock GenAI's data potential	It is a medical service taking care of patients directly in their homes. They were looking for a way to improve their service's quality with the help of AI.
Crurated		Crurated is a platform for wine passionate that connects them with the world's top producer: by becoming a member you get access to tailored experiences and services. Since they are highly focused on their community, they wanted a tool to personalize each member's experience.

Permasteelisa Group		It is a global leader in the design, construction and installation of advanced building envelopes. They wanted AI to help in analyzing documents and project to participate in competitive bidding process.
Caleffi Hydronic Solution	Content for everyone	Caleffi specializes in designing, manufacturing and distributing hydronic components and systems. They needed Artificial Intelligence's help in translating specific information in content for the enterprise magazine.
TAKA WRP		It provides a range of machines for coating profiles and panels in a variety of materials. They were looking for AI implementations into their machines to enhance quality checks during their processes.
CFI Refrigerazione	Vision to Insight	CFI Refrigerazione is a leading company in the design and production of refrigeration solutions and all its components. They wanted a system power by AI to automatically create control plans based on engineering drawings.
Comune di Padova	Knowledge distillation	Padova was the only member of local administration among all private companies and they wanted to provides citizens with a self-service platform to find information needed for municipal services.

Now, let's delve deeper into each use case to understand better what the challenge was to take on, and even in this case, knowledge distillation will be examined in the next section:

- Insight and validate: the main focus is on innovating processes to analyze unstructured data such as videos, images and texts;

- Unlock GenAI's data potential: GenAI becomes the perfect colleague to workers helping them in collecting, examining and interpreting data enabling workers to make informed strategic decisions;

- Content for everyone: the ability to create content by collecting insights from various documents;

- Vision to Insight: getting insights directly from images to guide businesses' strategic decisions.

Wings for Bluewind

Bluewind was assigned to the only use case not previously analyzed which is knowledge distillation: in this use case, the company's internal knowledge is integrated into an artificial intelligence model to answer engineers' prompts without the need to retrain the model. The challenge Bluewind launched was as clear as it was complex: every single software and engineering solution provided to their clients are based on technical drawings generated by their programming team, but to ensure accuracy and compliance, engineers have to delve into extensive technical manuals, full of norms and project-specific standards. What AI should have helped with is an AI-powered tool that enables easier and quicker manual examination without losing the quality of the answers given, meaning that it should respond to engineers' prompts maintaining the rigor and completeness expected.

The whole project was developed by following the design thinking method, therefore the first steps to take were getting to know Bluewind through the empathize phase, understanding its main needs and wants, on what we should focus on, and gaining insights from every information they gave. What emerged from the conversation we had together is four main aspects they wanted to improve and they gave great importance to: first of all, as revealed by the challenge they submitted, the software they develop is the result of norms and technical features but that is not all, also clients' requirements need to be considered but what stands out as one of the most important aspects to be compliant with is functional safety. Functional safety deals with everything that has to be done in order

to avoid people's harm, damage of any kind, such data breaches resulting in data loss and invasion of privacy. Another key aspect to take into consideration is resource optimization: in the previous chapters, we have long discussed about one of the main advantages of artificial intelligence, which is that it frees engineers' time, they have the chance to focus their effort on other activities that differ from coding and that could result in more value created.

Moreover, if they have more time available, they could also decide to undertake more projects without losing the level of quality Bluewind wants to maintain and deliver to their customers; simultaneously, by embarking on more projects at the same time, they can expand their knowledge base and apply it in different fields across different industries. Finally, they have the chance to meet the needs of always more clients, regardless of their financial means to invest: in fact, by taking on more projects, they can avoid rising service costs, making innovative and technological solution more accessible to anyone.

The definition phase led us towards the How Might We question (HMW) which summarized in a few concise words what problem the final solution should solve:

"How might we solve the need to take advantage of Bluewind's human resources with diverse skills that must read and comprehend long manuals full of norms to be compliant with before effectively designing and writing the programming code to satisfy custom software requested by the client, using AI tools?"

The HMW question highlights the main points Bluewind wanted to give a solution to, which came to light during the empathize phase. At this stage, Ennova Research helped us find the perfect AI-powered instrument: they developed a chatbot powered by artificial intelligence to answer engineers' questions in only a few seconds maintaining a high quality and standards level, it does not only reply to engineers' prompt in a timely manner, it also gives information on the source, it highlights where on the guidebook used to train the model the answer is, so that engineers can confirm whether it is correct or not. This last point addresses the concern some researchers may still have about AI completely replacing humans in the workforce: in reality, it transforms jobs, shifting responsibilities and core tasks, rather than eliminating them.

Once the DEMO developed by Ennova Research's engineers has been presented, we highlighted strengths, weaknesses and areas of improvement: without any doubt, the tool developed has access to several documents and a large amount of data and it can give an answer in just a few seconds, whereas engineers would spend much more time understanding where the information they are looking for is, moreover they could also lose some details because of the vast quantity of data; additionally, as previously mentioned, it points directly the source, where the info is. Clients' trust deficit is not the only weak spot identified, as a matter of fact, the new technology was expected to be proactive, whereas it was designed solely to deliver an accurate response, without any further suggestions; another key aspect to improve is connected to training data, it was not able to give any answer if inputs language was not the same as the one provided during the training phase of the model.

This new instrument has consequences also on relationships with clients: in fact, clients might look at it as proof of Bluewind's innovativeness, increasing the value of the company's final output but at the same time, some customers might be scared in front of such breakthrough technology because of the lack of trust on AI.

These topics have been the starting point of the brainstorming session leading toward the ideation and prototyping phases during which the whole plan took shape, and the project entitled *Wings for Bluewind* emerged: the name choice is not casual, we wanted to empathize the magnitude of the impact that artificial intelligence might have on the company. Bluewind's business is thriving right now, with financial data showing growth over the past year. However, artificial intelligence could be the game-changer they need to compete with bigger competitors: simply put, artificial intelligence could give Bluewind wings to soar toward bold, new goals.

What Bluewind could achieve by implementing the chatbot can have an impact on three main areas which are the organization itself, the technology, but also the communication:

- Organization: Bluewind's engineers are freed from routine tasks, they are able to focus on more valuable activities rather than writing code and follow more projects at the same time frame;
- Technology: from the technological point of view, they are able to receive a complete answer, and by taking it a step further, they could also get to understand what stands behind the answer given, meaning why the answer is correct, what

the reasoning behind it is; moreover, the knowledge embedded in the system can be used across diverse markets and projects;

- Communication: Bluewind's engineers and human resources are not the only ones benefitting from artificial intelligence, its clients too are going to solve their problems in less time and the solutions suggested gain more value. Furthermore, the democratization of these innovative solutions comes as a consequence of AI increasing margins and enabling companies with lower investment capacity to receive the service as well.

Considering all these factors, how can artificial intelligence generate value for Bluewind? Or, in other words, which is the value proposition? Briefly stated, it is an AI-powered software that can reliably, quickly and intuitively gather all the necessary information to build specific code: it addresses mainly internal human resources, who are more valued since they can spend their time on other activities that are not recurring; at the same time, one of the key benefits is expanding the client base without increasing costs.

Unlocking efficiency: Bluewind's journey with AI

At the end of September 2024, the Director of Engineering at Bluewind, Stefano Costa agreed to meet me and discuss Bluewind's path to include artificial intelligence into their process *(the entire interview can be read in Appendix 2)*.

Right from the start, he underlined how StrAIght to business was the right thing at the right time: at the beginning of 2024, Bluewind was trying to understand if and how AI was going to be part of its internal processes and the conference held by Upskill 4.0 gave Stefano Costa the chance to immerse himself in the topic, listening to experts but also other companies' use cases, enabling him to absorb all the information and take what seemed to be the best decision for his company.

After attending the conference, they decided it was time to take the big jump and embark on this new transformative process since the risks were high, but the potentialities were higher, however, before that, they had to deal with some obstacles: they had not many problems among engineers or clients as far as LLM models and generative artificial intelligence were concerned, the first were skeptical at the beginning mainly because they were not fully aware of AI's potentialities. They face major challenges when artificial

intelligence is part of the product they design, such as algorithms that provide feedback on the remaining range of electric vehicles, in this situations, customers still prefer sticking to traditional methods because they find them more reliable: in this case, customers' skepticism is the consequence of lack of awareness on AI, and on its potential as well. Unfortunately, Stefano Costa admits that he has not seen any change in such thought and, besides large multinationals that invest a lot in these technologies, smaller ones still tend to prefer old-fashioned approaches: to overcome such bias, they are providing demo and proof-of-concept to demonstrate what is achievable and they implement the AI instrument in any case to showcase its feasibility, enabling them to experiment it but without compelling them to depend exclusively on that option.

Speaking of the solution they decided to implement, they opted for something less ambitious than the chatbot presented during StrAIght to Business: they have not developed a personalized AI-powered tool but went for an off-the-shelf AI instrument. To avoid data breaches and privacy problems considering the amount of sensitive data they deal with, they chose to install that software on their devices and reproduce a chatbot in-house, abandoning the possibility to make any personalization and fine-tuning. Privacy concern is not the only reason leading to that decision: the majority of clients' contracts and information are protected by NDAs (non-disclosure agreements), therefore penalties are provided in case of breaches; other files might not fall under NDA protection, but Bluewind's image and reputation would be harmed if data were to be leaked. Lastly, any cloud service does not guarantee stability, whereas software they rely on must remain stable over time: cloud services are improving constantly, some may even disappear at any moment and Bluewind cannot take that risk, even considering that besides customers, they have close relationships with certification bodies, who need to be able to analyze every tool they use throughout the whole process. This does not mean falling into obsolescence: if the software updates while developing a project, they keep the same version throughout its duration but use the updated model for new activities.

Even if they are still in the experimental phase, artificial intelligence's effects can be seen in all of Bluewind's functions apart from the financial department, which is still untouched by artificial intelligence: besides AI's impact being significant in nearly all the activities they engage in, there are two main areas where its influence is at its highest which are management and strategic decision and software development. Time savings and increased productivity are the common denominators of AI implementation in the two

departments: LLM chatbots are used daily while writing code and act as tutors that help monitor code and prevent mistakes, at the same time, they suggest parts of code based on what engineers have previously written. Speaking of managers, they use artificial intelligence to process raw data and create presentations for other company members or external advisors, that way they can spend more time analyzing final data and take action on it. This brings to light also the shift from activities with low levels of added value to higher-value activities and a transformation in skills required in high-salary positions. Stefano Costa has a clear vision of how the future should look: first and foremost, as the experimental phase goes on, they can start training the algorithm on their material, in this case, they are not breaking any NDAs since they would be using aggregated data. By doing so, contracts and documents concerning preliminary analysis of technical activities can be directly generated by artificial intelligence and, consequently, when embarking on new projects and conducting preliminary analysis, time spent on those activities is remarkably reduced. Moreover, within a six-month timeframe, AI is expected to enter the accounting department and be used for everyday activities, thanks also to the enthusiasm of newly graduated students for these tools. Speaking of newly graduated students, they will continue seeking graduates from electronic engineering, industrial engineering and mathematics programs, who already have strong artificial intelligence knowledge, but they will also hire a specialized workforce to address the design of electronic systems for our clients using AI technologies.

When asked Bluewind's primary goal in one year at most, Stefano Costa did not hesitate: he wants AI to be seamlessly integrated into their routine: for example, creating a contract is a repetitive yet crucial task, therefore it should be standard practice to have it automatically generated by AI. This would allow the workforce to redirect their focus toward different skills: the key would be providing the correct guidelines for the offer, which necessitates a thorough interview with clients to gather all relevant information in an organized way. This approach saves a significant amount of time that would otherwise be spent on manual compilation, enabling a direct focus on reviewing the offer. In short, many processes should be standardized: currently, everyone completes contracts with minor variations, but utilizing the algorithm should produce consistent results over time.

The journey Bluewind decided to embark on is full of challenges and does not come without obstacles: starting from their engagement in the StrAIght to Business event,

luckily, Bluewind did not stop there, as they continued their experience, succeeding in what Upskill and Ennova Research wanted to achieve through the event hosted in Venice, that is bringing the world of AI closer to companies to guide them in comprehending the huge opportunity and unleash its potential. Honestly, by opting for a quite different solution than the one presented by Ennova Research, Bluewind proved they understood StrAIght to Business's aim: they preferred an off-the-shelf solution without the chance of any personalization and fine-tuning because they had very clear what their needs were, they had to comply with NDAs and privacy matter, they could not take any risks by uploading clients' data on cloud services, but what is relevant is that they did not stop and picked what was best for them. Moreover, they overcame the initial skepticism of their engineers through knowledge of the new technology, highlighting AI potentialities and limits, to put it in other words, they let them experiment and let the results speak for themselves.

Even if they are still going through the experimental phase, AI effects are already visible: both engineers and managers can focus on higher value activities, while saving time in those repetitive yet still necessary and usually not delegable to others tasks, such as writing contracts and offers for clients or presentations of data. What comes as an immediate consequence is a higher level of efficiency: engineers focusing on more projects in the same period, managers reallocating their time analyzing data and making conscious choices to shape Bluewind's strategy and be ready to adapt it to the countless shocks the market will encounter, especially as a result of AI.

Stefano Costa stressed that besides the initial choice of implementing an off-the-shelf solution, their goal is to achieve the level of personalization presented by Ennova Research in their DEMO and beyond: this is something reachable once they start uploading their aggregated data without risking leaking any data covered by NDAs. Only at that point, the efficiency level reached is maximized, which comes at the end of the experimentation phase. Namely, once the experimentation phase is over, in six months, one year at most, AI usage should be a standard within the whole organization, standardizing certain processes such as contracts and offers writing.

A theme to reflect on is the increasing need for employees with specific AI knowledge: Stefano Costa specified that they will not completely change their hiring process, graduates in engineering and mathematics are still the primary need but they have to be partnered with people who are specialized in using artificial intelligence technologies.

This leaves us with food for brains: is it better to train already hired engineers following intensive courses to expand their knowledge or hire an already AI-trained workforce? Both alternatives are valuable and, in both scenarios, Bluewind's needs would be fulfilled, the only variable that changes is the time needed: while the time required to fulfill the need increases in the first scenario, the latter option takes significantly less time, however training current engineers would enhance their skills set and make them feel valued and appreciated by the organization. To sum up, there is no right or wrong answer, the right balance between the two options might be what Bluewind could choose to achieve its goals within the set time frame.

The process embraced by Bluewind and described by Stefano Costa during the interview differs slightly from the one presented as "*Wings for Bluewind*" but responds to Bluewind's specific and inevitable needs and current situation, therefore Bluewind will have the power to soar towards new, ambitious and exciting goals.

Chapter 5

Conclusion

The main aim of this thesis was to explore the impact of artificial intelligence on companies, providing in the last chapter the case study of Bluewind: the journey started with a first chapter dedicated to building a foundational knowledge of artificial intelligence, understanding what stands behind a machine performing skills and abilities once associated exclusively with humans, whereas machines are expected to reach humans' performances any time now; Tesla's owner, Elon Musk forecasts that artificial intelligence will surpass human intelligence by the end of 2025. Honestly, it does not seem so surreal given the rapid growth AI has seen over the last two years, reaching milestones that took tech giants, such as Apple and Microsoft, much longer to accomplish: however, the pace of its progress has been hindered by a shortage of microchips, especially those made by Nvidia, which are crucial for training and operating AI models (Hammond, 2024). The core of the whole work is in the second chapter, where the impact of artificial intelligence on companies is explained: companies, industries, and countries had all different attitudes and reactions in front of an incredibly powerful force that is artificial intelligence. First and foremost, businesses need to rethink their strategies and business models to create value: if another tool is going to be implemented, balances inside the organization are to change, processes are far more data-driven and customer-centric, a new equilibrium between humans and machines is to be found, to be concise they need to prepare for artificial intelligence's arrival, but even in how prepared companies are, there are dissimilarities according to their level of understanding and adoption of AI, as the MIT Research found out. However, PwC findings gathered in the 27th Annual Global CEO survey captured the urgency felt by enterprise leaders toward technological change and innovation, together with their perceptions of artificial intelligence's impact on companies. Luckily, data on AI implementations inside companies is promising, the trend is positive and always more choose to use it in more functions and areas: the departments more impacted by AI usage are marketing and sales, product and service development and IT. The first results of AI implementation are already visible and as expected revenues, efficiency and productivity have increased but other benefits are coming to light, like enhanced relationships with clients, fraud detection and risk management.

From the geographical point of view, there is no surprise in finding out that the United States of America is leading investments in artificial intelligence, pushed by the huge number of US companies adopting advanced digital technologies; Europe does not excel in this field, only three European countries appear in the top ten countries investing in AI, which are Germany, Sweden and France.

Before focusing on introducing our case study, use cases are the topic of the third chapter, how to build them and why they are so valuable to companies is no longer a secret; a focus on GenAI use cases is provided by analyzing deeper three use cases, sales and marketing, together with product and service development have been previously identified as those departments inside a company where artificial intelligence is used the most, whereas code-generation software is the field where Bluewind operates.

Bluewind is the perfect case study to conclude this thesis: it is an Italian small-medium engineering enterprise, serving the Automotive, Industrial, Home and lights and Medical industries mainly throughout Europe and the United States. Innovation has always been the guiding light of Bluewind throughout all the phases it manages, in fact, it plays a central role in the whole product life cycle from the strategy to its production, through hardware and software development, testing and CE certification. To keep up with competitors, in May 2024 they have decided to take part in StrAIght to Business, the event designed to unite Italian small and medium-sized enterprises with artificial intelligence and management students, focusing on developing strategies and projects to integrate AI and GenAI into business processes to drive innovation and enhance competitiveness.

To understand whether Bluewind's engagement with artificial intelligence continued after the two-days conference in Venice, thanks to the Upskill team, I was able to get in touch with Stefano Costa, Director of Engineers at Bluewind. He was highly satisfied with his participation in the event, as its format effectively enabled him to understand the potential of artificial intelligence and to engage with other companies that had the same need; to cite his words "StrAIght to Business was the answer we were looking for at the right moment".

During the interview, he pointed out the process its company is following after taking part in StrAIght to Business to achieve complete integration of artificial intelligence within all the company's departments and activities: the AI-powered chatbot they decided to opt for is serving all the areas of the company, except for the accounting department where at the moment he does not see any way to leverage AI, which is in line with what emerged from

McKinsey survey concerning where GenAI is mostly employed inside organizations. The benefits he recognizes are also consistent with previous findings: both areas where the impact of artificial intelligence is greatest - software development together with management and strategic decision-making - identify time-savings and increased productivity as primary benefits. Moreover, he highlights how with AI implementation, workers at any level can focus on higher-value activities and develop new skills or broaden existing ones such as data interpretation and strategic decision-making. Speaking of workforce and reskilling processes, also the hiring process changes: they in fact started looking for graduates with specific AI knowledge to address the design of electronic systems for their clients using AI technologies.

One of the many aspects he emphasized is that any LLM tool they have decided to implement or will adopt in the future, none of them has replaced any of Bluewind's engineers, every single AI tool is supervised by them, as well as its result.

While explaining risks and biases that need to be overcome to be fully prepared for AI arrival, there was a low level of trust towards it: in Bluewind, engineers were skeptical but just at the beginning when its potentiality was not as clear as now, which is related to the explainability topic; who is more skeptical and whose attitude is not going to change any time soon, are clients receiving products that incorporate AI, small entities above all still prefer sticking to traditional methods instead of relying on an algorithm, whereas larger multinationals that use AI daily are much more confident.

Taking everything into account, artificial intelligence is impacting every aspect of everyone's life, and it is impacting industries and businesses as well, some more than others; benefits and advantages after its implementation may differ but time savings and productivity seem to be the common denominator.

That said, companies need to understand how to make artificial intelligence a helpful coworker, to create value for its employees and the entire organization, and to make them work together seamlessly because like Sir Lakhani said, *"Artificial Intelligence is not going to replace humans, but humans with Artificial Intelligence are going to replace humans without Artificial Intelligence".*

Acknowledgments

As my university journey comes to an end, there are several people I would love to thank for having stood by my side all this time. If you are reading this, you know me well enough to realize it is going to take some time before I manage to thank everyone like this out loud again!

First and foremost, I would like to express my deepest gratitude to my parents. Mom and Dad, your unwavering but quiet support, encouragement and belief in me have been the foundation on which this entire journey was built. Your love and sacrifices have meant the world to me, and even if I am not the best at showing it, I could not have accomplished this without you. Thank you for standing by my side and guiding me, pushing me to achieve my best.

To my sister, Tiziana, thank you for being my constant source of inspiration and strength. Your wisdom, guidance and sense of humor have helped me stay grounded throughout this process. I will still avoid calling you every night while you are in Milan and I will not save you from spiders, but I am really grateful to have you as both my sibling and my best friend.

And to Enrico, thank you for taking the time to play padel with me, I know I need to improve, but in the meantime, we can go for a run or hit the gym – you choose - I am much better at that!

To Elia, thank you for your love, encouragement, understanding and support. I am forever thankful for your patience and ability to make me laugh even in the most stressful time and for being willing to try every healthy recipe I cook, but please, once in a while, say it tastes good – although I will not stop either way!

To my friends:

to Chiara, Ariana and Emma, thank you for being my pillars of support. Whether it was through words of encouragement or simply being there to listen, you have played an essential role in helping me reach this point.

to Serena, Tomma, Leila, Ceck, Lotti, Pedro, Cristina and Mattia, thank you for putting up with me, even after the countless times I declined your invitations to nights out, I promise I will make it up to all of you, get ready for "AlePas cooking nights" and the chance to try new recipes!

to Claudia, Diletta, Gloria, Federico and Marco, thank you for always supporting my endless complaints. Thank you for having lightened these last two years, for our late-night gossip sessions and for always being my first choice when it came to picking group project partners. I know you are still owed lunch at my place – I am out of excuses!

To my aunts and uncles, Maria and Gina, Sergio and Ettore, even though I am sure you will not remember what I am graduating in - do not worry, neither does my father or my mother - thank you for always showing me how much you care and how proud you are with small, little gestures.

To my grandmother, who may no longer be here with us, but I know without a doubt she would be proud of her "*picoa*".

To my dog, Checco, thank you for the countless long walks that helped clear my mind and give me space to think. Your joyful companionship has brought me so much comfort and reminded me of the simple joys. You were with me every step of the way – quite literally!

Lastly, I would also like to thank Professor Stefano Micelli, who guided me throughout the thesis process. Thank you for the valuable insights and constructive feedback that have shaped this work.

To everyone, thank you, for everything.
Alessia

Appendix 1

The following appendix displays Bluewind's financial report: it covers the last ten years starting from 2013 and the last statement available is from the year 2022. All the information is available in AIDA, which is a comprehensive Italian database offering detailed financial data about companies operating on Italian soil, it is one of the many resources Ca'Foscari University gives access to for free.

BLUEWIND S.R.L.

31033 Castelfranco Veneto	**Codice fiscale**	03943330260
	Numero CCIAA	TV0310251

Società privata
This company is Independent (but not the Global Ultimate Owner of a Corporate Group)

Anagrafica

Indirizzo sede legale
VIA DELLA BORSA, 16/A
31033 Castelfranco Veneto
TREVISO(VENETO)

Numero di telefono 0423744738
Sito web www.bluewind.it

Indirizzo sede operativa
VIA DELLA BORSA 16/A
31033 Castelfranco Veneto
TREVISO(VENETO)

Numero di telefono 0423723431

Informazioni commerciali e legali

Stato giuridico	Attiva	**Data di chiusura ultimo bilancio**	31/12/2022
Forma giuridica	S.R.L.	**Numero di anni disponibili**	10
Data di costituzione	12/01/2005	**Bilanci disponibili**	Bilancio non consolidato
		Ultimo modello di contabilità - Bilancio	Abbreviato (D)

Informazioni su dimensione e gruppo

Ricavi del vendite (2022)	1.755.076 EUR	**Indicatore d'Indipendenza BvD**	B+
Utile netto (2022)	179.353 EUR	**N° azionisti registrati**	2
Totale Attività (2022)	999.300 EUR	**N° partecipate registrate**	0
Dipendenti (2022)	20		
Capitale sociale (2022)	10 migl EUR		
Principale Borsa	Non quotata		

Classificazione mercelogica

Descrizione attività italiano RICERCA E SVILUPPO SPERIMENTALE NEL CAMPO DELLE SCIENZE NATURALI E ELL'INGEGNERIA

Ateco 2007 721000 Ricerca e sviluppo sperimentale nel campo delle scienze naturali e dell'ingegneria

SAE code 430 Imprese produttive

RAE code 830 "Servizi ausiliari finanziari, d'assicurazione, di affari immobiliari; servizi di consulenza legale, contabile, fiscale, tecnica e organizzativa, servizi di pubblicità, servizi del trattamento elettronico dell'informazione"

Gruppo dei pari

Nome	721 VL (Aziende Molto Grandi)
Descrizione	Ricerca e svilupo sperimentale nel campo delle scienze naturali e dell'ingegneria
Dimensione	842 società

Profilo finanziario e dipendenti

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2022 EUR	31/12/2021 EUR	31/12/2020 EUR	31/12/2019 EUR	31/12/2018 EUR
	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS
Ricavi delle vendite	1.755.076	1.601.752	898.002	885.228	763.597
EBITDA	250.272	223.541	-47.589	57.214	89.263
Utile Netto	179.353	145.822	-49.814	40.412	67.700
Totale Attività	999.300	875.813	574.752	549.943	510.904
Patrimonio Netto	454.793	382.779	236.954	286.769	246.356
Posizione finanziaria netta	-206.402,00	-274.597,00	-178.309,00	29.001,00	42.984,00
EBITDA/Vendite (%)	14,04	13,66	-5,14	5,93	10,69
Redditività delle vendite (ROS) (%)	13,38	12,46	-7,40	3,68	8,97
Redditività del totale attivo (ROA) (%)	23,88	23,28	-11,93	6,45	14,65
Redditività del capitale proprio (ROE) (%)	39,44	38,10	-21,02	14,09	27,48
Debt/Equity ratio	0,22	0,36	0,64	0,11	0,18
Debiti v/banche su fatt. (%)	5,51	8,43	16,32	3,23	5,22
Debt/EBITDA ratio	0,39	0,62	-3,18	0,55	0,49
Rotaz. cap. investito (volte)	1,76	1,83	1,56	1,61	1,49
Dipendenti	20	11	9	9	9

Bilancio non consolidato	31/12/2017 EUR	31/12/2016 EUR	31/12/2015 EUR	31/12/2014 EUR	31/12/2013 EUR
	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato ICS	12 mesi Dettagliato ICS	12 mesi Dettagliato ICS	12 mesi Dettagliato ICS
Ricavi delle vendite	776.272	696.619	665.453	603.869	673.779
EBITDA	101.627	28.582	23.977	27.253	51.619
Utile Netto	87.820	11.861	9.421	1.139	11.944
Totale Attività	409.438	437.575	404.353	335.022	292.228
Patrimonio Netto	178.656	90.837	78.977	69.556	68.413
Posizione finanziaria netta	36.627,00	n.d.	145.920,00	92.157,00	60.453,00
EBITDA/Vendite (%)	11,39	3,84	3,35	4,43	7,50
Redditività delle vendite (ROS) (%)	9,82	1,48	0,71	2,73	4,88
Redditività del totale attivo (ROA) (%)	21,41	2,51	1,25	5,01	11,50
Redditività del capitale proprio (ROE) (%)	49,16	13,06	11,93	1,64	17,46
Debt/Equity ratio	0,21	n.d.	1,89	1,39	0,99
Debiti v/banche su fatt. (%)	4,30	n.d.	20,80	15,75	9,84
Debt/EBITDA ratio	0,38	n.d.	6,21	3,56	1,31
Rotaz. cap. investito (volte)	1,90	1,59	1,65	1,80	2,31
Dipendenti	9	9	9	8	9

Stato patrimoniale

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2022 EUR	31/12/2021 EUR	31/12/2020 EUR	31/12/2019 EUR	31/12/2018 EUR
	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS
Attivo					
A. CREDITI VERSO SOCI	0	0	0	0	0
Quota di capitale richiamata	0	0	0	0	0
B. TOTALE IMMOBILIZZAZIONI sep.ind. Di quelle conc. In loc. Finanz.	91.205	77.847	78.599	90.571	85.665
B.I. TOTALE IMMOB. IMMATERIALI	5.958	8.651	19.638	32.662	29.818
B.I.1. Costi impianto e ampl.	n.d.	n.d.	n.d.	n.d.	n.d.
B.I.2. Costi ricerca e pubb.	n.d.	n.d.	n.d.	n.d.	n.d.
B.I.3. Diritti brevetto ind.	n.d.	n.d.	n.d.	n.d.	n.d.
B.I.4. Concessioni, licenze	n.d.	n.d.	n.d.	n.d.	n.d.
B.I.5. Avviamento/Differenza di consolidamento	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: Avviamento	n.d.	n.d.	n.d.	n.d.	n.d.
B.I.6. Imm. in corso	n.d.	n.d.	n.d.	n.d.	n.d.
B.I.7. Altre immobiliz. Immateriali	n.d.	n.d.	n.d.	n.d.	n.d.
Fondo amm.to Immob. Immateriali	112.565	110.800	99.491	86.217	70.261
B.II. TOTALE IMMOB. MATERIALI	28.065	27.594	27.754	31.465	20.461
di cui: Beni materiali concessi in locazione finanziaria	n.d.	n.d.	n.d.	n.d.	n.d.
B.II.1. Terreni e fabbricati	n.d.	n.d.	n.d.	n.d.	n.d.
B.II.2. Impianti	n.d.	n.d.	n.d.	n.d.	n.d.
B.II.3. Attrez. industriali	n.d.	n.d.	n.d.	n.d.	n.d.
B.II.4. Altri beni	n.d.	n.d.	n.d.	n.d.	n.d.
B.II.5. Imm. in corso/acconti	n.d.	n.d.	n.d.	n.d.	n.d.
Fondo amm.to Immob. Materiali	84.726	97.783	89.460	105.306	99.999
B.III. TOTALE IMMOB. FINANZIARIE	57.182	41.602	31.207	26.444	35.386
di cui: esigibili entro l'esercizio successivo	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.1. TOT Partecipazioni	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.1.a. Imprese controllate	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.1.b. Imprese collegate	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.1.c. Imprese controllanti	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.1.d. In imprese sottoposte al controllo delle controllanti	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.1.d.bis. Altre imprese	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.2. TOT CREDITI Imm. Fin.	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.2.a. Cred. vs Controllate entro	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.2.a. Cred. vs Controllate oltre	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.2.b. Cred. vs Collegate entro	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.2.b. Cred. vs Collegate oltre	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.2.c. Cred. vs Controllanti entro	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.2.c. Cred. vs Controllanti oltre	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.2.d. Cred. vs imprese sottoposte al controllo delle controllanti entro	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.2.d. Cred. vs imprese sottoposte al controllo delle controllanti oltre	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.2.d.bis. Cred. vs Altri entro	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.2.d.bis Cred. vs Altri oltre	n.d.	n.d.	n.d.	n.d.	n.d.

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2017 EUR	31/12/2016 EUR	31/12/2015 EUR	31/12/2014 EUR	31/12/2013 EUR
	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato ICS	12 mesi Dettagliato ICS	12 mesi Dettagliato ICS	12 mesi Dettagliato ICS

Attivo					
A. CREDITI VERSO SOCI	0	0	0	0	0
Quota di capitale richiamata	0	0	0	0	0
B. TOTALE IMMOBILIZZAZIONI sep.ind. Di quelle conc. In loc. Finanz.	59.558	66.380	72.104	64.649	62.194
B.I. TOTALE IMMOB. IMMATERIALI	25.258	31.131	36.628	501	1.397
B.I.1. Costi impianto e ampl.	n.d.	8.297	11.063	0	0
B.I.2. Costi ricerca e pubb.	n.d.	0	0	0	0
B.I.3. Diritti brevetto ind.	n.d.	558	172	67	133
B.I.4. Concessioni, licenze	n.d.	0	0	0	0
B.I.5. Avviamento/Differenza di consolidamento	n.d.	22.276	25.059	0	0
di cui: Avviamento	n.d.	22.276	25.059	n.d.	n.d.
B.I.6. Imm. in corso	n.d.	0	0	0	0
B.I.7. Altre immobiliz. Immateriali	n.d.	0	334	434	1.264
Fondo amm.to Immob. Immateriali	n.d.	56.529	n.d.	n.d.	n.d.
B.II. TOTALE IMMOB. MATERIALI	7.292	8.606	18.151	18.030	23.342
di cui: Beni materiali concessi in locazione finanziaria	n.d.	n.d.	n.d.	n.d.	n.d.
B.II.1. Terreni e fabbricati	n.d.	0	0	0	0
B.II.2. Impianti	n.d.	0	0	0	0
B.II.3. Attrez. industriali	n.d.	1.772	4.988	1.070	1.427
B.II.4. Altri beni	n.d.	6.834	13.163	16.960	21.915
B.II.5. Imm. in corso/acconti	n.d.	0	0	0	0
Fondo amm.to Immob. Materiali	n.d.	119.966	n.d.	n.d.	n.d.
B.III. TOTALE IMMOB. FINANZIARIE	27.008	26.643	17.325	46.118	37.455
di cui: esigibili entro l'esercizio successivo	n.d.	26.543	17.325	8.663	n.d.
B.III.1. TOT Partecipazioni	n.d.	100	0	37.455	37.455
B.III.1.a. Imprese controllate	n.d.	0	0	37.455	37.455
B.III.1.b. Imprese collegate	n.d.	0	0	0	0
B.III.1.c. Imprese controllanti	n.d.	0	0	0	0
B.III.1.d. In imprese sottoposte al controllo delle controllanti	n.d.	0	n.d.	n.d.	n.d.
B.III.1.d.bis. Altre imprese	n.d.	100	0	0	0
B.III.2. TOT CREDITI Imm. Fin.	n.d.	26.543	17.325	8.663	0
B.III.2.a. Cred. vs Controllate entro	n.d.	0	0	0	0
B.III.2.a. Cred. vs Controllate oltre	n.d.	0	0	0	0
B.III.2.b. Cred. vs Collegate entro	n.d.	0	0	0	0
B.III.2.b. Cred. vs Collegate oltre	n.d.	0	0	0	0
B.III.2.c. Cred. vs Controllanti entro	n.d.	0	0	0	0
B.III.2.c. Cred. vs Controllanti oltre	n.d.	0	0	0	0
B.III.2.d. Cred. vs imprese sottoposte al controllo delle controllanti entro	n.d.	0	n.d.	n.d.	n.d.
B.III.2.d. Cred. vs imprese sottoposte al controllo delle controllanti oltre	n.d.	0	n.d.	n.d.	n.d.
B.III.2.d.bis. Cred. vs Altri entro	n.d.	26.543	17.325	8.663	0
B.III.2.d.bis Cred. vs Altri oltre	n.d.	0	0	0	0

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2022 EUR	31/12/2021 EUR	31/12/2020 EUR	31/12/2019 EUR	31/12/2018 EUR
B.III. CREDITI FIN. A BREVE	n.d.	n.d.	n.d.	n.d.	n.d.
B.III. CREDITI FIN. A OLTRE	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.3. Altri titoli	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.3.bis. Azioni proprie	n.d.	n.d.	n.d.	n.d.	n.d.
B.III.4. Strumenti finanziari derivati attivi	n.d.	n.d.	n.d.	n.d.	n.d.
Azioni proprie DI CUI: Val nominale	n.d.	n.d.	n.d.	n.d.	n.d.
C. ATTIVO CIRCOLANTE	853.990	787.192	481.369	426.034	385.057
C.I. TOTALE RIMANENZE	0	0	0	0	0
C.I.1. Materie prime	0	0	0	0	0
C.I.2. Prodotti semilav./in corso	0	0	0	0	0
C.I.3. Lavori in corso	0	0	0	0	0
C.I.4. Prodotti finiti	0	0	0	0	0
C.I.5. Acconti	0	0	0	0	0
Immobilizzazioni materiali destinate alla vendita	0	0	0	0	0
C.II. TOTALE CREDITI	549.266	374.653	151.865	423.845	384.497
C.II.1. Cred. vs Clienti entro	483.192	312.105	69.049	330.809	297.632
C.II.1. Cred. vs Clienti oltre	0	0	0	0	0
C.II.2. Cred. vs Controllate entro	n.d.	n.d.	n.d.	n.d.	n.d.
C.II.2. Cred. vs Controllate oltre	0	0	0	0	0
C.II.3. Cred. vs Collegate entro	0	0	0	0	0
C.II.3. Cred. vs Collegate oltre	0	0	0	0	0
C.II.4. Cred. vs Controllanti entro	0	0	0	0	0
C.II.4. Cred. vs Controllanti oltre	0	0	0	0	0
C.II.5. Cred. vs imprese sottoposte al controllo delle controllanti entro	0	0	0	0	0
C.II.5. Cred. vs imprese sottoposte al controllo delle controllanti oltre	0	0	0	0	0
C.II.5.bis. Cred. tributari entro	61.054	53.518	47.631	77.242	75.911
C.II.5.bis. Cred. tributari oltre	0	0	0	0	0
C.II.5.ter. Cred. per imposte anticipate entro	0	3.609	34.829	15.794	10.683
C.II.5.ter. Cred. per imposte anticipate oltre	0	0	0	0	0
C.II.5.quater. Cred. verso altri entro	2.020	5.421	356	0	271
C.II.5.quater. Cred. verso altri oltre	3.000	0	0	0	0
C.II. Crediti a breve	546.266	374.653	151.865	423.845	384.497
Crediti per imposte anticipate	n.d.	n.d.	n.d.	n.d.	n.d.
C.II. Crediti a oltre	3.000	0	0	0	0
C.III. TOTALE ATTIVITA' FINANZIARIE	0	0	0	0	0
C.III.1. Partec.ni in Controllate	0	0	0	0	0
C.III.2. Partec.ni in Collegate	0	0	0	0	0
C.III.3. Partec.ni in Controllanti	0	0	0	0	0
C.III.3.bis. Partec.ni in imprese sottoposte al controllo delle controllanti	0	0	0	0	0
C.III.4. Altre Partec.ni	0	0	0	0	0
C.III.4.bis. Azioni proprie	0	0	0	0	0
Azioni proprie DI CUI: Val nominale	0	0	0	0	0
C.III.5. Strumenti finanziari derivati attivi	0	0	0	0	0
C.III.6. Altri titoli	0	0	0	0	0

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2017 EUR	31/12/2016 EUR	31/12/2015 EUR	31/12/2014 EUR	31/12/2013 EUR
B.III. CREDITI FIN. A BREVE	n.d.	26.543	17.325	8.663	0
B.III. CREDITI FIN. A OLTRE	n.d.	0	0	0	0
B.III.3. Altri titoli	n.d.	0	0	0	0
B.III.3.bis. Azioni proprie	n.d.	0	0	0	0
B.III.4. Strumenti finanziari derivati attivi	n.d.	0	n.d.	n.d.	n.d.
Azioni proprie DI CUI: Val nominale	n.d.	0	0	0	0
C. ATTIVO CIRCOLANTE	308.787	332.681	290.692	225.671	182.450
C.I. TOTALE RIMANENZE	10.760	15.546	47.326	0	0
C.I.1. Materie prime	10.760	15.546	47.326	0	0
C.I.2. Prodotti semilav./in corso	0	0	0	0	0
C.I.3. Lavori in corso	0	0	0	0	0
C.I.4. Prodotti finiti	0	0	0	0	0
C.I.5. Acconti	0	0	0	0	0
Immobilizzazioni materiali destinate alla vendita	0	0	n.d.	n.d.	n.d.
C.II. TOTALE CREDITI	296.274	315.772	240.376	220.889	175.140
C.II.1. Cred. vs Clienti entro	214.931	n.d.	174.868	218.061	172.422
C.II.1. Cred. vs Clienti oltre	0	0	0	0	0
C.II.2. Cred. vs Controllate entro	n.d.	n.d.	0	0	0
C.II.2. Cred. vs Controllate oltre	0	0	0	0	0
C.II.3. Cred. vs Collegate entro	0	n.d.	0	0	0
C.II.3. Cred. vs Collegate oltre	0	0	0	0	0
C.II.4. Cred. vs Controllanti entro	0	n.d.	0	0	0
C.II.4. Cred. vs Controllanti oltre	0	0	0	0	0
C.II.5. Cred. vs imprese sottoposte al controllo delle controllanti entro	0	n.d.	n.d.	n.d.	n.d.
C.II.5. Cred. vs imprese sottoposte al controllo delle controllanti oltre	0	0	n.d.	n.d.	n.d.
C.II.5.bis. Cred. tributari entro	65.609	n.d.	57.697	2.779	2.589
C.II.5.bis. Cred. tributari oltre	0	0	0	0	0
C.II.5.ter. Cred. per imposte anticipate entro	15.565	n.d.	6.277	0	0
C.II.5.ter. Cred. per imposte anticipate oltre	0	0	0	0	0
C.II.5.quater. Cred. verso altri entro	169	n.d.	1.534	49	129
C.II.5.quater. Cred. verso altri oltre	0	0	0	0	0
C.II. Crediti a breve	296.274	315.772	240.376	220.889	175.140
Crediti per imposte anticipate	n.d.	n.d.	n.d.	n.d.	n.d.
C.II. Crediti a oltre	0	0	0	0	0
C.III. TOTALE ATTIVITA' FINANZIARIE	0	0	0	0	0
C.III.1. Partec.ni in Controllate	0	0	0	0	0
C.III.2. Partec.ni in Collegate	0	0	0	0	0
C.III.3. Partec.ni in Controllanti	0	0	0	0	0
C.III.3.bis. Partec.ni in imprese sottoposte al controllo delle controllanti	0	0	n.d.	n.d.	n.d.
C.III.4. Altre Partec.ni	0	0	0	0	0
C.III.4.bis. Azioni proprie	0	0	0	0	0
Azioni proprie DI CUI: Val nominale	0	0	0	0	0
C.III.5. Strumenti finanziari derivati attivi	0	0	n.d.	n.d.	n.d.
C.III.6. Altri titoli	0	0	0	0	0

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2022 EUR	31/12/2021 EUR	31/12/2020 EUR	31/12/2019 EUR	31/12/2018 EUR
C.III.7. Attività finanziarie per la gestione accentrata della tesoreria	0	0	0	0	0
C.IV. TOT. DISPON. LIQUIDE	304.724	412.539	329.504	2.189	560
C.IV.1. Depositi bancari	n.d.	n.d.	n.d.	n.d.	n.d.
C.IV.2. Assegni	n.d.	n.d.	n.d.	n.d.	n.d.
C.IV.3. Denaro in cassa	n.d.	n.d.	n.d.	n.d.	n.d.
D. RATEI E RISCONTI	54.105	10.774	14.784	33.338	40.182
Disaggio su prestiti	n.d.	n.d.	n.d.	n.d.	n.d.
TOTALE ATTIVO	999.300	875.813	574.752	549.943	510.904

Passivo

PATRIMONIO NETTO

A. TOTALE PATRIMONIO NETTO	454.793	382.779	236.954	286.769	246.356
A.I. Capitale sociale	10.000	10.000	10.000	10.000	10.000
di cui: Versamenti soci in c/capitale	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: Versamenti in c/futuro aumento di capitale	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: Versamenti in c/capitale	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: Versamenti a copertura perdite	n.d.	n.d.	n.d.	n.d.	n.d.
A.II. Riserva da sovrapprezzo	0	0	0	0	0
A.III. Riserva di rivalutazione	0	0	0	0	0
A.IV. Riserva legale	2.431	2.431	2.431	2.431	2.431
A.V. Riserva statutaria	0	0	0	0	0
Riserva azioni proprie	0	0	0	0	0
A.VI. Altre riserve	263.009	224.526	274.337	233.926	166.225
Riserva da cons. del Gruppo	n.d.	n.d.	n.d.	n.d.	n.d.
A.VII. Riserva per operazioni di copertura dei flussi finanziari attesi	0	0	0	0	0
A.VIII. Utile/perdita a nuovo	0	0	0	0	0
A.IX. Utile/perdita di esercizio	179.353	145.822	-49.814	40.412	67.700
Acconto dividendi	0	0	0	0	0
Copertura parziale perdita di esercizio	0	0	0	0	0
A.X. Riserva negativa per azioni proprie in portafoglio (+/-)	0	0	0	0	0
TOTALE PATRIMONIO DEL GRUPPO	n.d.	n.d.	n.d.	n.d.	n.d.
Capitale e riserve di pertinenza di TERZI	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: per imposte differite	n.d.	n.d.	0	0	0
Utile/perdita di es. di pertinenza di TERZI	n.d.	n.d.	n.d.	n.d.	n.d.
TOTALE PATRIMONIO DI TERZI	n.d.	n.d.	n.d.	n.d.	n.d.
B. TOTALE FONDI RISCHI	1.669	22.750	0	0	0
B.1. Fondo di Quiescenza	n.d.	n.d.	0	0	0
B.2. Fondo Imposte anche differite	n.d.	n.d.	0	0	0
B.3. Strumenti finanziari derivati passivi	n.d.	n.d.	0	0	0
B.4. Altri Fondi	n.d.	n.d.	0	0	0
di cui : fondo di consolidamento	n.d.	n.d.	n.d.	n.d.	n.d.
C. TRATTAMENTO DI FINE RAPPORTO	125.942	96.623	80.183	74.581	92.072

Debiti

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2017 EUR	31/12/2016 EUR	31/12/2015 EUR	31/12/2014 EUR	31/12/2013 EUR
C.III.7. Attività finanziarie per la gestione accentrata della tesoreria	0	0	n.d.	n.d.	n.d.
C.IV. TOT. DISPON. LIQUIDE	1.753	1.363	2.990	4.782	7.310
C.IV.1. Depositi bancari	n.d.	n.d.	2.658	4.545	7.082
C.IV.2. Assegni	n.d.	n.d.	0	0	0
C.IV.3. Denaro in cassa	n.d.	n.d.	332	237	228
D. RATEI E RISCONTI	41.093	38.514	41.557	44.702	47.584
Disaggio su prestiti	n.d.	n.d.	0	0	0
TOTALE ATTIVO	409.438	437.575	404.353	335.022	292.228
Passivo					
PATRIMONIO NETTO					
A. TOTALE PATRIMONIO NETTO	178.656	90.837	78.977	69.556	68.413
A.I. Capitale sociale	10.000	10.000	10.000	10.000	10.000
di cui: Versamenti soci in c/capitale	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: Versamenti in c/futuro aumento di capitale	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: Versamenti in c/capitale	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: Versamenti a copertura perdite	n.d.	n.d.	n.d.	n.d.	n.d.
A.II. Riserva da sovrapprezzo	0	0	0	0	0
A.III. Riserva di rivalutazione	0	0	0	0	0
A.IV. Riserva legale	2.431	2.431	2.431	2.431	2.431
A.V. Riserva statutaria	0	0	0	0	0
Riserva azioni proprie	0	0	0	0	0
A.VI. Altre riserve	78.405	66.545	57.125	55.986	46.903
Riserva da cons. del Gruppo	n.d.	n.d.	n.d.	n.d.	n.d.
A.VII. Riserva per operazioni di copertura dei flussi finanziari attesi	0	0	n.d.	n.d.	n.d.
A.VIII. Utile/perdita a nuovo	0	0	0	0	-2.865
A.IX. Utile/perdita di esercizio	87.820	11.861	9.421	1.139	11.944
Acconto dividendi	0	n.d.	n.d.	n.d.	n.d.
Copertura parziale perdita di esercizio	0	n.d.	n.d.	n.d.	n.d.
A.X. Riserva negativa per azioni proprie in portafoglio (+/-)	0	0	n.d.	n.d.	n.d.
TOTALE PATRIMONIO DEL GRUPPO	n.d.	n.d.	n.d.	n.d.	n.d.
Capitale e riserve di pertinenza di TERZI	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: per imposte differite	0	n.d.	n.d.	n.d.	n.d.
Utile/perdita di es. di pertinenza di TERZI	n.d.	n.d.	n.d.	n.d.	n.d.
TOTALE PATRIMONIO DI TERZI	n.d.	n.d.	n.d.	n.d.	n.d.
B. TOTALE FONDI RISCHI	0	0	0	0	0
B.1. Fondo di Quiescenza	0	0	0	0	0
B.2. Fondo Imposte anche differite	0	0	0	0	0
B.3. Strumenti finanziari derivati passivi	0	0	n.d.	n.d.	n.d.
B.4. Altri Fondi	0	0	0	0	0
di cui : fondo di consolidamento	n.d.	n.d.	n.d.	n.d.	n.d.
C. TRATTAMENTO DI FINE RAPPORTO	85.517	106.744	96.990	87.124	78.119
Debiti					

101

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2022 EUR	31/12/2021 EUR	31/12/2020 EUR	31/12/2019 EUR	31/12/2018 EUR
D. TOTALE DEBITI	318.349	318.620	217.794	165.585	149.094
D.1. Obblig.ni entro	0	0	0	0	0
D.1. Obblig.ni oltre	0	0	0	0	0
D.2. Obblig.ni convert. entro	0	0	0	0	0
D.2. Obblig.ni convert. oltre.	0	0	0	0	0
D.3. Soci per Finanziamenti entro	0	0	0	0	0
D.3. Soci per Finanziamenti oltre	0	0	0	0	0
D.4. Banche entro l'esercizio	38.270	40.421	16.557	31.190	43.544
D.4. Banche oltre l'esercizio	60.052	97.521	134.638	0	0
D.5. Altri finanziatori entro	0	0	0	0	0
D.5. Altri finanziatori oltre	0	0	0	0	0
D.6. Acconti entro	0	0	0	0	0
D.6. Acconti oltre	0	0	0	0	0
D.7. Fornitori entro	84.198	76.508	25.678	70.755	64.432
D.7. Fornitori oltre	0	0	0	0	0
D.8. Titoli di credito entro	0	0	0	0	0
D.8. Titoli di credito oltre	0	0	0	0	0
D.9. Imprese Controllate entro	0	0	0	0	0
D.9. Imprese Controllate oltre	0	0	0	0	0
D.10. Imprese Collegate entro	0	0	0	0	0
D.10. Imprese Collegate oltre	0	0	0	0	0
D.11. Controllanti entro	0	0	0	0	0
D.11. Controllanti oltre	0	0	0	0	0
D.11.bis. Debiti VS imprese sottoposte al controllo delle controllanti entro	0	0	0	0	0
D.11.bis. Debiti VS imprese sottoposte al controllo delle controllanti oltre	0	0	0	0	0
D.12. Debiti Tributari entro	69.351	62.533	15.135	25.666	18.990
D.12. Debiti Tributari oltre	0	0	0	0	0
D.13. Istituti previdenza entro	24.622	15.666	8.734	10.966	10.331
D.13. Istituti previdenza oltre	0	0	0	0	0
D.14. Altri Debiti entro	41.856	25.971	17.052	27.008	11.797
D.14. Altri Debiti oltre	0	0	0	0	0
D. DEBITI A BREVE	258.297	221.099	83.156	165.585	149.094
D. DEBITI A OLTRE	60.052	97.521	134.638	0	0
Total debiti entro l'esercizio	258.297	221.099	83.156	165.585	149.094
Total debiti oltre l'esercizio	60.052	97.521	134.638	0	0
E. RATEI E RISCONTI	98.547	55.041	39.821	23.008	23.382
Aggio sui prestiti	n.d.	n.d.	n.d.	n.d.	n.d.
TOTALE PASSIVO	999.300	875.813	574.752	549.943	510.904
TOTALE CONTI D'ORDINE	0	0	0	0	0
Garanzie prestate	0	0	0	0	0

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2017 EUR	31/12/2016 EUR	31/12/2015 EUR	31/12/2014 EUR	31/12/2013 EUR
D. TOTALE DEBITI	123.046	210.879	198.646	153.376	122.144
D.1. Obblig.ni entro	0	n.d.	0	0	0
D.1. Obblig.ni oltre	0	n.d.	0	0	0
D.2. Obblig.ni convert. entro	0	n.d.	0	0	0
D.2. Obblig.ni convert. oltre.	0	n.d.	0	0	0
D.3. Soci per Finanziamenti entro	0	n.d.	0	0	0
D.3. Soci per Finanziamenti oltre	0	n.d.	0	0	0
D.4. Banche entro l'esercizio	38.380	n.d.	119.436	96.939	67.763
D.4. Banche oltre l'esercizio	0	n.d.	29.474	0	0
D.5. Altri finanziatori entro	0	n.d.	0	0	0
D.5. Altri finanziatori oltre	0	n.d.	0	0	0
D.6. Acconti entro	0	n.d.	0	0	0
D.6. Acconti oltre	0	n.d.	0	0	0
D.7. Fornitori entro	37.109	n.d.	18.027	24.087	18.286
D.7. Fornitori oltre	0	n.d.	0	0	0
D.8. Titoli di credito entro	0	n.d.	0	0	0
D.8. Titoli di credito oltre	0	n.d.	0	0	0
D.9. Imprese Controllate entro	0	n.d.	0	0	0
D.9. Imprese Controllate oltre	0	n.d.	0	0	0
D.10. Imprese Collegate entro	0	n.d.	0	0	0
D.10. Imprese Collegate oltre	0	n.d.	0	0	0
D.11. Controllanti entro	0	n.d.	0	0	0
D.11. Controllanti oltre	0	n.d.	0	0	0
D.11.bis. Debiti VS imprese sottoposte al controllo delle controllanti entro	0	n.d.	n.d.	n.d.	n.d.
D.11.bis. Debiti VS imprese sottoposte al controllo delle controllanti oltre	0	n.d.	n.d.	n.d.	n.d.
D.12. Debiti Tributari entro	19.056	n.d.	4.201	10.327	14.866
D.12. Debiti Tributari oltre	0	n.d.	0	0	0
D.13. Istituti previdenza entro	11.531	n.d.	14.186	12.604	10.856
D.13. Istituti previdenza oltre	0	n.d.	0	0	0
D.14. Altri Debiti entro	16.970	n.d.	13.322	9.419	10.373
D.14. Altri Debiti oltre	0	n.d.	0	0	0
D. DEBITI A BREVE	123.046	198.247	169.172	153.376	122.144
D. DEBITI A OLTRE	0	12.632	29.474	0	0
Total debiti entro l'esercizio	123.046	198.247	169.172	153.376	122.144
Total debiti oltre l'esercizio	0	12.632	29.474	0	0
E. RATEI E RISCONTI	22.219	29.115	29.740	24.966	23.552
Aggio sui prestiti	n.d.	n.d.	0	0	0
TOTALE PASSIVO	409.438	437.575	404.353	335.022	292.228
TOTALE CONTI D'ORDINE	0	0	0	120.000	320.000
Garanzie prestate	0	0	0	n.d.	n.d.

Conto economico

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2022 EUR	31/12/2021 EUR	31/12/2020 EUR	31/12/2019 EUR	31/12/2018 EUR
	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS
A. TOT. VAL. DELLA PRODUZIONE	1.782.873	1.637.018	926.245	964.567	834.840
A.1. Ricavi vendite e prestazioni	1.755.076	1.601.752	898.002	885.228	763.597
A.2. Var. rimanenze prodotti	0	0	0	0	0
A.3. Variazione lavori	0	0	0	0	0
A.2. + A.3. Totale Variazioni	0	0	0	0	0
A.4. Incrementi di immob.	0	0	0	0	0
A.5. Altri ricavi	27.797	35.266	28.243	79.339	71.243
Contributi in conto esercizio	25.850	26.067	27.114	72.122	69.245
B. COSTI DELLA PRODUZIONE	1.544.273	1.433.109	994.810	929.077	759.991
B.6. Materie prime e consumo	358.775	496.165	290.709	116.048	71.131
B.7. Servizi	444.964	404.974	324.669	399.498	319.445
B.8. Godimento beni di terzi	41.692	36.976	35.464	39.255	37.306
B.9. Totale costi del personale	671.397	428.027	312.893	342.455	298.503
B.9.a. Salari e stipendi	503.350	319.574	231.776	257.831	220.336
B.9.b. Oneri sociali	120.320	82.526	61.875	66.470	60.682
B.9.c. Tratt. fine rapporto	43.757	25.538	19.242	18.154	17.485
B.9.d. Tratt. di quiescenza	0	0	0	0	0
B.9.e. Altri costi	3.970	389	0	0	0
B.9.f. TFR + quiescenza + altri costi	47.727	25.927	19.242	18.154	17.485
B.10. TOT Ammortamenti e svalut.	11.672	19.632	20.976	21.724	14.414
B.10.a. Amm. Immob. Immat.	3.116	11.309	13.273	15.956	7.859
B.10.b. Amm. Immob. Mat.	8.556	8.323	7.703	5.768	6.555
B.10.c. Altre svalut. Immob.	0	0	0	0	0
B.10.a+b+c. Amm. e svalut. delle immob.	11.672	19.632	20.976	21.724	14.414
B.10.d. Svalut. crediti	0	0	0	0	0
B.11. Variazione materie	0	0	0	0	10.760
B.12. Accantonamenti per rischi	0	22.750	0	0	0
B.13. Altri accantonamenti	0	0	0	0	0
B.14. Oneri diversi di gestione	15.773	24.585	10.099	10.097	8.432
RISULTATO OPERATIVO	238.600	203.909	-68.565	35.490	74.849
Valore Aggiunto	921.669	674.318	265.304	399.669	387.766
C. TOTALE PROVENTI E ONERI FINANZIARI	-349	-555	-284	-53	-921
C.15. Tot. proventi da partecip.	0	0	0	0	0
di cui: verso contr.anti, collegate, contr.te e sottoposte ctrl controllanti	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: da imprese controllanti	0	0	0	0	0
di cui: da imprese sottoposte al controllo delle controllanti	0	0	0	0	0
C.16. TOT Altri Proventi	1.169	781	357	57	29
C.16.a. Da Crediti	0	0	0	0	0
di cui: verso contr.anti, collegate, contr.te e sottoposte ctrl controllanti	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: da imprese sottoposte al controllo delle controllanti	0	0	0	0	0
C.16.b. Da titoli iscr. imm.	0	0	0	0	0
C.16.c. Da titoli iscr. att.circol.	0	0	0	0	0
C.16.b+c. Proventi da Titoli	0	0	0	0	0
C.16.d. Proventi fin. Diversi	1.169	781	357	57	29
di cui: verso contr.anti, collegate, contr.te e sottoposte ctrl controllantil	0	0	n.d.	n.d.	n.d.
di cui: da imprese sottoposte al controllo delle controllanti	0	0	0	0	0

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2017 EUR	31/12/2016 EUR	31/12/2015 EUR	31/12/2014 EUR	31/12/2013 EUR
	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato ICS	12 mesi Dettagliato ICS	12 mesi Dettagliato ICS	12 mesi Dettagliato ICS
A. TOT. VAL. DELLA PRODUZIONE	892.326	743.845	715.897	615.439	688.466
A.1. Ricavi vendite e prestazioni	776.272	696.619	665.453	603.869	673.779
A.2. Var. rimanenze prodotti	0	0	0	0	0
A.3. Variazione lavori	0	0	0	0	0
A.2. + A.3. Totale Variazioni	0	0	0	0	0
A.4. Incrementi di immob.	0	0	0	0	0
A.5. Altri ricavi	116.054	47.226	50.444	11.570	14.687
Contributi in conto esercizio	52.537	46.833	49.126	0	0
B. COSTI DELLA PRODUZIONE	804.681	732.846	710.829	598.653	654.861
B.6. Materie prime e consumo	88.305	27.406	27.049	31.494	73.625
B.7. Servizi	318.435	247.177	244.837	202.846	193.133
B.8. Godimento beni di terzi	36.730	31.982	38.010	42.608	40.188
B.9. Totale costi del personale	335.513	367.866	356.921	305.886	325.126
B.9.a. Salari e stipendi	243.650	267.110	259.693	225.570	241.483
B.9.b. Oneri sociali	72.978	80.239	77.333	63.192	65.037
B.9.c. Tratt. fine rapporto	18.885	20.517	19.895	17.124	18.606
B.9.d. Tratt. di quiescenza	0	0	0	0	0
B.9.e. Altri costi	0	0	0	0	0
B.9.f. TFR + quiescenza + altri costi	18.885	20.517	19.895	17.124	18.606
B.10. TOT Ammortamenti e svalut.	13.982	17.583	18.909	10.467	18.014
B.10.a. Amm. Immob. Immat.	5.873	6.206	6.803	897	9.536
B.10.b. Amm. Immob. Mat.	8.109	11.377	12.106	9.570	8.478
B.10.c. Altre svalut. Immob.	0	0	0	0	0
B.10.a+b+c. Amm. e svalut. delle immob.	13.982	17.583	18.909	10.467	18.014
B.10.d. Svalut. crediti	0	0	0	0	0
B.11. Variazione materie	4.785	31.780	14.963	0	0
B.12. Accantonamenti per rischi	0	0	0	0	0
B.13. Altri accantonamenti	0	0	0	0	0
B.14. Oneri diversi di gestione	6.931	9.052	10.140	5.352	4.775
RISULTATO OPERATIVO	87.645	10.999	5.068	16.786	33.605
Valore Aggiunto	437.140	396.448	380.898	333.139	376.745
C. TOTALE PROVENTI E ONERI FINANZIARI	-2.046	-6.205	-1.876	-3.406	-4.298
C.15. Tot. proventi da partecip.	0	0	0	0	0
di cui: verso contr.anti, collegate, contr.te e sottoposte ctrl controllanti	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: da imprese controllanti	0	0	n.d.	n.d.	n.d.
di cui: da imprese sottoposte al controllo delle controllanti	0	0	n.d.	n.d.	n.d.
C.16. TOT Altri Proventi	112	2	3.100	0	0
C.16.a. Da Crediti	0	0	0	0	0
di cui: verso contr.anti, collegate, contr.te e sottoposte ctrl controllanti	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: da imprese sottoposte al controllo delle controllanti	0	0	n.d.	n.d.	n.d.
C.16.b. Da titoli iscr. imm.	0	0	0	0	0
C.16.c. Da titoli iscr. att.circol.	0	0	0	0	0
C.16.b+c. Proventi da Titoli	0	0	0	0	0
C.16.d. Proventi fin. Diversi	112	2	3.100	0	0
di cui: verso contr.anti, collegate, contr.te e sottoposte ctrl controllantil	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: da imprese sottoposte al controllo delle controllanti	0	0	n.d.	n.d.	n.d.

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2022 EUR	31/12/2021 EUR	31/12/2020 EUR	31/12/2019 EUR	31/12/2018 EUR
C.17. Totale Oneri finanziari	1.515	1.336	641	110	1.371
di cui: verso contr.anti, collegate, contr.te e sottoposte ctrl controllanti	0	0	n.d.	n.d.	n.d.
di cui: da imprese sottoposte al controllo delle controllanti	0	0	0	0	0
C.17.bis Utili e perdite su cambi	-3	0	0	0	421
D. TOTALE RETTIFICHE ATT. FINANZ.	0	0	0	0	0
D.18. TOT Rivalutazioni	0	0	0	0	0
D.18.a. Rivalut. di partec.	0	0	0	0	0
D.18.b. Rivalut. di altre imm. fin.	0	0	0	0	0
D.18.c. Rivalut. di titoli	0	0	0	0	0
D.18.d. Rivalut. di strumenti finanziari derivati	0	0	0	0	0
Rivalut. di attività finanziarie per la gestione accentrata della tesoreria	0	0	0	0	0
D.19. TOT Svalutazioni	0	0	0	0	0
D.19.a. Svalut. di partec.	0	0	0	0	0
D.19.b. Svalut. di altre imm. fin.	0	0	0	0	0
D.19.c. Svalut. di titoli	0	0	0	0	0
D.19.d. Svalut. di strumenti finanziari derivati	0	0	0	0	0
Svalut. di attività finanziarie per la gestione accentrata della tesoreria	0	0	0	0	0
TOTALE PROVENTI/ONERI STRAORDINARI	0	0	0	0	0
Proventi Straordinari	0	0	0	0	0
di cui plusvalenze	0	0	0	0	0
Oneri Straordinari	0	0	0	0	0
di cui minusvalenze	0	0	0	0	0
di cui imposte esercizio precedente	0	0	0	0	0
RISULTATO PRIMA DELLE IMPOSTE	238.251	203.354	-68.849	35.437	73.928
20. Totale Imposte sul reddito correnti, differite e anticipate	58.898	57.532	-19.035	-4.975	6.228
Imposte correnti	58.898	26.312	0	136	1.347
Imposte relative a esercizi precedenti	0	0	0	0	0
Imposte differite e anticipate	0	31.220	-19.035	-5.111	4.881
Imposte differite (+/-)	0	n.d.	n.d.	n.d.	n.d.
Imposte anticipate (+/-)	0	n.d.	n.d.	n.d.	n.d.
Prov. (oneri) da adesione al regime di trasparenza fiscale	0	0	0	0	0
21. UTILE/PERDITA DI ESERCIZIO	179.353	145.822	-49.814	40.412	67.700
UTILE/PERDITA DI ESERCIZIO di pert. di TERZI	n.d.	n.d.	n.d.	n.d.	n.d.
UTILE/PERDITA DI ESERCIZIO di pert. del GRUPPO	179.353	145.822	-49.814	40.412	67.700
Dipendenti	20	11	9	9	9

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2017 EUR	31/12/2016 EUR	31/12/2015 EUR	31/12/2014 EUR	31/12/2013 EUR
C.17. Totale Oneri finanziari	2.158	6.207	4.976	3.406	4.298
di cui: verso contr.anti, collegate, contr.te e sottoposte ctrl controllanti	n.d.	n.d.	n.d.	n.d.	n.d.
di cui: da imprese sottoposte al controllo delle controllanti	0	0	n.d.	n.d.	n.d.
C.17.bis Utili e perdite su cambi	0	0	0	0	0
D. TOTALE RETTIFICHE ATT. FINANZ.	0	0	0	0	0
D.18. TOT Rivalutazioni	0	0	0	0	0
D.18.a. Rivalut. di partec.	0	0	0	0	0
D.18.b. Rivalut. di altre imm. fin.	0	0	0	0	0
D.18.c. Rivalut. di titoli	0	0	0	0	0
D.18.d. Rivalut. di strumenti finanziari derivati	0	0	n.d.	n.d.	n.d.
Rivalut. di attività finanziarie per la gestione accentrata della tesoreria	0	0	n.d.	n.d.	n.d.
D.19. TOT Svalutazioni	0	0	0	0	0
D.19.a. Svalut. di partec.	0	0	0	0	0
D.19.b. Svalut. di altre imm. fin.	0	0	0	0	0
D.19.c. Svalut. di titoli	0	0	0	0	0
D.19.d. Svalut. di strumenti finanziari derivati	0	0	n.d.	n.d.	n.d.
Svalut. di attività finanziarie per la gestione accentrata della tesoreria	0	0	n.d.	n.d.	n.d.
TOTALE PROVENTI/ONERI STRAORDINARI	0	0	1	-2	0
Proventi Straordinari	0	0	1	0	0
di cui plusvalenze	0	0	0	0	0
Oneri Straordinari	0	0	0	2	0
di cui minusvalenze	0	0	0	0	0
di cui imposte esercizio precedente	0	0	0	0	0
RISULTATO PRIMA DELLE IMPOSTE	85.599	4.794	3.193	13.378	29.307
20. Totale Imposte sul reddito correnti, differite e anticipate	-2.221	-7.067	-6.228	12.239	17.363
Imposte correnti	0	0	49	12.239	17.363
Imposte relative a esercizi precedenti	0	0	n.d.	n.d.	n.d.
Imposte differite e anticipate	-2.221	-7.067	-6.277	0	0
Imposte differite (+/-)	n.d.	n.d.	n.d.	n.d.	n.d.
Imposte anticipate (+/-)	n.d.	n.d.	-6.277	n.d.	n.d.
Prov. (oneri) da adesione al regime di trasparenza fiscale	0	n.d.	n.d.	n.d.	n.d.
21. UTILE/PERDITA DI ESERCIZIO	87.820	11.861	9.421	1.139	11.944
UTILE/PERDITA DI ESERCIZIO di pert. di TERZI	n.d.	n.d.	n.d.	n.d.	n.d.
UTILE/PERDITA DI ESERCIZIO di pert. del GRUPPO	87.820	11.861	9.421	1.139	11.944
Dipendenti	9	9	9	8	9

Indici

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2022 EUR	31/12/2021 EUR	31/12/2020 EUR	31/12/2019 EUR	31/12/2018 EUR
	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS	12 mesi Abbreviato (D) ICS

1. Indicatori finanziari

- Indice di liquidità	3,31	3,56	5,79	2,57	2,58
- Indice corrente	3,31	3,56	5,79	2,57	2,58
- Indice di indebitam. a breve	0,81	0,69	0,38	1,00	1,00
- Indice di indebitam. a lungo	0,19	0,31	0,62	0,00	0,00
- Indice di copertura delle immob. (patrimoniale)	0,06	0,07	0,12	0,11	0,08
- Grado di ammortamento	3,02	3,54	3,22	3,35	4,89
- Rapporto di indebitamento	2,20	2,29	2,43	1,92	2,07
- Indice di copertura delle immob. (finanziario)	5,64	6,17	4,73	3,17	2,88
- Debiti v/banche su fatt.	5,51	8,43	16,32	3,23	5,22
- Costo denaro a prestito	1,54	0,97	0,42	0,35	3,15
- Grado di copertura degli interessi passivi	165,20	167,32	n.s.	n.s.	65,11
- Oneri finanz. su fatt.	0,08	0,08	0,07	0,01	0,16
- Indice di indip. Finanz.	45,51	43,71	41,23	52,15	48,22
- Grado di indip. da terzi	1,43	1,20	1,09	1,73	1,65
- Posizione finanziaria netta	-206.402,00	-274.597,00	-178.309,00	29.001,00	42.984,00
- Debt/Equity ratio	0,22	0,36	0,64	0,11	0,18
- Debt/EBITDA ratio	0,39	0,62	-3,18	0,55	0,49

2. Indici della gestione corrente

- Rotaz. cap. investito (volte)	1,76	1,83	1,56	1,61	1,49
- Rotaz. cap. cir. lordo (volte)	2,06	2,03	1,87	2,08	1,98
- Incidenza circolante operativo	22,38	14,39	4,68	26,96	27,93
- Giac. media delle scorte (gg)	0,00	0,00	0,00	0,00	0,00
- Giorni copertura scorte (gg)	0,00	0,00	0,00	0,00	0,00
- Durata media dei crediti al lordo IVA (gg)	98,92	69,59	27,21	125,18	130,13
- Durata media dei debiti al lordo IVA (gg)	36,35	29,77	14,40	46,55	54,96
- Durata Ciclo Commerciale (gg)	62,57	39,82	12,81	78,63	75,16

3. Indici di redditività

- EBITDA	250.272	223.541	-47.589	57.214	89.263
- EBITDA/Vendite	14,04	13,66	-5,14	5,93	10,69
- Redditività del totale attivo (ROA)	23,88	23,28	-11,93	6,45	14,65
- Redditività di tutto il capitale investito (ROI)	n.s.	n.s.	-17,66	11,16	25,82
- Redditività delle vendite (ROS)	13,38	12,46	-7,40	3,68	8,97
- Redditività del capitale proprio (ROE)	39,44	38,10	-21,02	14,09	27,48
- Incid. oneri/Proventi extrag. (%)	75,17	71,51	n.s.	113,87	90,45

4. Indici di produttività

- Dipendenti	20	11	9	9	9
- Ricavi pro-capite	89.140	148.820	102.920	107.170	92.760
- Valore aggiunto pro-capite	46.080	61.300	29.480	44.410	43.090
- Costo lavoro per addetto	33.570,00	38.910,00	34.770,00	38.050,00	33.170,00
- Rendimento dipendenti	2,66	3,82	2,96	2,82	2,80

5. Dati significativi

108

Aida - società report di BLUEWIND S.R.L.

Bilancio non consolidato	31/12/2022 EUR	31/12/2021 EUR	31/12/2020 EUR	31/12/2019 EUR	31/12/2018 EUR
- Capitale circolante netto	595.693	566.093	398.213	260.449	235.963
- Margine sui consumi	1.396.301	1.105.587	607.293	769.180	681.706
- Margine di tesoreria	531.639	508.966	315.753	167.413	149.369
- Margine di struttura	363.588	304.932	158.355	196.198	160.691
- Flusso di cassa di gestione	191.025,00	165.454,00	-28.838,00	62.136,00	82.114,00

Bilancio non consolidato	31/12/2017 EUR	31/12/2016 EUR	31/12/2015 EUR	31/12/2014 EUR	31/12/2013 EUR
- Capitale circolante netto	185.741	134.434	121.520	72.295	60.306
- Margine sui consumi	683.182	637.433	623.441	572.375	600.154
- Margine di tesoreria	93.807	n.d.	10.220	69.516	57.717
- Margine di struttura	119.098	24.457	6.873	4.907	6.219
- Flusso di cassa di gestione	101.802,00	29.444,00	28.330,00	11.606,00	29.958,00

Probabilità di Default

You have no access to Probability of default module.

Fondo di Garanzia (DFKA)

You have no access to the DFKA module.

Attuali Esponenti/ Manager/ Contatti/ Sindaci

Consigli e altri organi societari

⊓ = anche azionista

		Nome	Ruolo	Organo	Fonte
1.	⊓	Sig. Nicola Bergamin P094960212	- CONSIGLIERE;PRESIDENTE CONSIGLIO AMMINISTRAZIONE (dal 21/06/2012)	BoD	HO
				Cerved (received on 15/07/2024)	
2.	⊓	Sig. Stefano Costa P094960213	- CONSIGLIERE;VICE PRESIDENTE CONSIGLIO AMMINISTRAZIONE (dal 21/06/2012)	BoD	HO
				Cerved (received on 15/07/2024)	
3.		Sig. Andrea Toscan P204211788	- CONSIGLIERE (dal 21/06/2012)	BoD	HO
				Cerved (received on 15/07/2024)	

Management e Staff

⊓ = anche azionista

		Nome	Ruolo	Dpt.	Fonte
1.	⊓	Sig. Nicola Bergamin P094960212	- AMMINISTRATORE DELEGATO (dal 21/06/2012)	SenMan	HO
				Cerved (received on 15/07/2024)	
2.	⊓	Sig. Stefano Costa P094960213	- AMMINISTRATORE DELEGATO (dal 21/06/2012)	SenMan	HO
				Cerved (received on 15/07/2024)	

Azionisti controllanti

Indice d'Indipendenza BvD: B+

Definizione di Azionista di Riferimento in uso   Percentuale minima 50,01% di controllo, Azionisti conosciuti e non conosciuti

This entity is independent and has no controlling shareholders.
Visualizza la sezione del report degli Azionisti attuali per vedere più azionisti.

Your access does not allow you to view ownership data provided by Factset

Aida - società report di BLUEWIND S.R.L.

Partecipazioni attuali

Non sono disponibili informazioni sulle partecipate di questa società

Your access does not allow you to view ownership data provided by Factset

M&A deal

Per questa società non sono disponibili operazioni M&A

Appendix 2

Here is the full interview with Stefano Costa, Director of Engineering at Bluewind. It took place at the end of September 2024, four months after StrAIght to Business.

A.P.: "Good afternoon and thank you for agreeing to this interview, and I appreciate your time and willingness in advance. We met in May at the StrAIght to Business conference, so let's start there: what are the reasons that guided you to take part in the event in first place?"

S.C.: "StrAIght to Business happened to be the answer we were looking for at the right moment. Let me be straight: we had to decide whether to start using AI to improve our internal processes, therefore we had two options in front of us, to start the experimental phase right away or take part in conferences with experts and other people with our same need. StrAIght to Business's format was successful for us: experts on one side and companies with similar aspirations on the other collaborating to find the best solution for their use case, while also understanding our options. In other words, it allowed me to immerse myself in something new quickly, reducing a portion of the experimentation process."

A.P.: "During the event, a chatbot demo powered by AI was presented to answer your needs: is that the tool you have decided to move forward with or does it differ?"

S.C.: "After StrAIght to Business, we started an experimental phase following a less ambitious path, as a matter of fact, we decided not to develop a tool specifically tailored on our necessities but opt for an off-the-shelf AI-powered tool. However, we immediately had to deal with the risk of data breaches and privacy matters, therefore we chose to install that software on our devices and produce a chatbot in house, instead of using a cloud solution to avoid losing control over clients' information and data, even if it meant we had not the chance to make any personalization and fine-tuning."

A.P.: "Is it privacy the only reason leading to that choice?"

S.C.: "Ninety percent is due to privacy, but then our clients' contract and information they share with us are all covered by non-disclosure agreements, therefore if we fail at protecting the data we incur in fines. Although some document are not protected by NDAs, if this information were to be leaked, it would harm our reputation and reduce our credibility with clients. Moreover, relying on cloud services such as OpenAI does not

guarantee stability: we need our software to remain stable over time, and when considering a five-year period – which is a reasonable timeframe for customers' relationships – cloud services are undoubtedly going to change. They may improve, but they could also disappear, and we cannot take that risk. We have close relationships with certification bodies, they need to be able to analyze the tools we have used along the process."

A.P.: "Isn't it easier to fall into software's obsolescence that way?"

S.C.: "Yes, it's true but this way we can maintain the first version for the work we have already begun and use the updated one for new activities, without the risk of falling back."

A.P.: "Which areas are mainly impacted by the implementation of AI inside the organization?"

S.C.: "Artificial intelligence has impacted all of Bluewind's functions and its influence is both vast and profound across almost all the activities we carry out, the only area currently unaffected is the financial department, as we do not see any opportunity to leverage AI there. However, if we were to pinpoint two areas where AI has the greatest impact, they would be management and strategic decision on one side, and software development on the other. One of Bluewind's daily activities is to write software code and documentation, LLM chatbots are commonly used while writing code and play the role of tutors that help monitor code and prevent mistakes; at the same time, they suggest parts of code based on what engineers have previously written. Moreover, chatbots can be used to generate text based on a given topic, avoiding errors of any type. These implementations allow developers to save time on a daily basis, leading to increased productivity levels. The same advantage applies to management: managers, who are highly compensated and are crucial for a successful company, can use AI-powered tools to spend more time analyzing final data and making decisions on it, raw data can be processed by AI, which can quickly create pitches ready to be presented to other company members or external advisors. In this scenario, we are witnessing not only a shift from activities with low levels of added value to higher-value activities but also a transformation in skills required. One of the aspects I would like to stress is that any kind of LLM tools we decide to implement will be supervised by experts and engineers."

A.P.: "Do you expect any more benefits shortly?"

S.C.: "Absolutely yes: as the experimental phase goes on, we can start uploading our material and train the algorithm on it; by doing so we are not sharing any information

protected by NDAs, because we are using aggregated data. By being trained on this data, the algorithm can generate contracts and documents related to the preliminary analysis of technical activities. As a consequence, when embarking on new projects and conducting preliminary analysis, time spent on those activities is remarkably reduced. But, as said earlier, none of that can be done without continuing the testing phase, or by uploading documents now we would risk privacy problems".

A.P.: "Now, let's take a step back and let's talk about obstacles you had to face before implementing AI-powered tools: did you find difficulties within the boundaries of your organization or skepticism among customers?"

S.C.: "As far as LLM models and generative AI are concerned, we have not found any complication, apart from some skepticism among engineers at the beginning due to little knowledge of the tool, but once understood its potentialities and limits, there was no doubt on its utility.

We have never had problems with customers caused by our usage of AI, sometimes they are not even as careful as we are in managing their own data: unfortunately, there is not much awareness of AI potential in all the activities, therefore more than skepticism there is ignorance on what could be achieved through artificial intelligence.

Clients have a different approach when interacting with AI-integrated products we design: for instance, there are AI-powered algorithms in cars that provide feedback on the remaining range of electric vehicles, in that case, skepticism is quite high, as clients struggle to understand its potential and how certain issues can be resolved in a cost-effective manner. They tend to prefer traditional methods to solve problems since they are considered more reliable, rather than training an algorithm to give me the solution."

A.P.: "Do you think it is possible to overcome such bias?"

S.C.: "What we have been doing to make them understand AI potential is providing them with DEMO demonstrating what it can achieve or with proof-of-concept, which is a prototype to verify whether the solution is feasible. In any case, we implement the AI-powered tool to demonstrate its feasibility, allowing them to try it without forcing them to rely solely on that option."

A.P.: "In this last case, is the attitude changing or still the level of skepticism is high?"

S.C.: "Unfortunately, it is not changing as fast as we would, besides multinational companies which invest a lot in such technologies, smaller entities still prefer traditional methods. What is changing is the increased need to respond to specific requirements:

certain tasks cannot be accomplished without AI, such as predicting failures, for which no alternatives exist, thus, artificial intelligence is the only solution; another scenario is when implementing AI leads to cost reductions, in such cases companies consistently opt for the cheaper alternative even if they are skeptical"

A.P.: "We have discussed your current situation and then made a jump in the past to understand what led Bluewind to embark on such path, but, what about the future? What do you expect from AI?"

S.C.: "I believe that in six months, after the experimental phase we are currently undergoing, the field of accounting and finance will also be affected by AI, particularly due the enthusiasm of newly graduated students for these tools."

A.P.: "Speaking of newly graduated people, do you think you will change how you hire people? Or better, do you think you will change the type of skills you will look for in applicants?"

S.C.: "We primarily seek graduates from electronic engineering, industrial engineering and mathematics programs, as they all possess a strong foundation in artificial intelligence. However, we will begin hiring a specialized workforce to address the design of electronic systems for our clients using AI technologies."

A.P: "One last question: what is the primary goal you would like to achieve regarding artificial intelligence in the next six months, one year at most?"

S.C.: "AI should be fully integrated into our everyday routine to become a normal help without worrying about privacy and data breaches; this is only possible once these two obstacles are removed, thanks to proven AI solutions. Let me give an example to be clear: writing a contract is a repetitive yet important process: it should become standard for it to be automatically generated by AI. This would shift the attention toward different skills: in fact, what becomes important is providing the correct guidelines on which the offer should be based: it requires a thorough interview with clients to gather all the information in an organized manner. By doing so, a significant amount of time is saved that would otherwise be spent compiling it manually, and at the same time allowing for a direct focus on reviewing the offer. Long story short, many processes should be standardized: everyone fills out contracts with slight variations, whereas using the algorithm, it should lead to consistent results over time:"

Bibliography

Andreessen, M. (2011, August 20). Why is software eating the world? *The Wall Street Journal*.

Anyoha, R. (2017, August 28). *Science in the News - The history od Artificial Intelligence*. Retrieved from Science in the News - Harvard Education: https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/

ASSOSOFTWARE. (2023). *Software nelle PMI: un motore d'innovazione per l'Italia.*

Behrends, C., Di Mattia, D., Shulman, J., & Torres, A. (February 2022). Reversal of fortune: How European software can play to its strengths. *McKinsey & Company*.

Bevan, O., Chui, M., Kristensen, I., Presten, B., & Yee, L. (March 2024). Implementing generative AI with speed and safety. *QuantumBlack AI by McKinsey*.

Bicanic, S., Bushy, M., Friis Hjortegaard, J., & Thappa, A. (2023, October 25). *How Generative AI Is Forging Productivity in Sales and Marketing*. Tratto da Bain & Company - Insights: https://www.bain.com/insights/how-generative-ai-is-forging-productivity-in-sales-and-marketing/#

Bittner, K., & Ian, S. (2002). Finding actors and Use Cases. In K. Bittner, & S. Ian, *Use Case Modeling* (p. 87-118). Boston: ADDISON-WESLEY.

Bittner, K., & Spence, I. (2002). Establishing the Vision. In K. Bittner, & I. Spence, *Use Case Modeling* (p. 49-86). Boston: ADDISON-WESLEY.

Bittner, K., & Spence, I. (2002). Fundamentals of Use-Case Modeling. In K. Bittner, & I. Spence, *Use case Modeling* (p. 19-48). Boston: ADDISON-WESLEY.

Bluewind. (2024). *Bluewind: About us*. Tratto da Bluewind Web Site: https://www.bluewind.it/services/products/

Booth, B., Donohew, J., Wlezien, C., & Wu, W. (2024, March 5). *Generative AI fuels creative physical product design but is no magic wand*. Tratto da McKinsey Digital: https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/generative-ai-fuels-creative-physical-product-design-but-is-no-magic-wand

Burning Glass Institute. (2024). *GENERATIVE ARTIFICIAL INTELLIGENCE AND THE WORKFORCE.*

Cai, K. (April 2024). AI 50. *Forbes*.

Cautela, C., Dell'Era, C., Mortati, M., & Gastaldi, L. (July 2019). The Impact of Artificial Intelligence on Design Thinking Practice: Insights from the Ecosystem of Startups. *Strategic Design Research Journal*, Strategic Design Research Journal.

Chui, M., Hazan, E., Roberts, R., Singla, A., Smaje, K., Sukharevsky, A., . . . Zemmel, R. (June 2023). *The economic potential of generative AI: The next productivity frontier.* McKinsey & Company.

Dam, R. F. (2024, March 1). *The 5 Stages in the Design Thinking Process*. Tratto da Interaction Design Foundation: https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process#did_you_know_design_thinking_is_a_non-linear_process?-6

Dam, R. F., & Siang, T. Y. (2022, May 20). *The History of Design Thinking*. Tratto da Interaction Design Foundation: https://www.interaction-design.org/literature/article/design-thinking-get-a-quick-overview-of-the-history

Datalogic. (2023). *Annual Report 2023.* Datalogic.

Datalogic. (2024). *Home: Datalogic* . Tratto da Datalogic: https://www.datalogic.com/ita/azienda/panoramica-dellazienda-co-4215.html

De Ridder, P., & Bogaert, N. (2023). *Welcome to the Age of Creative AI.* Board of Innovation.

Deveau, R., Griffin, S. J., & Reis, S. (2023, May 11). *AI-powered marketing and sales reach new heights with generative AI*. Tratto da McKinsey & Company: https://www.mckinsey.com/capabilities/growth-marketing-and-sales/our-insights/ai-powered-marketing-and-sales-reach-new-heights-with-generative-ai

Di Bella, L., Katsinis, A., Lagüera-González, J., Odenthal, L., Hell, M., & Lozar, B. (2023). *SMEs Performance review.* Luxembourg: Publications Office of the European Union,.

Engineering Ingegneria Informatica. (2023). *Accounts 2023.* Engineering Ingegneria Informatica.

Engineering Ingegneria Informatica. (2024). *What we do: Engineering Ingegneria Informatica*. Tratto da Engineering Ingegneria Informatica: https://www.eng.it

Ennova Research. (2024). *Ennova Research: About us*. Tratto da Ennova Research: https://ennova-research.com/about.html#

European Commission. (2021). *CE Marking*. Tratto da European Commission: https://single-market-economy.ec.europa.eu/single-market/ce-marking_en

European Commission. (2023). *Digital Economy and Society Index 2022: Italy.*

European Commission. (2024). *Digital Decade Country Report 2023: Italy.*

European Union. (2024). *European Year of skills: Plugging the digital skills gap.* Tratto da
Official Website of the European Union: https://year-of-skills.europa.eu/plugging-
digital-skills-
gap_en#:~:text=In%20the%20future%2C%2090%25%20of%20jobs%20will%2
0require,digital%20experts%20including%20for%20cybersecurity%20and%20
data%20analysis.

Farayola, O. A., Abdul, A. A., Irabor, B. O., & Okeleke, E. C. (2023). INNOVATIVE BUSINESS
MODELS DRIVEN BY AI TECHNOLOGIES: A REVIEW. *Computer Science & IT
Research Journal*, 85-110.

Forbes. (2024, June 7). *The Impact of AI on Media and Advertising Agencies.* Tratto da
Forbes Councils: https://councils.forbes.com/blog/ai-influence-media-and-
advertising-agenices

Frick, W. (June 2024). L'intelligenza artificiale faripensare agli economisti la
storiadell'automazione. *Harvard Business Review Italia*.

Gartner. (2021). *2021 Software Market Landscape: Italy.*

Gartner. (2022, March 24). *Gartner Hype Cycle.* Tratto da Gartner Tools:
https://www.gartner.com/en/research/methodologies/gartner-hype-cycle

Gartner, Inc. (2023). *Unlocking the Potential: GenAI's Impact on Product Innovation and
Growth.*

Gibson, K. (2024). AI-DRIVEN BUSINESS MODELS: 4 CHARACTERISTICS. *Harvard
Business Review*.

Gode, A., & Kalkan, A. (2023). What is Artificial Intelligence? In A. Akpinar, *Research on
Mathematics and Science - IV* (p. 23-43). Ozgur Yayin-Dagitim Co. Ltd.

Google Cloud. (2024). *What is a Data Lake?* Tratto da Google Cloud:
https://cloud.google.com/learn/what-is-a-data-lake?hl=en

Greenstein, B., Light, C., & Likens, S. (April 2024). *The path to generative AI value: Setting
the flywheel in motion.* PwC.

Greenstein, B., Petry, S., & Carlson, A. (2024). *10 ways GenAI improves software
development.* Tratto da PwC: https://www.pwc.com/us/en/tech-effect/ai-
analytics/generative-ai-for-software-development.html

Grennan, L., Kremer, A., Singla, A., & Zipparo, P. (September 2022). Why businesses need
explainable AI—and how to deliver it. *QuantumBlack AI by McKinsey*.

Hammond, G. (2024). Elon Musk predicts AI will overtake human intelligence next year. *Financial Times*.

Holdsworth, J. (2023, December 22). *What is a AI bias?* Tratto da IBM: https://www.ibm.com/topics/ai-bias

Holdsworth, J., & Scapicchio, M. (2024, June 17). *What is deep learning?* Tratto da IBM Home Page: https://www.ibm.com/topics/deep-learning

IDEO. (2024). *Design Thinking Defined*. Tratto da IDEO Design Thinking: https://designthinking.ideo.com

IDEO. (2024). *IDEO - About us*. Tratto da IDEO: https://www.ideo.com/about

IED Istituto Europeo di Design S.p.A. (2024, February 2). *Design thinking: what it is and how it can revolutionise business*. Tratto da IED: https://www.ied.edu/news/design-thinking-what-it-is-and-how-it-can-revolutionise-business

Italian Tech Landscape. (2024). *Studio sui software italiani 2024.*

Jain, S. (2018). *The potential impact of AI in the Middle East.* PwC.

Kaplan, S. (2024, March 5). *Supercharge Your Design Thinking Process With Artificial Intelligence*. Tratto da Inc.: https://www.inc.com/soren-kaplan/supercharge-your-problem-solving-with-artificial-intelligence.html

Lakhani, K. R. (2023, August 4). AI won't replace humans but humans with AI will replace humans without AI. (A. Ignatius, Interviewer)

Levy, S. (July 2023). Microsoft's Satya Nadella Is Betting Everything on AI. *WIRED*.

Liedtka, J. (October 2018). Why Design Thinking Works. *Harvard Business Review*.

Lohr, S. (2024, February 1). Generative A.I.'s Biggest Impact Will Be in Banking and Tech, Report Says. *The New York Times*.

Lynch, S. (2024, April 15). *AI Index: State of AI in 13 Charts*. Tratto da Stanford University: Humane-Centered Artificial Intelligence: https://hai.stanford.edu/news/ai-index-state-ai-13-charts

Maslej, N., Fattorini, L., Perrault, R., Parli, V., Reuel, A., Brynjolfsson, E., . . . Clark, J. (April 2024). *The AI Index 2024 Annual Report,.* Institute for Human-Centered AI, Stanford University.

McKinsey & Company. (2024). What is AI (Artificial Intelligence)? *QuantumBlack AI by McKinsey*.

Medium. (2024, June 26). *How JPMorgan Chase's COIN is Revolutionizing Financial Operations with AI*. Tratto da Medium : https://medium.com/@the_AI_ZONE/how-jpmorgan-chases-coin-is-revolutionizing-financial-operations-with-ai-120a2938dab7

Medium. (2024, January 9). *Predictions for 2024: Software and market trends the Dawn team are watching, from AI and VR to compliance*. Tratto da Medium: https://medium.com/@dawncapitalteam/predictions-for-2024-software-and-market-trends-the-dawn-team-are-watching-from-ai-and-vr-to-511025ae9c9e

Metz, C., & Schimdt, G. (2024, March 29). Elon Musk and Others Call for Pause on A.I., Citing 'Profound Risks to Society'. *The New York Times*, p. 5.

Micelli, S. (2024, May 18). Intelligenza Artificiale, imprese e università a Venezia insieme per colmare il ritardo. (RaiNews, Intervistatore)

Mickle, T., & Rennison, J. (2024, June 18). Nvidia's rise is among the fastest in market history. Just two years ago, the company's market valuation was a little over $400 billion. Now, in the span of a year, it has gone from $1 trillion to more than $3 trillion. *The New York Times*.

Mittal, N., Perricos, C., Schmidt, K., Sniderman, B., & Jarvis, D. (April 2024). *State of Generative AI in the Enterprise: Getting real about Generative AI.* Deloitte.

Mucci, T. (2024, February 13). *Generative AI use cases for the enterprise*. Tratto da IBM: https://www.ibm.com/blog/generative-ai-use-cases/

Newman, R. (2023, September 23). *Crafting HMW — "How Might We" Statements*. Tratto da Medium: https://medium.com/@notoneco/01-00-crafting-hmw-how-might-we-statements-436dd3c66662

OECD. (2024). *OECD: Going digital Toolkit*. Tratto da OECD: https://goingdigital.oecd.org/dimension/innovation

Ovans, A. (2015). What is a business model? *Harvard Business Review*.

Perri, L. (2023, August 17). *What's New in Artificial Intelligence from the 2023 Gartner Hype Cycle*. Tratto da Gartner Insights - Information Technology: https://www.gartner.com/en/articles/what-s-new-in-artificial-intelligence-from-the-2023-gartner-hype-cycle

Perrigo, B. (2024). The UAE Is on a Mission to Become an AI Power. *Time*.

Pirelli. (2024, September 10). *More safety, comfort, and driving dynamics: Bosch and Pirelli signed a development cooperation for intelligent tyre technology*. Tratto da Pirelli:

Press: https://press.pirelli.com/more-safety-comfort-and-driving-dynamics-bosch-and-pirelli-signed-a-development-cooperation-for-intelligent-tyre-technology/

Precedence Research. (2024). *Artificial Intelligence (AI) Market Size, Share, and Trends 2024 to 2034.*

Precedence Research. (2024). *Software Market Size. Share and Trends 2024 to 2034.*

PwC. (2024). *AI, la grande ricerca.*

PwC. (May 2024). *PwC's 2024 AI Jobs Barometer.*

Ransbotham, S., Kiron, D., Gerbert, P., & Reeves, M. (2017). *Reshaping Business With Artificial Intelligence.* MIT Sloan Management Review.

Romanoff, D., & Shetty, V. (December 2023). *Software makes everything easier.* Morningstar.

S. Rao, A., & Verweij, G. (2023). *Sizing the prize: What's the real value of AI for your business and how can you capitalise?* PwC.

Schneider, J., Shah, T., & Abraham, J. C. (2024, June 5). *Navigating the generative AI disruption in software.* Tratto da McKinsey & Company: https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/navigating-the-generative-ai-disruption-in-software#/

Shani, I. (2024, February 24). *Survey reveals AI's impact on the developer experience.* Tratto da GitHub - News and Insights: https://github.blog/news-insights/research/survey-reveals-ais-impact-on-the-developer-experience/

Silberg, J., & Manyika, J. (2019). *Tackling bias in artificial intelligence (and in humans).* McKinsey & Company. Tratto da McKinsey.

Singla, A., Sukharevsky, A., Yee, L., Chui, M., & Hall, B. (May 2024). The state of AI in early 2024: Gen AI adoption spikes and starts to generate value. *QuantumBlack AI by McKinsey.*

Sommer, J. (2024, September 13). Nvidia Holds the Key to the Market. But Is It Worth This Much? *The NEw York Times*, p. 3.

Stack Overflow. (2024). *2024 Developer Survey.* Tratto da Stack Overflow: https://survey.stackoverflow.co/2024/?utm_medium=referral&utm_source=blo g&utm_campaign=dev-survey-2024&utm_content=results

Stanford d.School. (2010). *An introduction to Design Thinking.* Process Guide.

Stanford d.school. (2024). *About us - Stanfrod d.school* . Tratto da Stanford d.school: https://dschool.stanford.edu/about

Statista. (2024). *Market Insights: Technology.*

Stryker, C. (2024, February 6). *IBM*. Tratto da What is responsible AI?: https://www.ibm.com/topics/responsible-ai

Stryker, C., & Scapicchio, M. (2024, March 22). *What is generative AI?* Tratto da IBM : https://www.ibm.com/topics/generative-ai#:~:text=Generative%20AI%20models%20can%20be,design%20of%20new%20pharmaceutical%20compounds.

Torabi, N. (2024, April 5). *Empowering Product Development: The Dawn of Generative AI in Product Design*. Tratto da Medium: https://medium.com/beyond-the-build/empowering-product-development-the-dawn-of-generative-ai-in-product-design-0c06e07bb902

Tuzil, V. (2024, May 19). Intelligenze artificiali: Una grande palestra del futuro. *Corriere della Sera*, p. 43.

TXT Group. (2023). *Relazione finanziaria 2023.* TXT Group.

TXT Group. (2024). *Who We Are: TXT Group*. Tratto da TXT Group: https://www.txtgroup.com/company-values/

Upskill 4.0. (2024). *About us: Upkill 4.0* . Tratto da Upkill 4.0: https://www.upskill40.it

Valentini, V. (2024, June 27). *Empowering SMEs for digital transformation and innovation: The Italian way*. Tratto da OECD: https://www.oecd.org/en/blogs/2024/06/empowering-smes-for-digital-transformation-and-innovation-the-italian-way.html

Winters, S., Horton, R., & Corduneanu, R. (2024, January 18). *Now decides next. Is Europe ready for generative AI? Opportunities and hurdles: Europe's path in the Generative AI era*. Tratto da Deloitte Insights : https://www2.deloitte.com/xe/en/insights/topics/emerging-technologies/generative-ai-in-europe.html

Yee, L., Chui, M., Roberts, R., & Issler, M. (July 2024). *Technology trend outlook 2024.* McKinsey Digital.

Yepis, E. (2024, July 24). *Developers want more, more, more: the 2024 results from Stack Overflow's Annual Developer Survey*. Tratto da Stack Overflow:

https://stackoverflow.blog/2024/07/24/developers-want-more-more-more-the-2024-results-from-stack-overflow-s-annual-developer-survey/

Zsolt, S. (2024, March 5). *Software and Information Services Will Be One of The Leading Industries of European ICT Spending*. Tratto da IDC Research: https://www.idc.com/getdoc.jsp?containerId=prEUR251926724