LUISS

*Department of Economics and Business*
*Marketing Innovations*

# EXAMINING ARTIFICIAL INTELLIGENCE IMPLEMENTATION IN THE ITALIAN CORPORATE LANDSCAPE: POTENTIAL SCENARIOS AND OPPORTUNITIES

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## Introduction: Context, Structure and Objectives of the Research

In recent years, starting from 2021 with the launch of Chat-GPT by OpenAI, the topic of artificial intelligence has become a subject of great interest and debate, moving beyond its traditional fields of study to become a societal issue. This phenomenon involves not only the corporate world, research, and academia but also the common citizen and the individual.

However, artificial intelligence is not a new technology. Significant research and implementations have been developing for over 70 years, as demonstrated by the creation of ELIZA in 1966, one of the first natural language processing programs developed by scientist Joseph Weizenbaum. During this period, the business world seized the opportunity to integrate artificial intelligence into their processes, both for automation and for developing chatbots.

The novelty today is that these technologies have become not only more powerful but also capable of directly interacting with citizens, who now perceive their impact tangibly, especially in the workplace, where they are being integrated into business processes. Artificial intelligence is thus profoundly influencing the structure of societies and companies, becoming a central theme in social debate. This growing social interest brings with it multiple variables and diverse, often conflicting perspectives, including conflicts of interest, enthusiasm, and concerns. The resulting narrative can obscure a clear and straightforward vision of the current scenario and the ongoing transformation. Addressing and correctly implementing this disruption in the corporate sphere, exploiting opportunities and mitigating risks, proves complicated and counterproductive without a real understanding of the phenomenon. Given the risk of a distorted social perception, this thesis aims to clarify the real adoption, implementation, and impact of artificial intelligence in the Italian corporate fabric. This will create a solid foundation for analyzing potential risks and opportunities for Italian companies in approaching this technology.

The primary objective of this thesis is to provide a general overview of AI implementation in the corporate sector, supporting the understanding of the phenomenon and offering insights to identify opportunities and risks for Italian companies. Since artificial intelligence is indeed a disruptive force capable of altering the market's foundations and the structure of companies, it is essential that they approach it consciously and correctly to enhance their competitiveness.

To obtain the most truthful and objective overview possible of the implementation of artificial intelligence in Italian companies, the thesis will start with an extensive analysis of the topic at a global level, considering current investments and implementations, and analyzing the main stakeholders and nations. This will provide a benchmark to compare how Italian companies are approaching Artificial Intelligence.

Subsequently, the perspectives of the main stakeholders involved will be analyzed, specifically those capable of influencing the future scenario of AI implementation in companies: businesses, consumers, policymakers, the financial and consulting sectors. The thesis will examine how each of these stakeholders is addressing and perceiving the implementation of artificial intelligence in companies, their understanding, perceived benefits, harms, desires, opportunities, and risks. This will allow an understanding of not only the general sentiment but also their sensitivities and reactions to the new technology in the corporate sphere, and how they intend to relate to it in the future.

A deep understanding of the individual key stakeholders and an analysis of how these stakeholders interact with each other will allow the identification of current market balance points and the detection of possible future balances. This set of balances will provide the necessary tools to understand potential developments and future scenarios, a comprehension useful for companies to correctly position themselves regarding AI implementation in their processes.

Since the goal of this thesis is to highlight the real structure and tangible impacts that this technology brings to companies, the research will be conducted through solid, specific, and detailed analyses to support each presented statement and conclusion. At the same time, to guide the reader through the development of the research, each chapter will begin with introductory paragraphs that clarify the motivations behind the analyses and the chapter's set objectives. Additionally, at the end of each chapter, "conclusive remarks" will highlight the revelations from the analyses and their comprehensive and relevant implications.

**Abstract:**

To investigate the implementation of artificial intelligence (AI) within the Italian corporate landscape, this research begins with a comprehensive analysis of the global context. It highlights significant growth in global corporate AI investments and adoption due to AI's ability to enhance efficiency—through operations automation, supply chain optimization, and product/service development—and customer interaction, particularly through technologies like large language models (LLMs) for text generation and information extrapolation.

The technology, media, and telecom sectors are at the forefront of AI adoption for product development, service operations, marketing, and sales. However, the manufacturing sector has seen the most significant positive impacts on revenue and cost efficiency.

While large companies spearhead the AI transformation, small-medium companies have exhibited the most exponential growth in adoption rate, impacts gained, and the number of newly funded AI companies in recent years.

Key risks identified include cybersecurity threats and ethical issues such as data privacy challenges, necessitating proactive measures to mitigate potential downsides and realize AI's potential responsibly. Geographically, the United States leads in market share and investments, followed by China and Europe, with Europe showing the largest year-over-year growth in AI adoption and leading in ethics and regulation.

The analysis of global stakeholders reveals a significant discrepancy between the optimistic scenarios promoted by companies, financial sectors, and consulting firms, and the concerns of consumers and policymakers about job loss, privacy, and personal information security.

In-depth examination of the Italian AI market reveals high interest but significant hesitation and skepticism among Italian businesses and consumers. The market analysis identifies the sectors and technologies driving AI adoption and the barriers hindering its implementation. AI adoption in Italian companies is driven by the need for production efficiency and improved customer interaction, with the telecommunications sector being most affected by these advancements and production processes significantly impacted by automation potential.ù

The research highlights specific opportunities in the Italian market, focusing on the most important business processes for Italian companies: marketing, product design and development, human resources, information systems, legal processes, and sustainable

development. For each process, there is a detailed analysis of how AI has contributed, with particular emphasis on the major opportunities identified, also including the

testimony of a successful case study for each business process. The companies taken as examples of correct AI implementation in these processes are CIRFOOD, LuisaViaRoma, Bending Spoons, SACE, Exein, and Aptus.AI.

In general, the findings indicate that while large companies have been primary drivers of AI adoption, smaller companies and startups are increasingly attracting attention and investment, suggesting a potential change in market structure and competitiveness. Companies aiming to maintain or challenge leadership must be aware of tangible market opportunities and evaluate their resources, particularly data, for effective AI implementation. Sectors relying on efficiency and customer interaction, such as manufacturing, product design, marketing, media, and telecommunications, must be the first to seize AI benefits.

The research underscores the importance of aligning AI strategies with regulatory compliance and data security to mitigate risks and enhance trust among consumers and stakeholders. This alignment will support companies in anticipating market trends, complying with regulations, and preparing to use future resources effectively and efficiently, ultimately improving their competitiveness and positioning them for global leadership.

# I

# The Global Landscape of Corporate AI Deployment

*This chapter provides a comprehensive analysis of how companies around the world are addressing the issue of artificial intelligence (AI), focusing on investment strategies, current adoption rates, and perceived risks. It aims to offer a broad overview of AI implementation in business, framing the* ***current scenario****, its tangible impacts, and emerging trends.*

*By examining the global landscape, including insights into key players such as the United States, China, and the United Kingdom, the chapter sets the stage for a more informed and conscious discussion on the state of AI implementation in Italian companies. This comparative perspective serves as a valuable benchmark, helping to understand Italy's factual position in this digital transformation, its approach, and its starting point in this rapidly evolving field.*

## 1.1 Corporate AI Investments and the Rise of Newly Funded Companies

**Corporate AI Investments:**

When discussing corporate AI investments, it is essential to consider all of its most important forms. The "AI Index 2024" Annual Report conducted by Stanford University[1], which will provide the data structure for this chapter, suitably considers in its corporate investment analysis a financial pool composed of mergers and acquisitions, minority stakes, private investments, and public offerings. Global corporate investment in AI has seen significant fluctuations over the past decade. From 2013 to 2023, AI-related investments increased thirteenfold, despite recent declines. In 2023, the total investment dropped to $189.2 billion, a decrease of approximately 20% from 2022. This downturn was mainly due to a significant reduction in mergers and acquisitions, which fell by 31.2%. In general, it's clear how corporations are heavily investing in this technology despite the decrease in mergers and acquisitions that is a systematic decline as the total M&A market dropped 15%, to $3.2 trillion, the lowest level in a decade, as dealmakers grappling with high interest rates, regulatory scrutiny, and mixed macroeconomic signals had to be more selective about which deals to pursue in 2023[2].

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[1] *Maslej, N., Fattorini, L., Perrault, R., Parli, V., Reuel, A., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Niebles, J. C., Shoham, Y., Wald, R., & Clark, J. (2024). The AI Index 2024 Annual Report. AI Index Steering Committee, Institute for Human-Centered AI, Stanford University.*

[2] *Bain & Company. (2024). Global M&A report 2024: Gaining an edge in a market reset. Bain & Company. https://www.bain.com/about/media-center/press-releases/2024/total-ma-market-dropped-to-$3.2-trillion-in-2023-leaving-a-backlog-of-deals-that-will-shape-the-2024-ma-agenda/*

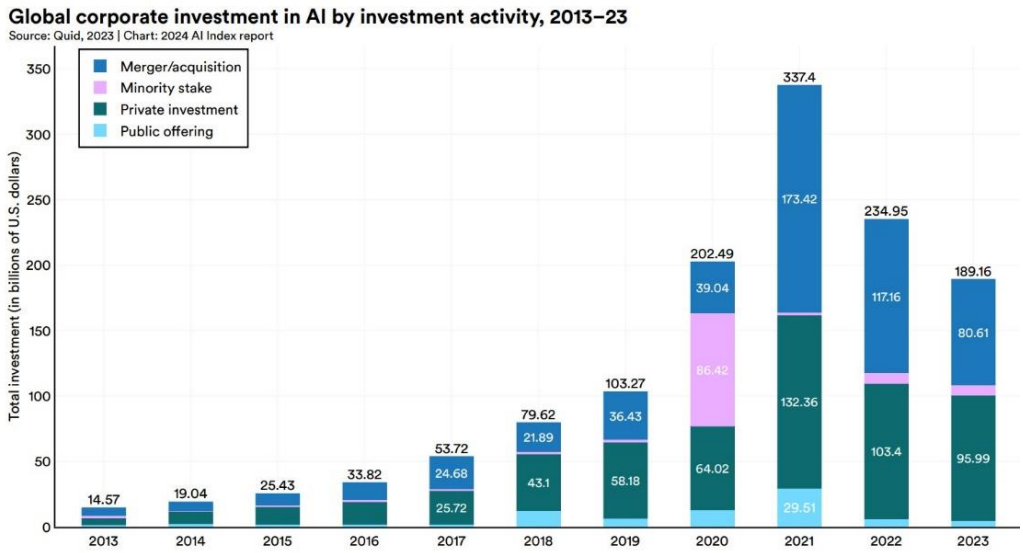


*Figure: 1*

*Source: Artificial Intelligence Index Report, Stanford, 2024.*

**Private AI Investments:**

Private investments in AI is also a key variable to consider to understand growth opportunities for companies within the sector. These investments come from venture capitalists, private equity firms, and other private investors who are keen on tapping into the potential of AI technologies.

From 2013 to 2023, private AI investment trends show a robust upward trajectory, even though the last couple of years have seen some fluctuations.

Private Investment for 2023 accounts for $96 billion, experiencing a slight decline of 7.2% from the previous year. However, this reduction is relatively minor compared to the significant growth observed over the past decade. Despite these short-term dips, the long-term trend remains positive, with private investments in AI startups fueling advancements.

A notable aspect of private investments is the substantial emphasis on generative AI.The funding for generative AI saw an unprecedented surge in 2023, reaching $25.2 billion, nearly nine times the investment of 2022 and about 30 times the amount from 2019. Furthermore, generative AI accounted for over a quarter of all AI-related private

investment in 2023 highlighting its strategic importance for future AI developments. This dramatic increase underscores the growing interest and confidence in AI technologies that can create new content, particularly for generating and understanding text, as well as images.

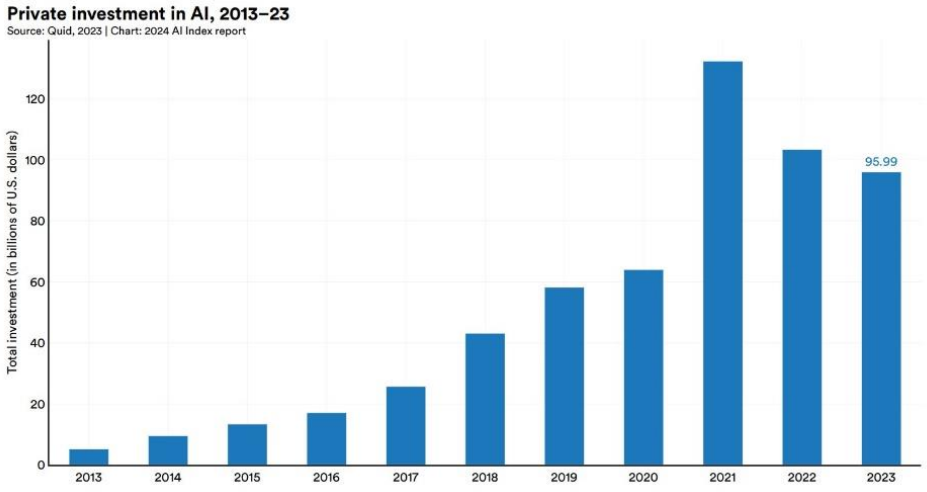


*Figure: 2*

*Source: Artificial Intelligence Index Report, Stanford, 2024.*

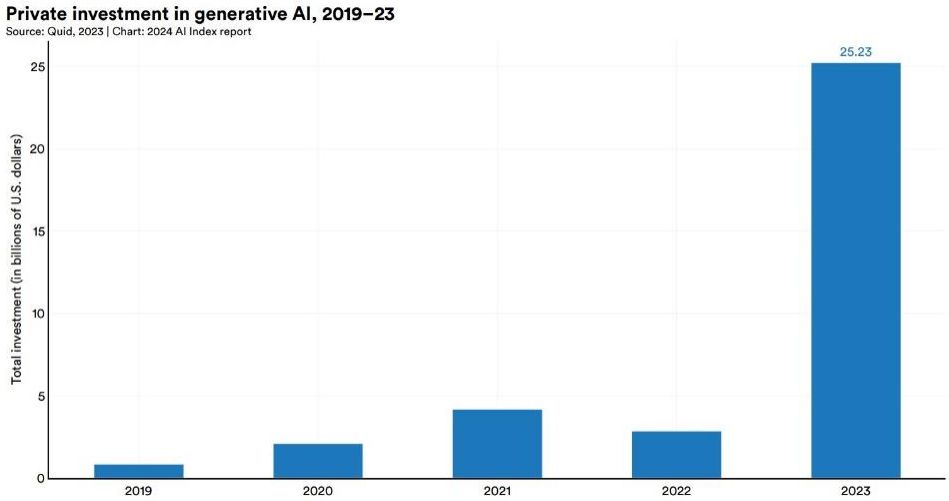


*Figure: 3*

*Source: Artificial Intelligence Index Report, Stanford, 2024.*

**Newly Funded Companies:**

The number of newly funded AI companies is a critical indicator to understand not only the sector's vitality and stability but also potential competition.

In 2023, the global number of newly funded AI companies saw a significant increase, with 1,812 companies receiving funding—a 40.6% increase over the previous year.

This surge of vibrant entrepreneurship creates a feeling of potential important competition, with many entities trying to take a share of the market.

It is therefore crucial in for well-established companies to consider the phenomenon of increasing competition in the AI market. With more and more companies seeking to gain market share, we can expect a significant transformation in the industry's structure. Thus, on one hand, new market opportunities are emerging that must be seized promptly. On the other hand, this can lead current market leaders to lose their dominant positions.

In general, several scenarios can be predicted for the market's transformation. If current leaders prove resilient, the market structure could remain similar, with minimal changes in the dominant companies. Conversely, we might see market fragmentation with a greater number of competitors, or a market driven by new leading companies pushing innovation.

In the past three years, we have already witnessed unexpected transformations, such as the shift in the global search engine market. ChatGPT has begun to challenge Google's dominance, but the underlying structure has not changed dramatically. Microsoft seized the opportunity, acquiring a 49% stake in ChatGPT for $10 billion, obtaining the right to 75% of the profits until it recoups its investment[3]. This example shows how a major leading company can maintain its status quo through strategic investments, even in the face of potential disruption.

In conclusion, we can expect a renewal in the market structure, which brings fertility and opportunities for new companies. These new entrants are coming in very aggressively, challenging current tech leaders who, supported by their substantial monetary and intellectual capital, are still able to maintain a strong position.

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[3] *Bass, D. (2023, January). Microsoft invests $10 billion in ChatGPT maker OpenAI. Bloomberg.*

## 1.2 Geographical comparative analysis of AI Corporate Investments: USA; EU; China

This section examines how financial capital flows, previously analized, move within the global landscape. Specifically, it investigates the primary recipient nations of these flows and subsequently conducts a comparative analysis with those observed in the European region. The geographical scenario of AI investment demonstrates significant regional disparities, with the United States leading global private investment, followed by China and the United Kingdom. In fact, in 2023, the U.S. invested approximately $67.2 billion in AI, vastly outpacing China and the United Kingdom, which invested $7.8 billion and $3.8 billion, respectively. This trend is consistent over the past decade, with the U.S. accumulating a total of $335.2 billion in AI investments since 2013. China's total over the same period stands at $103.7 billion, while the UK has invested $22.3 billion. Notably, the gap in investments between these regions has widened, particularly in emerging areas like generative AI, where U.S. investments reached $22.46 billion in 2023, significantly surpassing both China and the combined European Union and UK investments. This regional disparity underscores the United States' dominance in the AI sector, driven by substantial investments in AI infrastructure, research, and governance, along with significant private sector engagement in cutting-edge AI technologies.

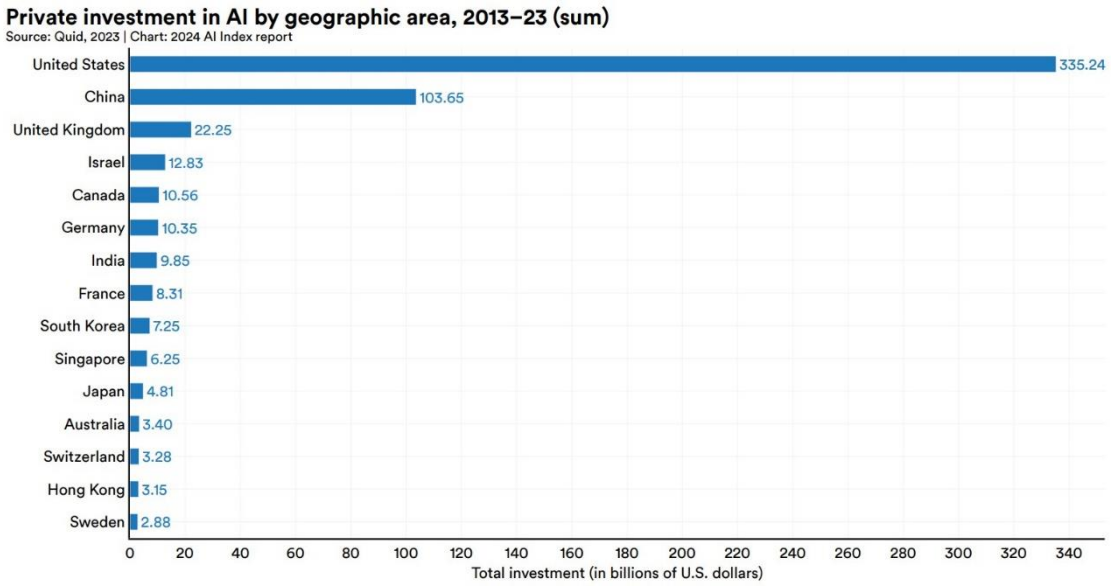


*Figure: 4*

*Source: Artificial Intelligence Index Report, Stanford, 2024.*

However, one thing I think is useful to note is the positive trend of newly funded AI companies in the European Union (EU) and the United Kingdom (UK). From 2013 to 2023, Europe has steadily increased its share of newly funded AI companies. In 2023, the EU and the UK collectively saw 368 new AI companies, which is about a 20% increase from 2022. In comparison, China had only 122 newly funded companies and experienced a year-over-year decrease, while the US had 897 newly funded companies, up from 500 in 2022.

This testifies to the fertility of Europe for new businesses in the field of AI. However, it is also true that if we refer to Italy in particular, the peninsula fails to keep up with its economic structure as the tenth largest economy in the world by GDP, as it is neither among the top 15 for investments nor among the top 15 for AI companies created. This could represent a risk for future competitiveness if AI becomes the foundation of the future economy, but it could perhaps represent an opportunity for entrepreneurs who want to gain market share in the economic fabric of the peninsula.

## 1.3 The Current Adoption of AI in Business

Artificial Intelligence (AI) has evolved rapidly from a speculative concept to a practical tool that is transforming business operations across various industries. This chapter delves into the current state of AI adoption in business, supported by recent data and insights from the McKinsey "The State of AI in 2023: Generative AI's Breakout Year[4]" and the Stanford "Artificial Intelligence Index Report 2024".

**AI Adoption Trends:**

According to Stanford's report in 2023, 55% of organizations reported using AI in at least one function, a slight increase from 50% in 2022 and a significant jump from 20% in

[4] *McKinsey & Company. (2023). The state of AI in 2023: Generative AI's breakout year.* *https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-ais-breakout-year*

2017. This indicates a stabilization in AI adoption, suggesting that companies are beginning to integrate this technology structurally. Also, the IBM's 2023 Global AI

Adoption Index sees a similar scenario where 42% of enterprise-scale organizations have AI actively in use, with an additional 40% exploring or experimenting with AI. This growth is primarily driven by early adopters who have overcome initial barriers and are now accelerating their investments[5].

In 2023, 55% of organizations reported using AI in at least one function, a slight increase from 50% in 2022 and a significant jump from 20% in 2017. This indicates a stabilization in AI adoption, suggesting that companies are beginning to integrate this technology structurally. Additionally, IBM's 2023 Global AI Adoption Index shows a similar scenario, with 42% of enterprise-scale organizations actively using AI and an additional 40% exploring or experimenting with AI. This growth is primarily driven by early adopters who have overcome initial barriers and are now accelerating their investments.

Therefore, it is important to highlight, before delving into specific applications and causes, that companies globally are undergoing a transformation process, increasingly engaging with AI technology.

**Common AI Use Cases by Function:**

AI is utilized across multiple functions, demonstrating its broad utility in different business operations. The most prevalent AI applications in 2023 included contact-center automation (26%), personalization (23%), customer acquisition (22%), and AI-based enhancements of products (22%).

It is interesting to observe that while AI technology has been implemented in numerous and diverse areas, the most widespread applications are those that facilitate customer interaction. Specifically, this technology enhances customer interaction through contact (customer acquisition), dialogue (contact-center automation), and listening (personalization). Only subsequently does the technology optimize company operations

[5] *IBM Newsroom. (2024, January 10). Data suggests growth in enterprise adoption of AI is due to widespread deployment by early adopters. https://newsroom.ibm.com/2024-01-10-Data-Suggests-Growth-in-Enterprise-Adoption-of-AI-is-Due-to-Widespread-Deployment-by-Early-Adopters.*

and efficiency. This approach may represent an opportunity for companies to better understand their customers, improve their offerings, and consequently accelerate the commercial market.

**AI Adoption by Industry and Function:**

The technology, media, and telecom sectors led AI adoption in product/service development (44%), service operations (36%), and marketing/sales (36%). It is noteworthy that the most prevalent activities involve company-client relationships, a trend that is even more pronounced in these sectors. Beyond the tech industry where AI originated, media and marketing sectors, which are inherently customer-focused, are also heavily investing in AI.

**Changes in AI Adoption (2022 vs. 2023):**

There were significant gains in marketing and sales (up 18 percentage points), product/service development (up 14 points), and service operations (up 4 points). Conversely, strategy and corporate finance (down 12 points), risk (down 9 points), and human resources (down 2 points) saw the most significant drops.

This evidence suggests that the perspective on AI technology is becoming clearer. While there has been considerable hype and enthusiasm from companies to utilize and experiment with AI, the passage of time is providing insights into the returns on their investments, both time and money. Despite the sustained high levels of enthusiasm, companies are beginning to adjust their focus, increasing investments in areas that have shown positive feedback, such as marketing and sales, and reducing investments in areas with less favorable outcomes, such as finance and human resources. The finance sector, traditionally proactive in adopting cutting-edge technology, has also started to divest to recalibrate its approach. This shift underscores a commitment to utilizing AI effectively.

In summary, while investments and enthusiasm for AI remain strong, companies are

starting to fine-tune their strategies, showing a willingness to divest where necessary to optimize their use of AI.

**Impact on Costs and Revenues:**

AI has had a significant impact on costs and revenues across various sectors. Manufacturing (55%), service operations (54%), and risk (44%) saw the most significant cost decreases due to AI. Meanwhile, manufacturing (66%), marketing/sales (65%), and risk (64%) reported the highest revenue gains.

This section provides valuable insights into the driving forces that motivate companies to invest in various sectors. In manufacturing, AI enables both cost reduction through process efficiency and value chain integration, and revenue growth by improving products or reducing costs, thereby increasing demand. In contrast, marketing typically operates with a predefined budget allocated to activities such as brand awareness campaigns or investments geared towards short-term profitability. In both scenarios, AI presents an opportunity to enhance revenue. This dual capability of AI to cut costs and boost revenue highlights its attractiveness as a strategic investment across different sectors.

**Global AI Adoption (2022 vs. 2023):**

Europe experienced the largest year-over-year growth in AI adoption (9 percentage points), although North America remained the leader. All surveyed regions reported increased AI adoption compared to 2022.

It is encouraging to observe that, despite Europe's reputation in recent decades as a declining force in business, there is now significant interest in embracing this new technological disruption. This disruption may offer European companies an opportunity to regain competitiveness in the future economy, creating a fertile ground for those

looking to implement it. As highlighted by Bob Sternfels in the "Sole 24 Ore" journal[6], the global CEO of McKinsey, the Italian economic landscape, characterized by its numerous SMEs, stands to benefit greatly from these technological advancements. Italy's strong tradition of high-quality products, when combined with the efficiency offered by AI— business efficiency has been a competitive hallmark in recent decades for developing regions such as Asia and China —can potentially restore its competitiveness on the global stage.

**Business adoption and impact on Small and Medium-sized Businesses (SMBs):**

A Microsoft News Center Article[7] highlights the significant impact AI adoption is having on small and medium-sized businesses (SMBs). In 2023, about 33% of SMBs invested in AI This investment is expected to continue, as 71% of SMBs plan to maintain or begin AI investments in the near future. Additionally, 78% of SMBs are currently adopting AI technologies, with 57% using AI for virtual customer service roles. These investments have led to a 40% increase in productivity and 68% of SMBs reporting improved efficiency.

Comparatively, a noteworthy point is that larger companies have a more established but slower-growing adoption rate for AI. In fact, cccording to IBM[8], large enterprises are 100% more likely to have deployed AI compared to SMBs, and in 2023, 57% of very large enterprises planned to increase their AI investments. However, midsize companies are catching up rapidly, particularly through the use of cloud-based and SaaS AI models which reduce cost barriers significantly. This has led to 80% of midsize companies intending to increase their AI investments, outpacing larger firms in the adoption of cloud-based AI technologies.

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[6] *Il Sole 24 Ore. (2023). Sternfels (McKinsey): How to become world leader with quality and speed. But inequalities are a big worry. Retrieved from https://www.ilsole24ore.com/art/sternfels-mckinsey-how-to-become-world-leader-with-quality-and-speed-but-inequalities-are-big-worry-AFW19qBB?refresh_ce&nof*

[7] *Microsoft News. (2024, April 19). AI and SMBs: An analysis of their adoption and impact. Retrieved from https://news.microsoft.com/en-ca/2024/04/19/ai-and-smbs-an-analysis-of-their-adoption-and-impact/*

[8] *IBM. (2022, May). IBM Global AI Adoption Index 2022.*

In general the affordability and accessibility of AI technologies empower SMBs to innovate and compete more effectively with larger enterprises. Historically, larger companies have led in AI adoption, but this gap is narrowing. SMBs are now leveraging more accessible and cost-effective AI solutions to enhance productivity, efficiency, and innovation. This shift allows smaller businesses to harness AI's potential, driving significant advancements and leveling the competitive playing field.

## 1.4 Risks and Challenges of AI Adoption for Companies

Throughout our discussion of producers in the artificial intelligence (AI) field, we have outlined both the vast benefits the technology produces and the increasing confidence companies demonstrate as they continue to commit significant capital to the field. At the same time, to gain a comprehensive view of the corporate landscape, it is necessary to further investigate companies' perspectives on their perceived risks and fears when approaching AI and its implementation. Understanding these factors is crucial in explaining the changes that artificial intelligence is bringing and its possible future developments.

**Cybersecurity and Privacy Risks:**

There is one major risk that will be associated with AI: cybersecurity. Indeed, the KPMG Global Insights report states that 73% consider AI to hold very high risks, with cybersecurity at the top of the list[9]. More specifically, the vulnerability for AI systems to be hacked or manipulated will be a significant risk for businesses. Unauthorized access to business operations and data may cause business dysfunctions and even run the risk for considerable financial loss.

[9] *KPMG. (2023). Trust in artificial intelligence: Global insights 2023. https://kpmg.com/au/en/home/insights/2023/02/trust-in-ai-global-insights-2023.html*

An important risk is also data exposure. According to AvePoint 2024 AI and Information Management Report[10], 45% of firms have experienced unintended data exposure when implementing AI-based solutions. This is a high tendency, indicating that strict data privacy should be ensured by firms, with security measures in place to prevent data offenses and leakages.

**Governance and Ethical Standards:**

There is, therefore, a growing call for AI governance and ethical standards. As a KPMG report considers, overall, producers state that 71% of the respondents think that AI requires regulation to be used responsibly. In fact, businesses have the rise of concern about the ethical considerations of AI, including biases in AI models and the role human oversight should play in the decision-making processes guided by AI.
Of great importance are, above all, the ethical issues—especially the biases that can be unknowingly built in the models. These biases can create unfair treatment towards some people, discrimination, and a loss of trust in an AI. Ethical guidelines during development and deployment of an AI system are, therefore, very important to implement in order to secure public trust and guarantee long-term sustainability in using AI.

**Data Privacy and Security Challenges:**

Although generative AI solutions have been successfully piloted for most companies (77%), the majority of the respondents (80%) indicate that data privacy and security concerns remain to be the most significant challenge to scale AI, according to the poll from Alteryx[11]. The challenge that companies are faced with is two-fold: that of reaping the benefits of AI while mitigating and reducing the risks of AI. The very form of getting

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[10] *AvePoint, Inc. (2024). AI & information management report: The data problem that's stalling AI success. AvePoint, Inc.*
[11] *Alteryx. (2023, May 25). Believe the hype: Real-world data on generative AI adoption and perception. Alteryx. https://www.alteryx.com/blog/believe-the-hype-real-world-data-on-generative-ai-adoption-and-perceptionpee*

AI implemented into the business processes is data-thirsty and, therefore, gives solid grounds for being concerned over privacy and data security.
To this end, companies need to invest in advanced security technologies and in the development of comprehensive data governance frameworks. Those would include a range of measures to protect data integrity and confidentiality, including encryption, anonymization, and strict access control.

The perceived risks of AI for companies are multifold, ranging from cyberthreats to ethical issues and data privacy challenges. As businesses continue investing in AI, these threats continue emerging, thus becoming an imperative for proactive service. Stringent security measures, ethical standards, and data privacy protocols are bound to get implemented in an effort to mitigate the potential downside that AI might create. This way, the companies will realize the full potential of AI in manners that are safe for their operations and maintain trust with their stakeholders. Risks must be understood and mitigated to secure a sustainable and responsible application of AI in the corporate world.

***Concluding Remarks – Chapter I:***

In this chapter, we have observed how the implementation of **artificial intelligence in businesses is a rapidly growing phenomenon**, with investments increasing exponentially and companies increasingly adopting this technology in their operations. This trend is driven by the efficiency AI can bring to processes and the enhancement of customer interactions.

However, it is erroneous to view the implementation of artificial intelligence as a total disruption or as a completely new topic of recent years, given that it has been following a significant growth trajectory that began over a decade ago. What has truly been a disruption, with rapid and substantial growth in the past two years, is generative artificial intelligence. This subset of AI, capable of generating texts, images, videos, and music, is primarily utilized for the first two applications.

Upon closer examination of the phenomenon, particularly current trends, it becomes evident that this disruption has the potential to **alter market structure**, competitiveness, and leadership. Notably, although large companies are at the forefront of this movement, it is the smaller companies and startups that are experiencing the most exponential trends and are being impacted at a higher growth rate. This sector is becoming extremely appealing to smaller companies and startups, which are attracting significant interest from investors, leading to the emergence of more startups. As analyzed, investments and capital flows are increasingly directed towards startups, causing the number of AI companies to grow substantially, representing one of the most significant trends. For instance, in 2023, the number of newly founded companies increased by 40%.

Therefore, while large companies have been driving the transformation thus far, recent years reveal a trend where smaller companies and startups are gaining more attention. This shift raises questions about changes in market structure and leadership. In recent decades, leading tech companies, driven particularly by the community asset they created, have experienced significant growth, dividing the market among themselves. Now, during this transformation, they face a new wave of competition. Consider the case of ChatGPT, which has challenged the previously undisputed search engine giant Google.

Although it has not dethroned Google, merely questioning a tech giant's dominance would have seemed improbable to most. However, in this instance, another tech giant, Microsoft, capitalized on the opportunity by acquiring a substantial portion of OpenAI, the company behind the ChatGPT chatbot. Thus, to summarize, it is a period of significant transformation and fertile investment, where giants and startups are more than ever required to monitor each other closely.

Finally, in the overview presented in this chapter, we have seen how AI has enabled companies to enhance process efficiency and improve customer interactions, fostering closer relationships with individuals. This is achieved through better understanding, analyzing, and interpreting customer data, coupled with improved communication through greater personalization and generative AI, which facilitates direct communication like chatbots.

However, the emerging risk is the ability to **protect data correctly**, securely, and ethically. Due to this powerful AI technology, cyberattacks have become increasingly frequent, placing companies under significant pressure. Furthermore, as individual data is personal and sensitive, there is little margin for error, compelling companies to safeguard it to the best of their ability. This is necessary not only for ethical reasons but also to avoid losing customers and facing economic repercussions, as well as to prevent penalties or sanctions from a regulatory and legal standpoint.

# II

# Perspectives of Key Global Stakeholders on AI's impacts on Enterprises

*Now that the general starting framework has been established, the next step involves laying the foundations to identify potential opportunities and risks that this technology may bring to businesses globally. The implementation of artificial intelligence is part of a broader technological transformation, characterized by its complexity—driven by a vast number of variables—and rapid pace, making it very difficult to capture possible developments and define future scenarios.*

*In this complexity, rather than rolling the dice, it is useful to* ***define the domain of the transformation****, which is the basis of the current scenario and determines future developments. In the previous chapter, an analysis was conducted on the foundations of the current scenario. Now, it is useful to analyze the driving forces of the transformation, which are the perceptions of the entities at the heart of the transformation. Indeed, if a scenario can be defined as a figure resulting from the balance of the various parts in play, considering their centrality and capacity, to intercept how it may change, it is essential to understand how the entities driving the transformation are approaching the issue, how they interact with each other, and the potential consequences of their actions.*

*This chapter will consider the perceptions of the main entities involved in the implementation of artificial intelligence in businesses. Perception refers to how the entity in question is approaching the issue, analyzing attractive forces, resistances, benefits, and harms caused, as well as perceived future advantages and risks.*

*Given that the topic is the implementation of artificial intelligence in businesses, the primary protagonists are certainly the businesses themselves, already properly analyzed in the previous chapter. But there are other central players in this transformation: consumers, financial entities for capital access, entities for operational and strategic support, institutions, and policymakers.*

*The first analysis will focus on the perceptions of consumers, the other protagonists of the transformation, as they represent the other force of the market. It must be remembered that businesses arise and develop to solve consumers' problems/needs through products or services, and consumers are willing to reward the business with a monetary transaction that allows the business to sustain its offer. Therefore, their perception is fundamental in structuring the domain of the transformation.*

*Secondly, entities supporting the market, which direct and accelerate it, will be considered. The perceptions under examination will be those of the entities providing access to capital—thereby determining the realization and growth of ideas and the market—and those of entities supporting the implementation of ideas and long-term strategies.*

*Lastly, the final entity in the structure of the domain, whose perception has a significant impact on potential developments, are policymakers. Institutions that regulate society and, therefore, the market, set the rules and norms on the playing field.*

*The analyses in this chapter aim to provide an awareness of the domain of the transformation, understanding the individual entities that compose it and the outcomes of their interactions. In this way, an understanding of what drives, directs, and guides developments on the topic of artificial intelligence implementation in businesses can be forged, thus enabling the interpretation of the balances arising between them and ultimately* ***understanding the potential developments and future scenarios.***

## 2.1 Overview of Potential Perceptions

It is interesting to note that within the context of the multifaceted discussions regarding the future relationship between humans and AI, presented by the media, institutions, consulting firms, scientific and academic research, blogs, and conferences, various perspectives are emerging and shaping the discourse. These perspectives can be grouped and schematized into three distinct clusters, as highlighted in Peeters' report "Hybrid collective intelligence in a human–AI society.[12]" The three perspectives are as follows:

(1) "*The technology-centric perspective"*, claims that AI will soon outperform humankind in all areas, and that the primary threat for humankind is superintelligence.

This school of thought, expansively expressed by Bostrom in the Oxford University Press[13], is based on the idea that what leads a reality to become dominant in its sphere, capable of progressing and gaining control over externalities, from an evolutionary point of view, is intelligence.
It observes that what has enabled humans to prevail over the rest of the animal world is precisely their intellectual capacity, allowing them to collaborate effectively and to build increasingly advanced tools. However, if our ability to build tools, in this case, ever more evolved models of artificial intelligence, astonished us to the point of making them *superintelligent*, the risks could be unimaginable and perhaps uncontrollable. The repercussions, from job losses to social inequalities, could even touch existential issues.

As Bostrom analyzes, currently the fate of a gorilla is in the hands of the human species, which has a higher degree of intelligence, allowing it to exercise control. Therefore, it is intelligence that triggers control. If an entity, like artificial intelligence, possessed greater intelligence, our fate could be called into question or, at the very least, placed in the hands of someone else. Certainly, it is necessary to better define what we mean by "intelligence," circumscribing it in all its nuances and implications. However, what we want to highlight is the evolutionary structure of species.

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[12] *Peeters, M.M.M., van Diggelen, J., van den Bosch, K. et al. Hybrid collective intelligence in a human–AI society. AI & Soc* ***36****, 217–238 (2021). https://doi.org/10.1007/s00146-020-01005-y*

[13] *Bostrom, Nick (ed.) (2014). Superintelligence: paths, dangers, strategies. Oxford University Press.*

In general, this perspective is based on the idea that AI has the potential to become a superintelligence, which could pose a significant threat to humanity if its goals are not aligned with those of human beings.

(2) In the ongoing discourse surrounding AI, the second identified termed the *"human-centric viewpoint,"* underscores the significance of human social and societal dynamics.

Advocates of this perspective contend that human superiority over AI persists, particularly in realms like creativity, empathy, and social acumen. They caution against overestimating AI's trajectory and stress the potential oversight of human-centric values in its development. Essentially, there's concern that AI designs may neglect crucial social facets intrinsic to human nature[14].

Supporters of this perspective argue that AI cannot fully emulate human social adeptness and emotional intelligence. They advocate for AI to complement human abilities rather than supplant them. Additionally, they warn of AI potentially exacerbating existing social and economic disparities, underscoring the need for a holistic assessment of its societal impacts.

This human-centric stance underscores the primacy of human social and societal elements while acknowledging AI's limitations in these domains. While proponents recognize AI's potential advantages, they also stress the importance of grappling with its ethical dimensions and potential hazards.

(3) The proponents of the third school advocate for a *"hybrid collective-intelligence perspective,"* which posits that the collaboration between humans and AI can yield outcomes surpassing those achievable by either party in isolation.

Proponents of this school of thought envision a future wherein human and machine intelligence converge synergistically, transcending individual capacities to achieve unprecedented levels of cognitive prowess. This vision epitomizes the philosophy of

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[14] *Human, S., & Cech, F. (2020). A Human-centric Perspective on Digital Consenting: The Case of GAFAM. https://doi.org/10.1007/978-981-15-5784-2_12*

collective intelligence (CI), characterized by the emergence of heightened intelligence through the cooperative endeavors, shared knowledge, and competitive dynamics of diverse individuals. In essence, the hybrid collective-intelligence perspective advocates for the symbiotic integration of human and AI capabilities, heralding a new era of collaborative innovation and problem-solving. This vision demonstrates how humans and AI possess complementary capabilities that, when synergized, can achieve a level of collective intelligence that surpasses the collective capabilities of either humans or AI in isolation[15].

## 2.2 Consumers Insights and Perceptions

If the market is indeed the intersection between supply and demand, between the consumer and the producer, to fully understand the current AI scenario in the industry and potentially capture any developments and possible scenarios, it is therefore essential to thoroughly analyze not only the companies' side but also the consumers' side. Once we have a full understanding of the two entities, their needs, and what they derive the most value from, we can better understand their interactions and their market equilibriums.
Once a conceptual framework is built and the underlying causes of the market equilibrium are understood, it becomes possible to identify the various points where these two entities can balance in the future and predict possible market scenarios, along with their respective risks and opportunities.

The present market may in fact hide various causes for its structure and may rely only on a specific need, remedy, or constraint of the particular historical moment, which leaves no room for growth or future sustainability. For example, a market characterized by a particular consumer demand leads to a particularly high demand, but this market will likely rebalance with the consequent potential increase in supply due to the market's attractiveness. Alternatively, consider a low awareness of the market by consumers, whose future sensitization would completely change the system. Consider the historical relationship between the consumer and the company since industrialization: consumers

[15] *Cui, H., & Yasseri, T. (2024). AI-enhanced collective intelligence: The state of the art and prospects. 1(1).*

tended to buy only the product with the lowest price, regardless of everything that entailed. Today, with the attention to ESG and social sustainability, a negative reputation in these areas can lead to significant present and future financial losses for the company.

In short, given the fundamental law of supply and demand, in which needs and demands balance out in the long term, it is essential to understand consumers' perceptions of disruption when analyzing the impact of a corporate transformation over time. And if we can summarize the actions taken by companies as attempts to solve consumer problems to generate the greatest possible value for themselves, it is the consumer who is the protagonist of the economic system, the beating heart, and the company its accelerator.

**Consumer Awareness and Understanding of AI:**

The "2023 AI Index Report"[16] conducted by Stanford University highlights that in 2022, over 60% of respondents from 28 different nations, aged between 16 and 74, reported having a good understanding of AI (64%) and believed that AI-driven products and services would have a profound impact on daily life within 3-5 years[17].

Firstly, it is important to note that the advent of AI has rapidly become a widely discussed topic and is perceived by society as a central issue capable of directly influencing it.
Additionally, most people (>50%) believe that the introduction of AI-based products and services into the market will make life easier and lead to improvements in key areas, in order of priority: education, entertainment, transportation, home, shopping, safety, environment, and food/nutrition.

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[16] *Maslej, N., Fattorini, L., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Ngo, H., Niebles, J. C., Parli, V., Shoham, Y., Wald, R., Clark, J., & Perrault, R. (2023). The AI Index 2023 annual report. AI Index Steering Committee, Institute for Human-Centered AI, Stanford University.*

[17] *Ipsos. (2022, January). Global opinions and expectations about AI.*

**Analytical Study on Consumer Hesitation Towards AI Adoption:**

Up to this point, we are dealing with a widely adopted technology, where consumers are not only convinced that AI-based products or services will personally interest them in their daily lives but also make their *lives easier and more functional.*

So far, the potential AI offerings from producers appear to align well with consumer needs. However, particular research data significantly shifts this perspective and opens the discussion for a broader and more nuanced debate. In fact, the research further explicates how a large portion (48%) of the surveyed sample perceives the advent of technology in products and services as bringing more drawbacks than benefits.

Delving deeper into the issue, it is interesting to note that a study conducted by the "Lloyd's Register Foundation and Gallup"[18] reveals that, although 39% of people think AI will mostly help over the next 20 years, there is a segment of 28% that is convinced it will mostly cause harm. Specifically talking about GenAI - the fastest-growing branch of AI in recent years - the "Global Consumer Survey" conducted by BCG[19] supports this view, showing that although 43% of consumers are enthusiastic about the technology, a significant portion (29%) remains very concerned.

We are thus facing a scenario where a large part of society, despite recognizing the power and potential of this new technology, remains unconvinced about its introduction. There is a significant divide in social thinking, with one part of society being very enthusiastic and the other very worried.

At this point, it is necessary to delve deeper into the principles underlying this social concern. From the employees' perspective, as initially introduced, all the reliable research agree that the greatest fear is job loss, a Microsoft Report[20] evidences how 49% of global employees is worried (for comparison, this figure rises to 77% in the USA, with 44%

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[18] *Lloyd's Register Foundation, & Gallup. (2022). Chart: 2023 AI Index Report.*
[19] *BCG. (2023). CCI Global Consumer Sentiment Survey 2023.* *https://www.bcg.com/publications/2024/consumers-know-more-about-ai-than-businesses-think*
[20] *Microsoft. (2023). Work Trend Index (WTI) Report: Will AI fix work.*

being very concerned[21]). However, if we shift to the other side, the one relevant to our research, namely the consumers, what are their concerns based on? Here too, all research agrees: Consumers' main concern is **protecting their personal data**.

As revealed in fact by the *IAPP Privacy and Consumer Trust Report 2023*[22], 68% of consumers globally are either somewhat or very concerned about their privacy online. The diffusion of AI even potentiates these concerns, with 57% of consumers globally agreeing that AI poses a significant threat to their privacy. Similarly, also a 2023 study carried out by KPMG and the University of Queensland found that, while most believe AI will have a positive impact, the majority (53%) also believe AI will make it harder for people to keep their personal information private[23] (The main driver is that, as the IAPP research evidences, computer automation with no human oversight enhances perceived privacy risk for most consumers).
To this must be added the fact that most consumers struggle to comprehend what data is collected and how it is used (IAPP Privacy and Consumer Trust Report 2023). In fact a Cisco's 2021 study of consumer confidence revealed nearly half of consumers, at 46%, do not feel they are able to effectively protect their personal data. Of these, the majority, at 76%, said this was because it is too hard to figure out what companies are doing with their data[24].

These concerns leave customers distraught, leading to unstable and declining trust in companies that use artificial intelligence: Globally, trust has declined in AI companies over the past five years from 61 percent to 53 percent. In the U.S., there has been a 15-point drop from 50 percent to 35 percent[25].

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[21] *Watts, R. (2023, July 20). Over 75% of consumers are concerned about misinformation from artificial intelligence. Forbes. https://www.forbes.com/advisor/business/artificial-intelligence-consumer-sentiment/*
[22] *IAPP. (2023). Privacy and Consumer Trust Report 2023.*
[23] *Gillespie, N., Lockey, S., Curtis, C., Pool, J., & Akbari, A. (2023). Trust in artificial intelligence: A global study. The University of Queensland and KPMG Australia. https://doi.org/10.14264/00d3c94*
[24] *Cisco. (2021). 2021 Consumer privacy survey.*
[25] *Edelman. (2024). Edelman 2024 Trust Barometer Global Report.*

**Implications of Consumer Perspectives on Business Outcomes - Why Companies Should Pay Attention:**

So, we are faced with a situation where one out of two potential customers approach this new technology with hesitation and fear, mainly due to the fear of losing personal information regarding their privacy.

Finally, after examining consumers' perspectives, this section will uncover the relationship between these views and business outcomes. It will highlight the cause-and-effect relationships to explain why protecting privacy and building consumer trust are significant matters for present-day firms. This analysis serves as a powerful tool to reveal potential risks and opportunities that can impact companies' future competitiveness in the market.

A 2022 survey conducted by McKinsey[26], encompassing over 1,300 business leaders and 3,000 consumers worldwide, indicates that cultivating trust in products and experiences reliant on AI, digital technologies, and data not only aligns with consumer expectations but also has the potential to foster business growth. The research reveals that organizations adept at fostering digital trust are statistically more inclined to achieve annual EBIT growth rates of at least 10 percent across both their top and bottom lines.
From a customer's perspective it is interesting how a big portion (46%) considers switching brands if the one they are considering is *unclear* on how it uses their data, and 53% purchases a product or service only after making sure that the company has a good reputation for protecting its customers' data.

To accurately forecast future scenarios, it is essential to take into account three critical aspects:

Firstly, it is noteworthy that younger generations exhibit a greater sensitivity to these issues, with a 10% higher percentage of concern compared to previous generations. This

[26] *McKinsey & Company. (2022). Global survey on digital trust.*

insight is vital for identifying the profile of future customers and understanding the evolving needs of emerging markets.

Secondly, 40% of respondents indicated they ceased purchasing from companies that violated digital trust. This data is instrumental in predicting market trends. Although this concern may not significantly impact companies' balance sheets in the short term, given the nascent nature of the industry and emerging market needs, the first company to effectively address this issue could capture a substantial market share despite existing customer relationships. However, looking ahead, failure to resolve digital trust issues could result in a loss of customers and market share. It is particularly significant to observe that customers are not unconditionally loyal and are willing to switch allegiances to fulfill their needs.

Thirdly a Capgemini Survey[27] found that 61% of consumers were more likely to refer a company to friends and family if they perceived the AI interactions to be ethical. Additionally, 59% of consumers showed greater loyalty to such companies. This data highlights the significant impact of ethical AI interactions on word-of-mouth marketing, which is a powerful tool in the 21st century, especially with the widespread use of social media.

The Capgemini study also evidences how those who openly communicate in this way about how their technology works are more likely to be trusted by consumers to use AI to its full potential. In addition, according to 64% of consumers, companies that provide clear information about their privacy policies enhance their trust. (IAPP Privacy and Consumer Trust Report 2023). This is not a surprise and its aligned with the Ipsos survey[28] proposed in the World Economic Forum that deducts a direct and positive correlation between the understanding of AI and trust in companies that use artificial intelligence. The research indicates a difference between emerging and high-income

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[27] *Capgemini Research Institute. (2023, June). 73% of consumers globally say they trust content created by generative AI. https://www.capgemini.com/be-en/news/press-releases/73-of-consumers-globally-say-they-trust-content-created-by-generative-ai/*

[28] *Ipsos. (2022, January). Global opinions and expectations about AI.*

countries, showing that the perceived knowledge about technology affects the level of trust in it.

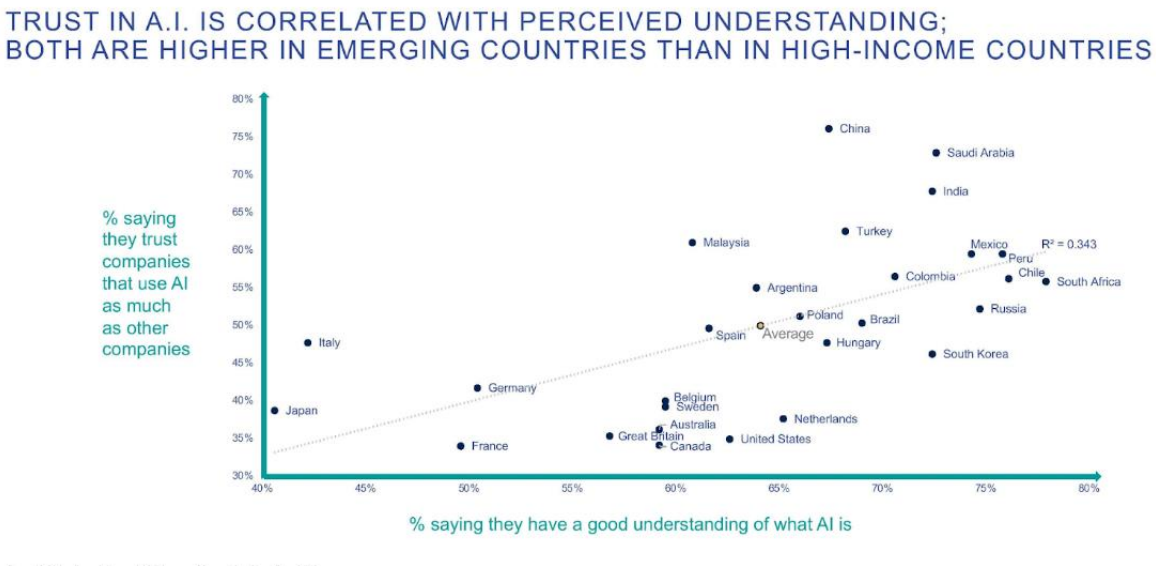


*Figure: 5*

*Source: Ipsos. (2022, January). Global opinions and expectations about AI.*

In conclusion, we can affirm that the market is currently extremely attentive to companies adopting AI because, firstly, it feels directly impacted and is preparing to be even more so in the coming years. Part of this attention is driven by enthusiasm, that is, the belief in the enormous potential of AI products and services to simplify life, starting with everyday activities. Therefore, we are facing a sensitive market, preparing to engage with the technology, enthusiastic about companies adopting AI, and eager to experiment with AI-enhanced offerings. At the same time, the other part of the attention this technology has received is due to a feeling of concern, born from a defence mechanism against the perceived potential loss of privacy. This concern leads to a loss of consumer trust in companies, resulting in a decreased willingness to support them.

From the company's perspective, gaining customers' trust is becoming increasingly a key variable to take into consideration to correctly align with future customer and market needs and stay competitive. The path to follow is to not only pay attention to the privacy requirements of individuals but also to transparently inform customers about how their

data is being used and for what purpose. Customer trust then leads to higher usage of the product or service, improves customer retention, and expands the customer base. Consequently, this results in not only more ethical operations but potentially also higher competitiveness and profits for the company.

## 2.3 Perspectives from Transformation Drivers - Finance & Consulting

Having provided a global overview of how companies and consumers are approaching this technological transformation, the focus will now shift to analysing the key players supporting, directing, and accelerating this transformation. Specifically, entities that provide access to monetary capital—enabling the realization and growth of company ideas—and consulting firms that offer support in terms of intellectual capital through strategic and operational assistance will be examined.

**Entities that support through Access to Financial Resources: The Financial Industry Perspective**

Starting with those who provide access to monetary capital for firms operating in the AI industry, we analyse the extensive reports of a leader in the sector, Goldman Sachs. Goldman Sachs' enthusiasm for AI is evident, and the firm foresees substantial growth in the sector. According to Goldman Sachs Research, the global impact of AI could be transformative. As tools utilizing advances in natural language processing become integrated into businesses and society, they could drive a 7% (or almost $7 trillion) increase in global GDP and lift productivity growth by 1.5 percentage points over a 10-year period[29].

[29] *Goldman Sachs. (2023, April 10). Generative AI could raise global GDP by 7 percent. Goldman Sachs. https://www.goldmansachs.com/intelligence/pages/generative-ai-could-raise-global-gdp-by-7-percent.html.*

Goldman Sachs sees significant growth in AI investments, particularly from private investments. This is critical information for firms as it signals both great opportunity and potential competition, given the increased access to capital. Goldman anticipates exponential growth in private AI investments, projecting that from 2022, where private investments amounted to more than $90 billion, this figure will rise to $158 billion by 2025[30]. This surge in investment indicates growing confidence in AI's potential to drive economic and business transformation. Looking further ahead, AI-related investments could reach as high as 2.5% to 4% of GDP in the U.S. and 1.5% to 2.5% of GDP in other major AI-leading countries. By 2025, AI investment in the U.S. could approach $100 billion, and globally, it could reach $200 billion, underscoring the significant financial commitment expected to drive AI innovation and integration.

Goldman Sachs also addresses the timing of investment gains, noting that the AI investment cycle's timing is hard to predict. Business surveys suggest that AI's investment impact will likely start in the second half of this decade, with earlier adoption by larger firms in information and professional, scientific, and technical services. Generative AI has enormous economic potential and could boost global labour productivity by more than 1 percentage point a year in the decade following widespread usage. However, significant upfront investments in physical, digital, and human capital will be required for large-scale transformation, potentially amounting to around $200 billion globally by 2025. These investments will likely precede the major gains in productivity from AI adoption.

Goldman Sachs emphasizes the urgency for companies to start investing in AI immediately to maintain a competitive edge. According to their survey, less than 25% of companies expect generative AI to impact their operations or reduce labor needs within the next one to three years. However, a significant majority expect to adopt AI within the next three to ten years. If these projections are accurate, AI adoption could start significantly impacting the U.S. economy between 2025 and 2030.

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[30] *Goldman Sachs. (2023, August 1). AI investment forecast to approach $200 billion globally by 2025. Goldman Sachs. https://www.goldmansachs.com/intelligence/pages/ai-investment-forecast-to-approach-200-billion-globally-by-2025.html*

This research is valuable for understanding the perceptions of stakeholders who facilitate capital access for companies. It serves as an important and insightful reference for comprehending how the financial sector is approaching this technology and for assessing the potential to secure investment funding.

However, these sources should not be considered entirely objective and comprehensive for a 360-degree assessment, as they tend to be optimistic. In fact, the research does not highlight significant risks for companies, except for the possibility that AI could replace employees through automation. Additionally, estimates in these reports, often characterized by excessive optimism, are not always accurate. For example, Goldman Sachs predicted a 20% increase in investments from 2022 to 2023, but as noted in Stanford's "Artificial Intelligence Index Report 2024," this did not occur.

**Entities Providing Intellectual Capital for Strategic and Operational Support: A Consulting Industry Perspective**

This section will analyse the perspectives from the consulting industry's viewpoint. These actors support leading companies in their approach to AI, providing both strategic guidance and practical assistance in integrating the technology into their organizations and internal processes.

It is essential to examine the perspectives of consulting firms, as they serve as guiding lights for the companies they support. Companies perceive these consulting firms as authoritative and reliable, often following their guidance. The opinions of consulting firms play a significant role in the market, influencing the decisions of market leaders. Therefore, to understand the potential developments in the technological transformation of AI, it is crucial to analyse and understand the perceptions of these consulting firms.

To do this, we will start with the report "Sizing the Prize"[31] published by PricewaterhouseCoopers (PwC), one of the Big Four. This report has formed the basis for many other studies and has laid the groundwork for business research.

Firstly, PwC shares a profoundly optimistic outlook for the next decade. The company's positive view of the introduction of AI is reflected in its prediction of the future impacts of the technology on the global economy. PwC predicts that "global GDP will be up to 14% higher in 2030 as a result of the accelerating development and take-up of AI – the equivalent of an additional $15.7 trillion (more than the current output of China and India combined)." This prediction differs significantly from Goldman Sachs, which estimates an impact half that of PwC.

An in-depth analysis of the PwC report reveals that out of the $15.7 trillion, $6.6 trillion are attributed to productivity gains and $9.1 trillion is likely to come from consumption side effects. The increase in consumer demand due to enhanced products and services will attract more consumers, fostering a cycle of increased data, better insights, and further demand. This will result from the availability of personalized and/or higher-quality AI-enhanced products and services.

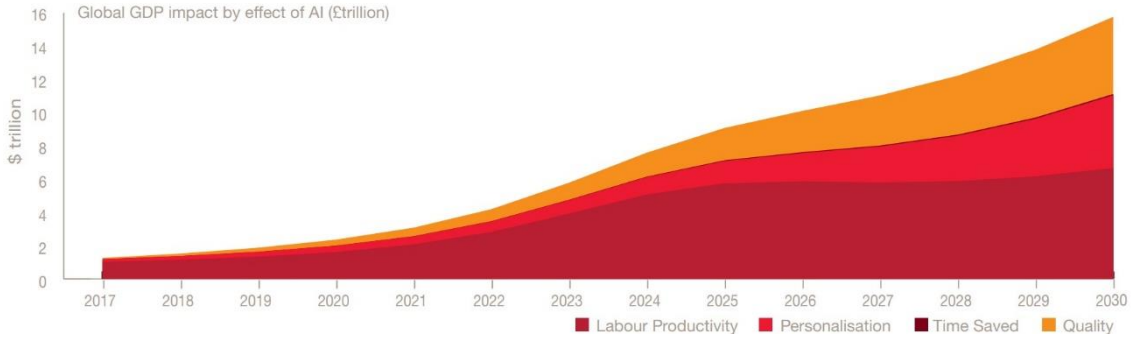


*Figure: 6*

*Source: PwC (2020). Sizing the Prize.*

[31] *PwC (2020). Sizing the Prize. What's the Real Value of AI for Your Business and How Can You Capitalise? https://www.pwc.com/gx/en/issues/analytics/assets/pwc-ai-analysis-sizing-the-prize-report.pdf*

As for productivity, this will come from businesses automating processes, including the use of robots and autonomous vehicles, and augmenting their existing labour force with AI technologies - assisted and augmented intelligence. The manufacturing and transport sectors will benefit the most from AI-driven efficiency. In manufacturing, enhanced monitoring and auto-correction of manufacturing processes can reduce defects and production delays, leading to substantial cost savings. On-demand production and supply chain optimization enabled by AI can reduce inventory costs and improve production planning. For transport, AI technologies such as autonomous vehicles and predictive maintenance will drastically reduce downtime and increase the efficiency of transport operations. Autonomous trucking and delivery systems can operate 24/7, enhancing asset utilization and reducing labour costs. Traffic control systems powered by AI can reduce congestion and improve route efficiency, saving time and fuel costs.

The report is certainly to be taken into great consideration at the same time, it is necessary to keep in mind that it revolves around PwC operational scope. PwC, being an operational consulting firm, structures the report by highlighting the future increase in demand and the benefits that companies can gain by operating in this sector. In fact, on one hand, the report focuses on the future increase in demand and the benefits companies can gain by operating in this sector, and on the other hand, it conducts an in-depth analysis of the most promising sectors, so it is not a totally impartial entity.

While the data in the report is highly optimistic regarding investments, encouraging firms to invest without defining risks, the statements about the sectors that can benefit the most are very convincing. PwC excels in analysing industries and sectors, drawing on a deep understanding of their history and current dynamics. With extensive experience across numerous sectors and long-term projects, PwC’s comparative analysis of industries, sectors, and processes offers a reliable and credible perspective.

Regarding the perception of the possible impact on various countries, PwC's perspective is very similar to that of other reports, such as the one previously analysed compiled by Stanford. PwC highlights that "all regions of the global economy will experience benefits from artificial intelligence. North America and China stand to see the biggest economic

gains, with AI enhancing GDP by 26.1% for China (amounting to $7 trillion) and 14.5% for the US (amounting to $3.7 trillion), totaling $10.7 trillion (70% of the global economic impact). The trajectory of the impact for the two countries differs, as North America is expected to realize the majority of AI benefits faster, while China will likely adopt AI technology more slowly but could see a large impact on GDP by 2030.
Europe, unlike developing countries, will also experience significant economic gains from AI, enhancing GDP by 9.9% ($1.8 trillion). Northern Europe and Southern Europe are expected to see considerable economic benefits from AI adoption, with Northern Europe experiencing a 9.9% GDP increase and Southern Europe an 11.5% increase.

The Global Trade Analysis Project (GTAP) database provides details on the size of different economic sectors (57 in total) and how they trade with each other through their supply chains. It gives this detail on a consistent basis for 140 different countries.

Ultimately, PwC and, specifically, Goldman Sachs, describe few risks associated with this technology, highlighting only in broad terms the potential replacement of jobs by AI, as well as ethical and regulatory risks.

## 2.4 Policy Makers' Perspectives: Comparative Analysis in the USA, Europe, and China

It is widely recognized that two major transformations are underway in the 21st century, commanding significant attention from society, particularly in the Western world. One concerns sustainability, with a deep attention and a new and particularly sensitive approach to the environment, social issues, and governance. The other transformation is technological. The substantial difference between the two is the driving force: the former is policy-driven, meaning that regulatory institutions lay the foundations and then the market attempts to comply with the rules. The latter transformation, technological, is market-driven, meaning that the market drives and develops the transformation, with policymakers then attempting to establish rules and regulations based on market experience to guide the transformation towards a dimension that protects society.

That said, since we are dealing with AI, one of the entities driving the technological transformation, it is now fundamental to analyse how this regulatory part, which is the main actor after the market for technological transformation, is approaching the issue of AI. These normative institutions regulate this transformation. They set the rules of the game, establishing constraints and incentives to guide the process toward a balance that puts society at the centre, protecting it from potential risks while preserving the benefits.

Firstly, the presence and activity of policymakers is not only a highly demanded topic but also central to the appropriate use of technology, starting from the perception of citizens. More than 35% of consumers in fact ranked compliance with legal obligations as the biggest factor motivating companies to protect their privacy. While other forces — from corporate values to competition in today's marketplace — are thought to play a role, most consumers see privacy laws and regulations, such as the EU General Data Protection Regulation, as having a large or moderate effect on the privacy practices of companies[32]. The 2024 Edelman Trust Barometer[33] shows how most of the respondents across 28 markets are concerned that government regulation is lagging behind the rapid pace of invention.

Artificial Intelligence (AI) remains a central focus of global policy due to its transformative potential across various sectors. The AI policies of the United States, European Union (EU), and China reflect their distinct socio-political contexts and strategic priorities. This chapter examines and compares the AI policy frameworks, capabilities, and regulatory approaches of these three major global players, incorporating recent developments up to 2024.

[32] *IAPP. (2023). Privacy and Consumer Trust Report 2023. https://iapp.org/resources/article/privacy-and-consumer-trust-summary/*

[33] *Edelman. (2024). 2024 Edelman trust barometer global report. Edelman.*

**European Union**

The European Union's approach to AI is grounded in its broader regulatory philosophy, emphasizing human rights, ethics, and data privacy. The EU's AI policy, articulated in the White Paper on Artificial Intelligence and complemented by the General Data Protection Regulation (GDPR), aims to create a framework that fosters innovation while protecting individual rights[34].

The European Union's Artificial Intelligence Act (AI Act) is the latest pioneering effort to create a comprehensive regulatory framework for AI, addressing the diverse risks and opportunities presented by this rapidly advancing technology. Proposed by the European Commission on April 21, 2021, and subsequently passed by the European Parliament and Council, the AI Act aims to ensure that AI systems deployed within the EU are safe, transparent, and respect fundamental rights. The Act introduces a risk-based approach, categorizing AI applications into four levels: unacceptable, high, limited, and minimal risk, with general-purpose AI receiving special attention[35].

Unacceptable risk AI applications, such as those used for social scoring or real-time biometric surveillance in public spaces, are outright banned under the AI Act. High-risk AI applications, including those in critical sectors like healthcare, education, and law enforcement, must comply with stringent requirements related to security, transparency, and human oversight. These systems are subject to conformity assessments both before being placed on the market and throughout their lifecycle to ensure ongoing compliance. The Act also accommodates the evolving nature of AI by allowing the list of high-risk applications to be updated without amending the Act itself.

Limited risk AI systems, which include applications like chatbots and certain types of recommendation systems, have lighter transparency obligations, mainly aimed at informing users that they are interacting with AI. Minimal risk AI applications, such as

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[34] *European Commission. (2020). White paper on artificial intelligence: A European approach to excellence and trust.*

[35] *Future of Life Institute. (2024). High-level summary of the AI Act. EU Artificial Intelligence Act. https://artificialintelligenceact.eu/high-level-summary/.*

those used in video games or spam filters, are largely exempt from regulation, reflecting their low potential for harm. The Act also addresses general-purpose AI systems, particularly generative models like ChatGPT, which are subject to transparency requirements and additional scrutiny if they pose systemic risks[36].

To enforce the AI Act, the EU has established several new institutions, including the European Artificial Intelligence Board and national competent authorities, to oversee compliance and provide guidance. These bodies will work together to ensure that AI systems meet the necessary standards, fostering a harmonized approach across the EU. The Act's extraterritorial provisions also extend its reach beyond EU borders, requiring non-EU providers to comply if their AI systems impact users within the EU.

Overall, the AI Act positions the EU as a global leader in AI regulation, balancing the need for innovation with the imperative to protect fundamental rights and public safety. By setting clear rules and establishing robust oversight mechanisms, the Act aims to build trust in AI technologies and promote their ethical and responsible use across various sectors.

**China**

China’s AI strategy is driven by the central government's ambitious goal to become the world leader in AI by 2030. The Chinese government plays a pivotal role in directing investments towards AI projects and creating a conducive environment for AI proliferation. China's policy framework supports extensive data collection and utilization, facilitated by lax privacy regulations, which accelerates AI development[37].

Recent developments include the New Generation AI Development Plan’s continued implementation, with a focus on integrating AI into various sectors such as healthcare,

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[36] *European Commission. (2024). Regulatory framework proposal on AI. Digital Strategy. https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai*

[37] *Roberts, H., Morley, J., Barham, H., et al. (2019). The Chinese approach to artificial intelligence: An analysis of policy, ethics, and regulation.*

finance, and urban planning. China has also introduced more stringent data protection laws, such as the Personal Information Protection Law (PIPL) in 2021, to regulate data use and address privacy concerns.

**United States of America**

The United States has historically led AI development, driven by substantial private sector investment and innovation. The American AI Initiative, launched in 2019, emphasizes technological breakthroughs, development of technical standards, workforce training, and safeguarding American values like civil liberties and privacy. The initiative encourages federal agencies to develop sector-specific guidelines, promoting a flexible and innovation-friendly regulatory environment.

Recent updates include the National AI Initiative Act of 2020, which established the National AI Initiative Office to coordinate AI research and policy across the federal government[38]. The Biden administration has further emphasized the need for ethical AI development, addressing biases in AI systems, and enhancing AI education and training programs to ensure a diverse AI workforce[39].

**Comparative Analysis**

The AI policies of the US, EU, and China reflect their distinct strategic priorities and regulatory philosophies. The US prioritizes innovation and economic competitiveness, relying on the private sector for AI development. The EU focuses on ethical standards and human rights, striving to set global norms for AI regulation. China emphasizes rapid development and state control, leveraging its centralized political structure to drive AI advancements.

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[38] *National AI Initiative Office. (2020). National AI Initiative Act of 2020.*
[39] *Soni, D. (2020). The U.S. AI Initiative and its impact on technology policy.*

Each approach has its strengths and weaknesses. The US's flexible regulatory environment fosters innovation but may overlook ethical concerns. The EU's emphasis on ethics and human rights ensures responsible AI development but may hinder rapid technological progress. China's state-driven approach accelerates AI development but raises significant ethical and privacy issues.

The comparison of AI policies in the US, EU, and China highlights the diverse approaches to managing AI's transformative potential. Balancing innovation with ethical considerations and regulatory oversight is crucial for harnessing AI's benefits while mitigating its risks. As AI continues to evolve, international cooperation and harmonization of standards will be essential to address the global challenges posed by this disruptive technology.

***Concluding Remarks – Chapter II:***

Observing the perspectives of the four key players identified - consumers, policymakers, financial entities, and consulting firms - two main aspects emerge.

Regarding the latter two entities, which specifically support market producers, the outlook is clearly optimistic. Both foresee a rapidly growing market, fueled by increased productivity (especially in the manufacturing sector) and demand, with artificial intelligence driving consumer purchases and accelerating the market, expanding its size. No significant risks have been identified that could hinder companies. In summary, there is strong encouragement for companies to invest in this new technology and its implementation.

As for society, the perspective changes drastically. Although consumers and policymakers express confidence and enthusiasm about the improvements that artificial intelligence will bring to market products, there is also considerable concern. This mainly stems from the management of sensitive and private data by companies. Personal data are extremely sensitive, and the fact that they are managed by profit-oriented companies causes insecurity. Companies must increasingly consider that consumers are less willing to compromise. In the medium to long term, inadequate management of personal information can lead to a loss of customers and, ultimately, a loss of competitiveness. To fully exploit opportunities and gain market share, companies need to earn consumers' trust. To achieve this trust, companies must adequately protect personal data (e.g., against cyberattacks) and not misuse it. They must also interact transparently with customers and accompany them in their actions, preventing them from feeling lost or unaware of what they are using. Uncertainty decreases trust, while transparency and guidance increase it.

In this scenario, European policymakers and those of the two leading economies, the USA and China, although initially lagging in the transformation, are beginning to become more active, each according to their own strategies and regulatory philosophies. European institutional policies address the issue by seeking to protect the citizen, their privacy, and ultimately, collective well-being. The established policies and regulations aim to directly steer the market towards these socially-oriented goals.

The perspective changes across the Atlantic when looking at the United States of America. US policies do not focus as much on consumers and society as they do in Europe but rather on producers. In fact, the USA has adopted a largely laissez-faire approach, encouraging innovation and industry self-regulation.

Finally, Chinese policies aim to grow rapidly and increase their competitiveness, striving to achieve global leadership with this innovation. Unlike the USA, China, in enhancing its competitiveness, also seeks to maintain a central role of the state, retaining significant control.

Although the USA, China, and Europe are pursuing the transformation of artificial intelligence with great interest, attention, and investment, companies must be aware of the different socio-political situations in various states and consider the different strategies and positions regarding the balance between ethics, competitiveness, and state

control. This will be crucial, as the technological transformation of artificial intelligence is initially market-driven, giving companies considerable freedom of movement, but now policymakers are beginning to become more active. Their influence is likely to increase, as they seek to dictate the rules of the game more and more. In summary, political and regulatory developments are uncertain, but it is clear that, now that companies and technological innovation have made enormous progress, making artificial intelligence a topic of social relevance, policymakers have entered the game.

# III

# Current AI Landscape in Italy: Market Analysis, Implementation Drivers, and Hurdles

*After exploring and analyzing the global landscape of artificial intelligence and its implementation worldwide, this chapter aims to delve into the Italian context to understand how this nation is approaching this transformation.*

*The analyses presented in the previous chapters will serve as a benchmark to assess Italy's position and identify the trends emerging in its companies. The analysis will start with macro scenarios and gradually narrow down to specific business aspects. Ultimately, it will lay the groundwork for hypothesizing potential opportunities and risks.*

*Specifically, the initial focus will be on analyzing the AI market and its consumers, followed by an examination of the impacts AI has had on various industries and business processes. The chapter will also identify which technological applications of AI have been most utilized by Italian companies.*

*Highlighting the risks, benefits, motivations, and resistance to AI, and conducting a detailed analysis of each, will provide an understanding of the current receptivity of this technology within the Italian economic fabric. It will explore which industries/sectors or business processes have seen the most positive outcomes from AI and which have seen less, as well as where there is still room for improvement.*

*In summary, this chapter aims to test, evaluate, and interpret the overall sensitivity of the Italian economy to the introduction of artificial intelligence.*

## 3.1 The Italian Perspective on Artificial Intelligence: High Interest Amidst Hesitation and Skepticism

The research conducted by the Artificial Intelligence Observatory of the School of Management of the Politecnico di Milano highlights that in 2023, almost all Italians (98%) have heard of Artificial Intelligence, and more than one in four Italians (29%) have a medium-high level of knowledge about it[40]. The interest in the topic is very strong, but it must be remembered that it is a new topic and has not had time to structure itself, bringing with it a lot of enthusiasm but also a lot of confusion. It is interesting to note that one in four Italians claims to have interacted at least once with ChatGPT, and three out of four have heard of ChatGPT, but only 57% know the term "Generative Artificial Intelligence."

There is therefore a lack of information and a lot of confusion, accompanied by a fear of something perceived as powerful but with little knowledge. In fact, 77% of Italians (+4 percentage points compared to 2022) view Artificial Intelligence with fear, especially concerning its possible impacts on the world of work. However, there is hesitation but not outright rejection: only 17% are firmly opposed to the entry of AI into professional activities.

The data reveals that in Italy, even more so than globally, society is highly attracted to the topic of Artificial Intelligence but remains poorly informed. This lack of knowledge is accompanied by a degree of hesitation and skepticism.

## 3.2 Italian AI Market Analysis and Current Implementation

In Italy, when we talk about artificial intelligence (AI), we are referring to a market that is not only steadily growing but also expanding exponentially. The research conducted by the Osservatorio Artificial Intelligence provided a detailed analysis of the overall AI

[40] *Osservatorio Artificial Intelligence (2024, February 1). Intelligenza artificiale, crescita record del mercato in Italia: +52%. https://www.osservatori.net/it/ricerche/comunicati-stampa/intelligenza-artificiale-italia*

market, revealing that in 2021, the total market value was 360 million euros. Just two years later, this value doubled, reaching 760 million euros, marking a +52% increase compared to the previous year.

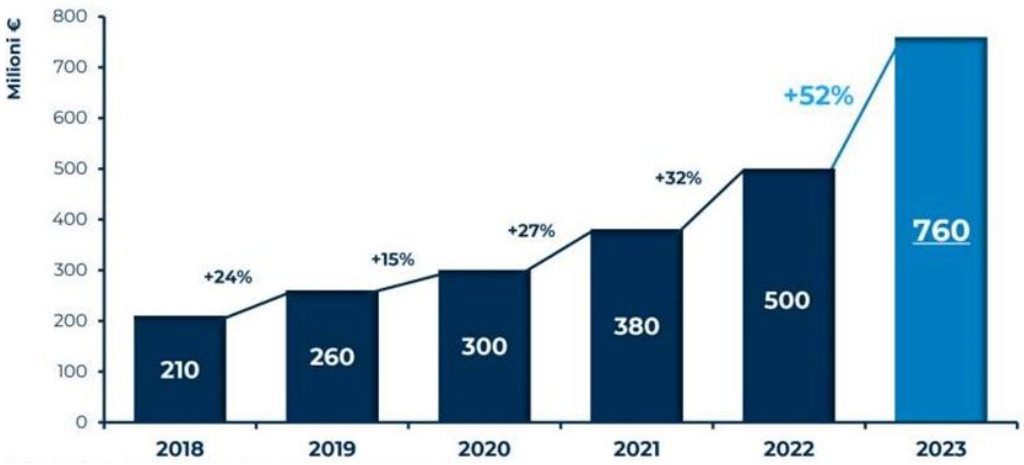


*Figure: 7*

*Source:* *Osservatorio Artificial Intelligence (2024, February 1). Intelligenza artificiale, crescita record del mercato in Italia: +52%*

Thus, the AI market is of great interest and rapidly expanding. However, despite its strong growth, it remains a new market, as evidenced by its structure. Surprisingly, the pool of companies that already use artificial intelligence, even marginally, is mainly composed of large enterprises and constitutes a minority. Despite AI being a widely discussed topic and at the center of debates, it is currently neither central to the operations nor has it penetrated the walls of most Italian companies. Unioncamere released a Report on March 4, 2024[41], stating how less than 10% of Italian companies utilize AI, a small figure but still growing, as an additional 15% plan to invest in AI in the next three years. This data, derived from the Selfi 4.0 digital maturity self-assessment campaign submitted to 40,000 Italian companies.

[41] *Unioncamere. (2024, March 4). Intelligenza artificiale: meno del 10% delle imprese la utilizza già.* *https://www.unioncamere.gov.it/comunicazione/comunicati-stampa/intelligenza-artificiale-meno-del-10-delle-imprese-la-utilizza-gia*

It's worth noting that the expansion of the artificial intelligence market does not come from an increase in the number of companies using AI, but rather from investments in future implementation. The Italian National Institute of Statistics (ISTAT) conducted a survey in 2023 called "Rilevazione sulle Tecnologie dell'Informazione e della Comunicazione nelle Imprese"[42], which confirms the slow progress in AI technologies.

As reported in the following Table, in 2023, only 5% of companies with at least 10 employees (compared to 6% in 2022) use at least one of seven AI technologies - Text mining (T1); Voice recognition (T2); Natural language generation (T3); Image recognition and processing (T4); Machine learning, deep learning, and neural networks (T5); Robotic process automation (T6); Robots, drones, or autonomous vehicles (T7).

*Tabella 1 - Distribuzione (in percentuale) dell'adozione delle 7 tecnologie di IA in funzione del numero di addetti (Rilevazione ICT ISTAT, 2023)*

| Classi di addetti | T1 | T2 | T3 | T4 | T5 | T6 | T7 | Almeno 1 su 7 | Almeno 2 su 7 | Almeno 3 su 7 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10-49 | 40.8 | 32.9 | 30.8 | 31.4 | 27.2 | 38.5 | 16.6 | 4.4 | 2.4 | 1.4 |
| 50-99 | 33.5 | 24.6 | 24.8 | 29.4 | 30.4 | 45.2 | 14.6 | 5.6 | 2.4 | 1.3 |
| 100-249 | 30.5 | 20.8 | 24.9 | 21.5 | 31.5 | 44.7 | 23.2 | 10.4 | 5.1 | 2.4 |
| 250 e più | 39.8 | 28.8 | 25.5 | 31.4 | 51.9 | 45.7 | 17.9 | 24.1 | 14.5 | 8.7 |

*Table: 1*

*Source: ISTAT (2023). Rilevazione sulle Tecnologie dell'Informazione e della Comunicazione nelle Imprese.*

Companies with 50-99 employees have seen a decrease in usage, standing at 5.6% (compared to 9.4% in 2022). The proportion of large companies remains stable at around 24%.

Therefore, it becomes clear that large companies are driving this new technological frontier. However, considering only the number of companies implementing the technology does not provide a comprehensive understanding of the phenomenon. The

[42] *ISTAT. (2023). Rilevazione sulle Tecnologie dell'Informazione e della Comunicazione nelle Imprese. Retrieved from https://www.istat.it/it/files//2023/12/report-imprese_2023.pdf*

surprising fact is that, according to the Osservatorio Artificial Intelligence, 90% of the AI market in Italy is accounted for by large enterprises. The remainder is evenly distributed between SMEs and the Public Administration. In this scenario, large companies are leading the transformation.

Given that large companies are the primary drivers, it is advantageous to adopt a comprehensive perspective on the AI maturity of Italian corporations. This approach will facilitate a deeper and more detailed analysis of these major enterprises.
To this respect, the Osservatorio of Artificial Intelligence analysed the maturity of large organizations in the adoption of AI, identifying five different profiles. 11% of companies are pioneers (an increase of 2 percentage points compared to last year), having achieved full maturity at the technological, organizational, and managerial levels in adopting AI solutions. 23% of companies are apprentices, with several projects underway but often managed with unstructured methodologies, frequently relying on standard or off-the-shelf solutions. In the remaining 66% of cases, situations are heterogeneous: some organizations are on the way (29%), equipped with enabling elements but with few projects, and companies that do not perceive the topic as relevant and lack adequate infrastructure.

## 3.3 Key Business Sectors and Technologies Driving the Italian AI Market

This chapter delves into the Italian AI market, leveraging data from the Italian National Institute of Statistics (ISTAT) to analyse the factors driving this transformation and the associated investments. The analysis begins with a macro perspective, identifying the industries that have spearheaded the transformation. Following this, it examines the specific business areas that have motivated these industries to invest in AI. Finally, to comprehend the innovations AI brings to these companies and its perceived utility, the chapter analyses the most utilized AI technologies. This approach clarifies which AI applications have been most beneficial to the Italian economy.

**Industry Analysis: Leading Sectors Driving AI Adoption in Italy:**

Regarding the industries that have proven to be the leading implementers of AI, it is interesting to note that we can observe a scenario similar to the global one. The industries most utilizing AI are, on the one hand, companies active in IT, with 23.6% of them involved in AI in 2023, and on the other hand, companies operating in telecommunications with 13.3%. These data were extracted from the ISTAT survey "*Rilevazione sulle Tecnologie dell'Informazione e della Comunicazione nelle Imprese*."

However, it is important to note that according to the "2023 Censimento Permanente delle Imprese", another more in-depth ISTAT report on about 280,000 companies[43], a new result emerges. Given the high number of economic activities considered in the multi-purpose survey, it is revealed that insurance companies and the financial sector are among those that use AI techniques the most (51% and 31%, respectively). These sectors are strongly attracted to AI mainly for reasons of cybersecurity, particularly for preventing cyber-attacks.

[43] *Istituto Nazionale di Statistica. (2023). Censimento permanente delle imprese 2023: primi risultati. https://www.istat.it/it/files//2023/12/report-imprese_2023.pdf*

The reason for the difference in results between the two reports is that the first did not fully take into account AI for cybersecurity, which, as we have seen previously, is one of the greatest perceived risks for companies. More sensitive and consumer-exposed sectors, such as the financial or insurance sectors, cannot afford to compromise on this front.

**AI Adoption in Business Processes and their Key AI Technologies:**

Following the analysis of the market and the general landscape of artificial intelligence in Italy, a more targeted analysis will be conducted to identify the areas and business processes driving investments. Additionally, the specific AI applications most frequently utilized by Italian companies will be examined.
Regarding business areas, AI systems are most frequently adopted in the following processes:

1. *Production processes:* Particularly for predictive maintenance or quality control of production (39.0%, up to 52.5% in the manufacturing sector).

2. *Marketing or sales functions:* Notably for customer support functions or personalized promotional campaigns (33.1%, up to 41.3% in the service sector).
3. *Cybersecurity:* Used by 23.7% of companies, with a peak of 50.6% in the energy sector.

4. *Research and development (R&D) or innovation activities:* To analyze data, develop a new or significantly improved product/service (21.1%).

Percentage of AI Systems Usage Stratified by Business Areas of Adoption and Industry Sector (ISTAT ICT Survey, 2023)

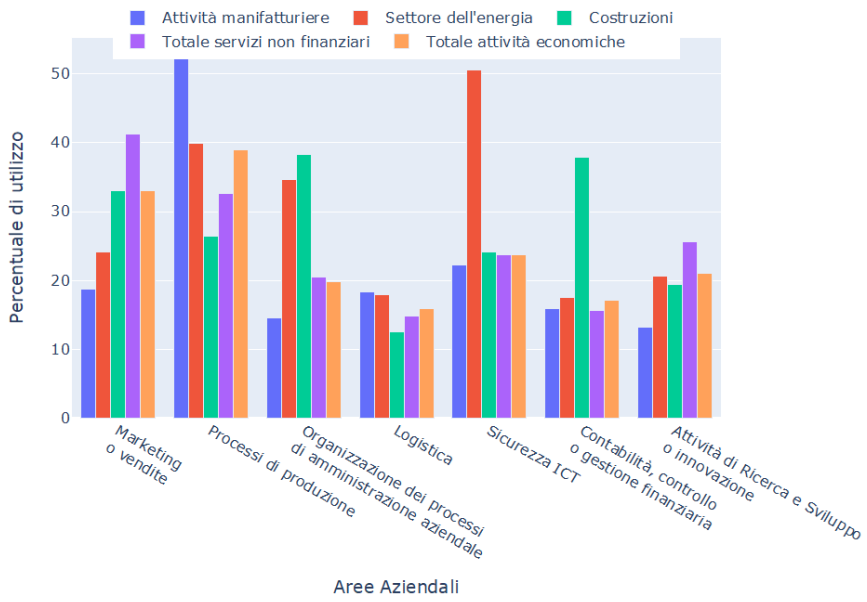


*Figure: 8*

*Source: Istituto Nazionale di Statistica. (2023). Censimento permanente delle imprese 2023*

Having identified the sectors that are both in need of and most attractive to artificial intelligence, it is now crucial to delve into the specific technologies that have been most widely adopted to drive these impacts. This understanding will enable us to comprehensively evaluate the current landscape of AI implementation, providing insights into how these technologies are transforming various industries and where further opportunities for advancement may lie.

Among companies using AI, the most common technologies are:

1. Workflow automation through robotic software: Used by 40.1% of companies, up from 30.5% in 2022.

2. Knowledge and information extraction from text documents: Adopted by 39.3% of companies, up from 37.9% the previous year.

3. Conversion of spoken language into computer-readable formats through speech recognition technologies: Used by 31.0%, stable from the previous year.

4. Data analysis through machine learning: The most widely used technology by large companies employing AI, with a percentage of 51.9%.

These technologies represent the main AI applications implemented by Italian companies to improve production processes, marketing, cybersecurity, and research and development activities.

## 3.4 Key Motivations Driving AI Investments in Italian Companies

In the previous chapters, the spaces in which companies operate when approaching artificial intelligence were examined, including specific industries, business processes, and technologies used. In this context, the motivations and obstacles that drive Italian companies to invest in the implementation of artificial intelligence are analyzed in detail, based on a 2024 study conducted by Minsait in collaboration with the University of Luiss Guido Carli[44].

The main motivations emerging from the research, ordered by relevance, are:

- *Efficiency:* Optimization of operations and cost reduction.

- *Customer Experience:* Improvement of customer experience.

- *Flexibility and Adaptability:* Ability to respond quickly to market changes.

[44] *Minsait & Università Luiss Guido Carli. (2024). Intelligenza Artificiale in Italia: La rivoluzione che sta cambiando il business.*

- *Sales:* Revenue increases through improved offerings and customer understanding.

- *New Offerings and Business Models:* Innovation in products and services offered.

- *Positioning as an Innovative Company:* Strengthening the image of a cutting-edge company.

The bar chart illustrated in the figure below shows how these motivations vary in terms of relevance across different industrial sectors and in relation to company size.

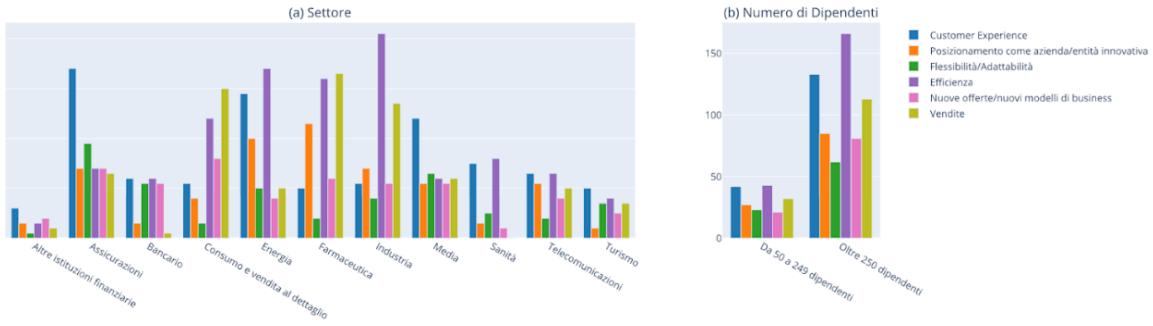


*Figure: 9*

*Source: Minsait & Università Luiss Guido Carli. (2024). Intelligenza Artificiale in Italia: La rivoluzione che sta cambiando il business.*

In general, efficiency (25%) and customer experience (20%) are the most relevant motivations for introducing AI across various sectors. This result is clearly aligned with the ISTAT study "Survey on Information and Communication Technologies in Enterprises," previously analyzed, which identified production processes and marketing and sales functions as the primary business processes for AI implementation. Indeed, efficiency enhances production processes, and customer experience enhances marketing and sales. In short, this survey highlights once again the potential of AI to improve business margins through process optimization and to offer more personalized services that meet consumer needs. Most demanded AI capabilities by companies.

Additionally, it is interesting to note how motivations differ depending on company size. It is observed that while efficiency and customer experience are fundamental for all companies, large enterprises tend to focus more on innovating new business models. In contrast, small businesses place greater importance on flexibility and adaptability. This is a causal effect of their necessity to respond quickly to market changes, aiming to capture market opportunities and potential value creation drivers before large corporations do.

## 3.5 Analyzing the Barriers to AI Implementation in Italian Businesses

To understand how to maximize the relationship between businesses and AI, it is crucial to consider not only the benefits and potential that technology implementation can bring but also the significant obstacles that Italian companies have faced when interacting with this technology. Recognizing these obstacles is essential for gaining a comprehensive and accurate view of the Italian market structure as a whole. As discussed in previous chapters, the number of companies embarking on the path to AI implementation in business processes is quite limited. Consequently, most of the Italian market comprises companies that are not actively engaged in this transformation, whether by choice or otherwise.

Firstly, obstacles can manifest in various ways. To provide a thorough overview, this chapter's analysis will focus on two aspects: on one hand, it will examine the barriers that have prevented companies from wanting to implement AI in their business processes; on the other hand, it will investigate the obstacles that halted the transformation process for companies that had already begun the journey but subsequently decided to stop due to these obstacles. Although the difference is subtle, comparing these two analyses will offer an additional tool to understand the distinction between the perceptions and beliefs of Italian companies and the actual obstacles they have encountered, which, as we will see, have led some companies to halt their progress.

In the research conducted by the consultancy firm Minsait in collaboration with Luiss Guido Carli University, the barriers preventing companies from wanting to implement AI were identified. In order of relevance, these obstacles are:

1. *Financial:* The company does not have sufficient investment capacity.

2. *Skills:* Difficulty in finding qualified professionals.

3. *Vision:* Business leaders do not have a clear direction on how to apply AI to extract full value.

4. *Technology:* The infrastructure is not ready, and the market offerings are not mature and tested.

5. *Data:* Data silos exist that would require investments in a unified platform and the creation of a new data management model.

6. *Organization:* The organization has not adapted to AI adoption (roles/processes/methodologies).

7. *Regulatory:* Access and management of data in compliance with privacy regulations.

8. *Other regulatory and legal uncertainties.*

The following bar chart illustrates the most significant barriers by sector and company size.

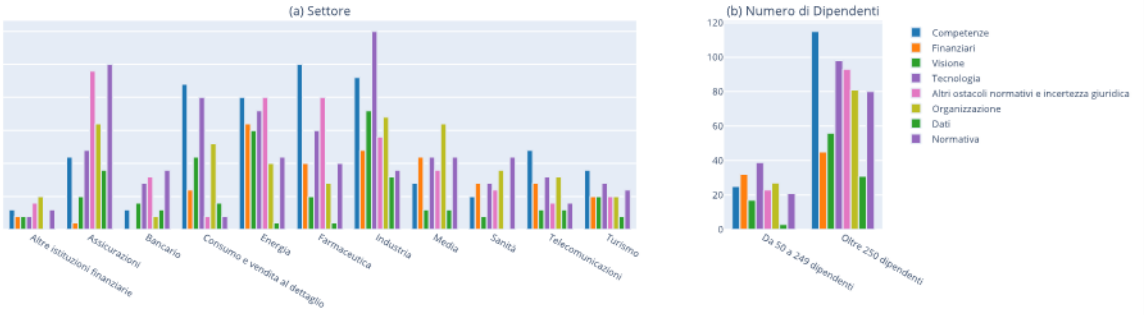


*Figure: 10*

*Source: Minsait & Università Luiss Guido Carli. (2024). Intelligenza Artificiale in Italia: La rivoluzione che sta cambiando il business.*

From the chart, it is evident that for medium-large companies, the main obstacles are skills and technology, at 19% and 16%, respectively. Skills are a fairly generalized obstacle, except in banking, insurance, and healthcare, where it is not seen as the primary obstacle. In small businesses, budget constraints are also an obstacle, which is not surprising given the high entry barrier for introducing this type of technology in smaller entities.

It is important to consider, along with the data from Minsait's research, the previously analyzed report "Rilevazione sulle tecnologie dell'informazione e della comunicazione nelle imprese," conducted by ISTAT, the Italian National Institute of Statistics. This report helps to understand the obstacles that hindered companies during the AI implementation process. Specifically, it analyzes those companies that had started the AI implementation process but subsequently stopped for various reasons. These companies represent only 4.4%, so we are not talking about a large segment, but neither is it an insignificant percentage that cannot be analyzed for the most significant obstacles that halted their transformation process toward AI.

In the subsequent bar chart depicting the main obstacles, it can be noted that there are no standout obstacles but rather a series of different barriers that equally share the causes of the failed AI implementation. However, among the obstacles to AI usage detailed in the

next chart, the lack of skills (55.1%), high costs (49.6%), and the unavailability or poor quality of the necessary data (45.5%) stand out, while the perceived uselessness of AI technology is indicated by 14.3% of companies.

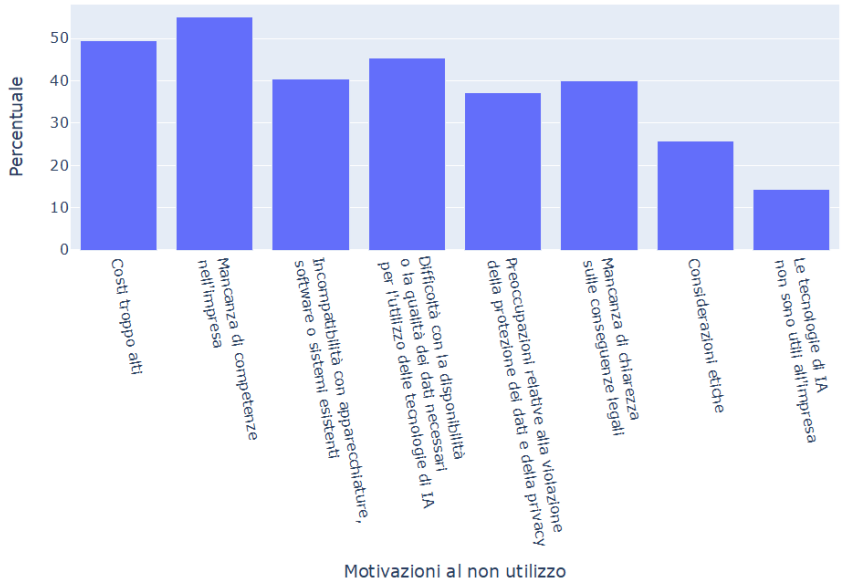


*Figure: 11*

*Source: ISTAT. (2024, May 10). Rilevazione sulle tecnologie dell'informazione e della comunicazione nelle imprese.*

Comparing the two types of obstacles identified in the two studies, namely the obstacles that prevent companies from wanting to implement AI in their processes, and the obstacles that hinder companies already in the process of implementation, we can observe some differences. Firstly, both highlight the issues of cost and skills, and therefore the financial capacity to support the transformation and the internal capabilities to pursue it successfully.

Regarding the differences, while for the companies that have not yet started the implementation journey the lack of vision represents a problem, this obstacle is not found in the companies already engaged in the process. This is intuitive as the transformation is new and not all organizations are aware of how to best seize the opportunities offered by AI.

It is interesting to note that among the obstacles that arise during implementation, the issue of data emerges, whose centrality was not evident in the first group. This difference underscores the importance and centrality of data in the twenty-first century. Therefore,

companies, to initiate the transformation towards AI implementation, must ensure they possess the necessary data, guaranteeing that it is of high quality and properly collected.

An interesting aspect of the research is that, although the overall rate of companies stopping from the initial desire to implement AI is very low at 4.4%, it is more than three times higher for large companies (15.3%). This may be since there was greater interest from large companies and because it was technically more complicated to implement in a more complex and sensitive data structure. Therefore, although large companies are driving the transformation toward AI, thanks to access to capital and large amounts of data, they are also less agile and quick compared to Italian SMEs. These data reinforce the idea that SMEs can leverage their intrinsic strength—speed of action—to seize new AI opportunities before large companies make significant inroads.

**Case Study - Ammagamma:**

A significant example is the experience of the consultancy firm Ammagamma, founded in 2013 in Modena. It has worked to improve the productivity and performance of Italian companies by leveraging AI potential, partnering with leading companies in the energy, insurance, banking, utilities, and media sectors. Over the decade, the company has grown exponentially, closing 2022 with 6.5 million euros in revenue, a significant number considering its focus on the Italian market and that its turnover doubled compared to 2020.

The company's ability to move ahead of its competitors allowed it to not only grow rapidly but also establish itself in the market, both through client relationships and by technically developing skills, expertise, and experience in the Italian market. This led the multinational consultancy firm Accenture, a global leader in helping companies with IT services, to acquire Ammagamma on January 30, 2024[45], to remain competitive in the Italian market.

[45] *Accenture. (2024). Accenture acquisisce Ammagamma per accelerare l'innovazione delle aziende italiane grazie all'Intelligenza Artificiale [Press Release]. Accenture.* *https://newsroom.accenture.it/it/news/2023/cs-accenture-acquisizione-ammagamma-28112023*

***Concluding Remarks – Chapter III:***

The analysis conducted in this chapter has highlighted how the adoption of artificial intelligence in the Italian economic landscape follows trends in line with global tendencies. Although the number of companies implementing AI in Italy is still low, there is a rapidly growing AI market that has not been affected by the slight decline recorded globally from 2022 to 2023. Socially, Italians also show a strong interest and attraction to this new technology, despite having limited actual knowledge about it.

The primary driver for Italian companies to implement this technology has been efficiency reasons, leading to AI being implemented mainly in production processes through automation with robotic software.

The second reason attracting companies towards the adoption of this technology pertains to customer interaction, namely marketing and customer experience. This has contributed to making Large Language Models (LLMs) the second most used AI technology, particularly important for generating text to interact with customers and for extracting information from texts. Finally, AI has been implemented for cybersecurity reasons, to protect sensitive data and digital assets of companies.

Overall, the increasing process of AI implementation in Italian companies has been driven primarily by improvements in production efficiency and customer interaction. The in-depth analysis reveals that AI significantly enhances customer interaction. It is not surprising that the telecommunications sector emerges as the most impacted, as it is a sector structurally based on interaction as its core business model.

# IV

# Integration of Artificial Intelligence in Italian Business Processes: Analysis of Opportunities Through Case Studies

*The subsequent chapter examines the business processes wherein artificial intelligence has demonstrated substantial impact for Italian enterprises. This analysis will allow us to comprehend the extent to which Italian companies are tangibly impacting various processes with AI tools. Furthermore, to elucidate the opportunities inherent in each business process, a successful case study will be presented to demonstrate the actual potential within the domain.*

*Up to this point, the current general scenario of the entry of artificial intelligence into the corporate fabric and its surrounding factors has been analysed. This analysis was necessary to provide a solid awareness of the structure of this potential digital transformation. Now, the focus shifts to the areas where the application of this technology is taking place concretely and where objectives, challenges, and opportunities are realized: the individual business processes and their applications. This chapter is useful for understanding how the various market perspectives have been channeled and how the opportunities that artificial intelligence can offer companies have been realized.*

*Regarding the data, the analysis will employ the most recent information from the study titled "Intelligenza Artificiale in Italia: La rivoluzione che sta cambiando il business," conducted by Minsait in collaboration with the University of Luiss Guido Carli. This study is based on a sample of over 502 organizations across 11 different sectors.*

## 4.1 ESG & Sustainable Development

The adoption of Artificial Intelligence (AI) in the realm of sustainability has become a central topic for many Italian companies, aiming to enhance their sustainability journey and commitment to social responsibility. According to a study by Minsait, about 50% of companies in the Italian economic fabric report having at least some use cases in the ESG (Environmental, Social, and Governance) domain. These use cases vary significantly in terms of implementation and characteristics, primarily due to two main factors.

The first factor pertains to the ESG concept itself, which is divided into three macro-areas: Environmental, Social, and Governance. These areas are quite different in their characteristics but are united by the values and beliefs underpinning the commitment to these sectors. The second factor concerns the multitude and diversity of intersection points between companies and sustainability, which can occur in various ways.

The following graph has been constructed using the data collected from the research conducted by Minsait in collaboration with Guido Carli University, which illustrates the diverse and balanced ways companies can enhance their ESG pathways.

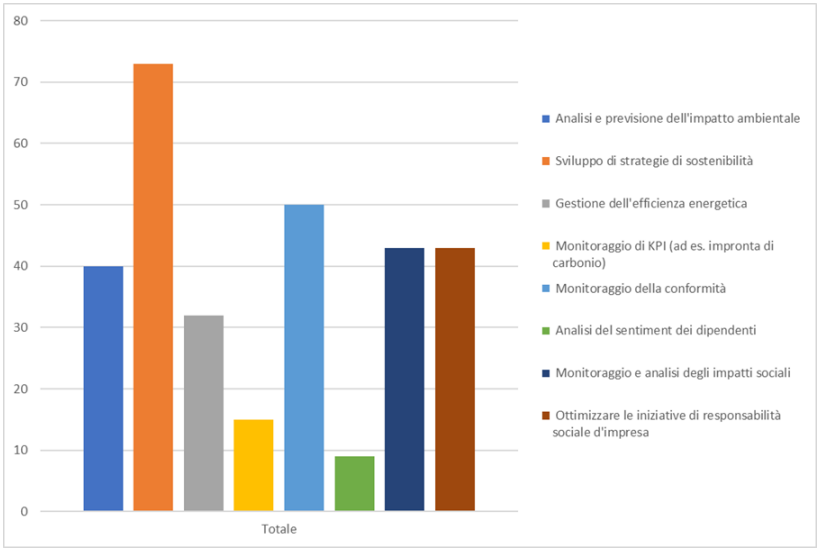


*Figure: 12*

*Source Minsait & Università Luiss Guido Carli. (2024). Intelligenza Artificiale in Italia: La rivoluzione che sta cambiando il business.*

Artificial Intelligence (AI) provides sophisticated tools for monitoring, analyzing, and optimizing Environmental, Social, and Governance (ESG) performance, thereby enhancing the effective and responsible management of these critical resources.

A company can express its sustainability path and articulate its social responsibility in various ways: from a sustainable relationship with the environment, it interacts with, to an approach oriented towards social and individual respect and well-being, to governance that includes the ethical values deemed important by society. In short, the actions aimed at demonstrating a company that approaches the environment around it responsibly can be very diverse and cover different areas, spaces, and procedures. In light of the above examining the data, one should not be surprised to see balanced impacts, not overly skewed towards one aspect of sustainability. Specifically, AI has been deployed for:

- *Environment:* Analysis and prediction of environmental impact and management of energy efficiency.

- *Social:* Monitoring and analysis of social impacts, optimization of corporate social responsibility initiatives, and sentiment analysis of employees.

- *Governance:* Compliance monitoring and KPI tracking.

Moreover, it is evident how business-driven companies are. The largest investments have been made in areas with the most significant monetary impact. The primary area where AI is most utilized is in long-term strategies, as sustainability is perceived as a transformation that will profoundly impact business over time and in the long term. Subsequently, the adoption of AI for compliance monitoring represents a policy-driven transformation. This progression is primarily driven by regulations and institutional mandates, which elevate the standards for advancement, contrasting with the typically market-driven nature of technological adoption.

## Case Study: CIRFOOD, a Sustainable yet Efficient Approach to Supply Chain Planning and Management

CIRFOOD, an Italian cooperative specializing in collective catering and welfare services, collaborated with Ammagamma, an Italian AI consulting company, from 2020 to 2023 to apply artificial intelligence (AI) algorithms to meal planning and raw material procurement. The objective was to measure and improve the qualitative impacts on the environmental and social sustainability of the company's logistics processes.

The AI solution developed by Ammagamma for CIRFOOD yielded significant results in the first year, both in terms of environmental sustainability and quality of work improvement. Specifically, the demand forecasting and inventory optimization system applied to warehouse management and storage reduced food waste by 15% and decreased raw material storage by 111 tons.

Additionally, there was a 94% increase in monitorable references and a 56% improvement in forecasting accuracy. Employees also experienced higher work quality and better planning due to the implemented sustainability strategy. Furthermore, the supply chain was more effectively involved, reducing the overall environmental impact of the activities carried out[46].

This case study provides an example of a company that not only complied with sustainability impact regulations but also, with the aid of AI, became more socially responsible and improved its business performance. In fact, this case study can serve as an inspiration for other companies to identify business processes where social responsibility can coexist with improvements in other areas, such as social or business performance. I believe this represents an interesting and at least rewarding opportunity for Italian companies on this front.

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[46] *ESG360. (2023, May 18). Misurare l'impatto sostenibile dell'AI nella ristorazione: il case study CIRFOOD. Retrieved from https://www.esg360.it/digital-for-esg/misurare-limpatto-sostenibile-dellai-nella-ristorazione-il-case-study-cirfood/*

## 4.2 Marketing

Firstly, marketing, much like in global companies, represents one of the preferred areas for Italian businesses. Approximately 50% of the companies surveyed report having AI use cases in marketing, as depicted in the graph below.

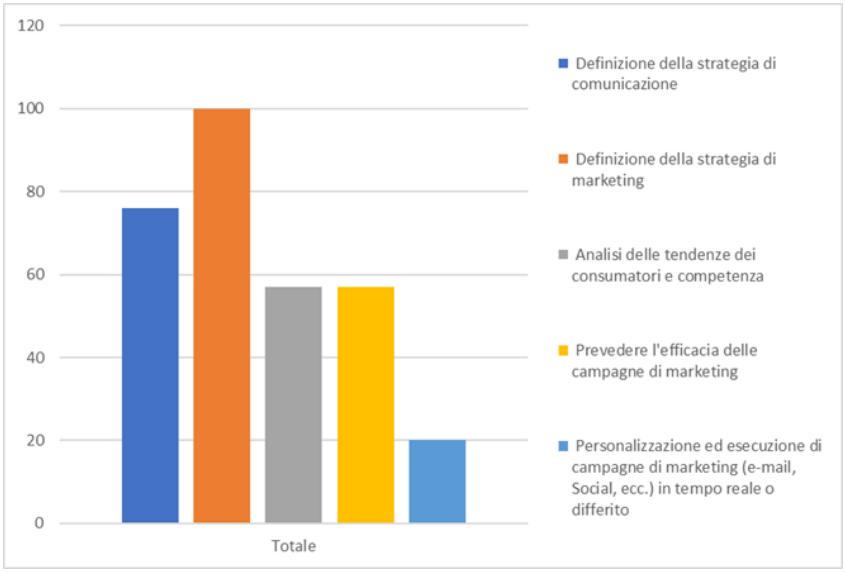


*Figure: 13*

*Source Minsait & Università Luiss Guido Carli. (2024). Intelligenza Artificiale in Italia: La rivoluzione che sta cambiando il business.*

In analysing these data, it is essential to understand the underlying principles. Two primary concepts are pivotal: customer listening and communication. Listening can be categorized into two distinct types: firstly, artificial intelligence (AI) facilitates a deeper understanding of individual consumers; secondly, it enables the analysis of broader market trends. This advanced listening capability empowers companies to attain a holistic view of customer preferences and behaviours, thereby enhancing their strategic decision-making processes.

Communication, powered by AI, is also twofold. AI allows for targeting general trends with broad communication and marketing strategies, capable of optimally leveraging emerging trends. At the same time, it enables personalized communication with

individual consumers, offering tailored experiences that increase customer engagement and satisfaction.

In summary, AI in Italian companies enhances customer relationships by increasing their ability to listen to and understand both individual consumers and market trends, and to communicate effectively on both a large scale and a personalized level. This results in more targeted and efficient marketing campaigns, more sophisticated and meaningful customer management.

## Case Study: Artificial Intelligence Transforms LuisaViaRoma's Advertising Campaigns

LuisaViaRoma, an Italian fashion retailer, has addressed the increasing competition in the e-commerce market by adopting AI-based marketing strategies. The need to optimize resources and returns on advertising investments led to the implementation of a predictive model.

In collaboration with Google and Making Science, LuisaViaRoma tested Gauss Smart Advertising, an AI-based predictive model for advertising campaigns. Given the planned elimination of Google cookies[47], the model utilizes first-party data to assign values to user actions on the site, such as interactions with product pages and adding items to the cart.

Campaigns based on this model increased sales by 36% compared to a control group and improved returns on advertising spend. AI enabled the identification of customers most likely to make a purchase, thereby optimizing the campaigns[48].

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[47] *Brittin, M. (2024, February). Sblocca la crescita nel 2024: preparati a un nuovo modo di fare marketing. Think with Google. Retrieved from https://www.thinkwithgoogle.com/intl/it-it/strategie/dati-e-misurazione/crescita-marketing-2024/*

[48] *Antonelli, N. (2024, Marzo). Dietro le quinte di LuisaViaRoma: come trasformare i dati in clienti di valore. Think with Google. https://www.thinkwithgoogle.com/intl/it-it/strategie/marketing-automation/luisaviaroma-intelligenza-artificiale-moda/*

This case study is valuable for Italian companies operating in marketing and e-commerce, to understand how to adapt to potential future scenarios. The trend, at least in Europe, is clear: institutions are increasingly focused on regulating and limiting access to personal data. Accessible data will be fewer and primarily consist of those directly provided by customers during interactions with the company. Companies, as LuisaViaRoma has done, will need to improve in listening to and understanding customers to accurately segment their target audience. Online competition is growing, and to remain competitive, companies must make the most of available data in an increasingly restrictive regulatory context.

## 4.3 Product and Service Design

The use of artificial intelligence (AI) in companies is beginning to transform the way products and services are defined, which can have a positive impact on both businesses and consumers. Thanks to AI, companies can analyse vast amounts of data to identify consumer patterns and preferences, enabling unprecedented customization of products and services. This not only enhances customer satisfaction but also optimizes production by reducing waste and improving efficiency. Moreover, AI can predict market trends and identify new business opportunities, fostering innovation. The automation of decision-making and operational processes can then reduce repetitive workload, allowing staff to focus on more strategic and creative tasks.

The adoption of AI in this sector is high, around 85%. This figure is justified by the significant role AI can play in the design of goods and services for customers, positively influencing market competition and business performance.

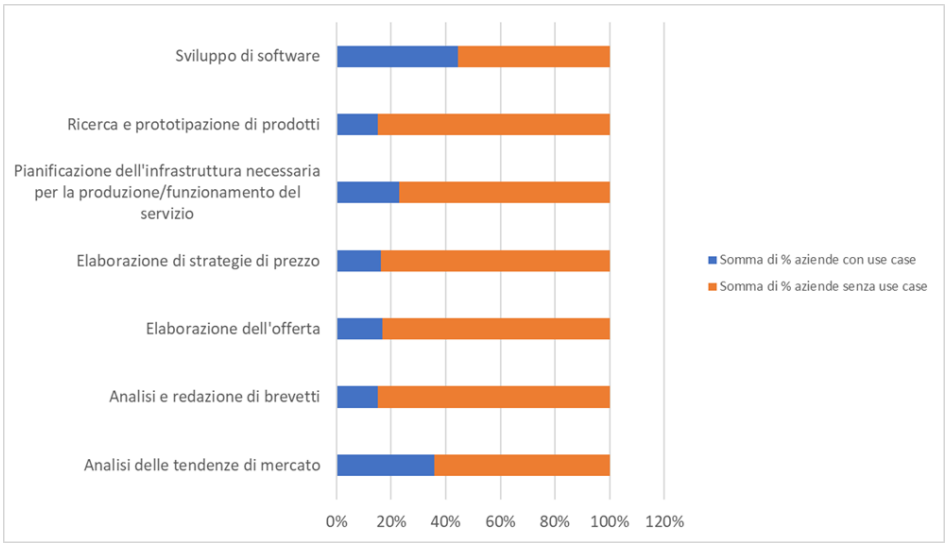


*Figure: 14*

*Source Minsait & Università Luiss Guido Carli. (2024). Intelligenza Artificiale in Italia: La rivoluzione che sta cambiando il business.*

AI is crucial for developing systems that offer better products to end customers (approximately 42%). Additionally, it is essential in the development of digital products, accelerating the creation of innovative solutions. AI is also seen as a valuable tool in market trend analysis (about 38%), particularly in predictive analytics, significantly improving the decision-making process. However, AI is less utilized in research and prototyping, with relatively low adoption rates (around 15%).

It is evident that Italian companies have not fully benefited from the technological revolution of recent decades and the trade of products or services in new markets, remaining focused on more traditional sectors (unlike countries such as the USA, Israel, China, India, etc.). However, AI can represent a technology capable of changing the global landscape and making Italy more competitive in new technological frontiers.

Indeed, while continuing to progress within the current market structure required significant pre-existing capital (financial, intellectual through research and development, and legal such as patents), AI can represent a turning point for making Italy more competitive and less dependent on technological front-runners. The risk is that if significant investment is not made during this transformative period, Italy could find itself again in a situation where the market is dominated by leaders that are difficult to compete with.

## Case study: AI in Mobile App Design to Compete for Industry Leadership: The Case of Bending Spoons

An emblematic example of success in integrating artificial intelligence into software development is represented by Bending Spoons, an Italian company that has effectively leveraged the potential of AI in its mobile applications. This innovative approach has allowed Bending Spoons to emerge as one of the most dynamic and competitive entities in the Italian economic landscape, managing to compete with global tech industry giants.

A significant indicator underscoring Bending Spoons' success is its achievement, in July 2023, of the top spot in global download charts for ten consecutive days, making it the most downloaded app globally during that period. This case study highlights how AI can represent a true revolution, capable of transforming market dynamics, and Bending Spoons is fully capitalizing on this opportunity.

Founded in 2013, Bending Spoons has rapidly become one of the leading application developers in the world. With over seven million monthly users and more than two hundred million downloads, the Lombard company has seen its market value grow to reach $2.55 billion[49].

In short, the introduction of AI has led to a disruption, at least in the technological landscape. Bending Spoons exemplifies this opportunity present in the market and demonstrates how it is possible to seize it by investing resources to design and offer potential products or services for the future market.

[49] *Milano Finanza. (2024, February 16). Bending Spoons vara il riassetto e riorganizza tutte le partecipazioni. Retrieved from https://www.milanofinanza.it/news/bending-spoons-vara-il-riassetto-e-riorganizza-tutte-le-partecipazioni-202402160123131559*

## 4.4 Human Resources (HR)

The adoption of artificial intelligence in the human resources sector could significantly transform this field, enhancing efficiency and effectiveness in personnel management. With AI, the recruitment process could become more precise and faster, thanks to systems capable of analyzing thousands of resumes to identify the best candidates based on required skills and experiences. This could expedite hiring and make the process more objective, reducing unconscious biases.

AI could also personalize employee training by analyzing their performance and feedback to create tailored development programs, increasing engagement and productivity. Additionally, AI tools could monitor employee well-being, detecting signs of stress or dissatisfaction and enabling proactive interventions to improve satisfaction and staff retention. In this way, AI could help companies manage human capital more strategically, enhancing talent selection and management and contributing to long-term business success.

Currently, the use of AI in human resources is rather low, around 40%. This may be due to cultural resistance among workers to using automated processes. Today, AI is primarily used for employee training and development, with a 40% usage rate. In personnel analysis and selection, the use of AI is still low, around 20%, but this area could be heavily influenced by AI in the near future. Probably, soon CV analysis and initial candidate screening could be completely entrusted to AI tools.

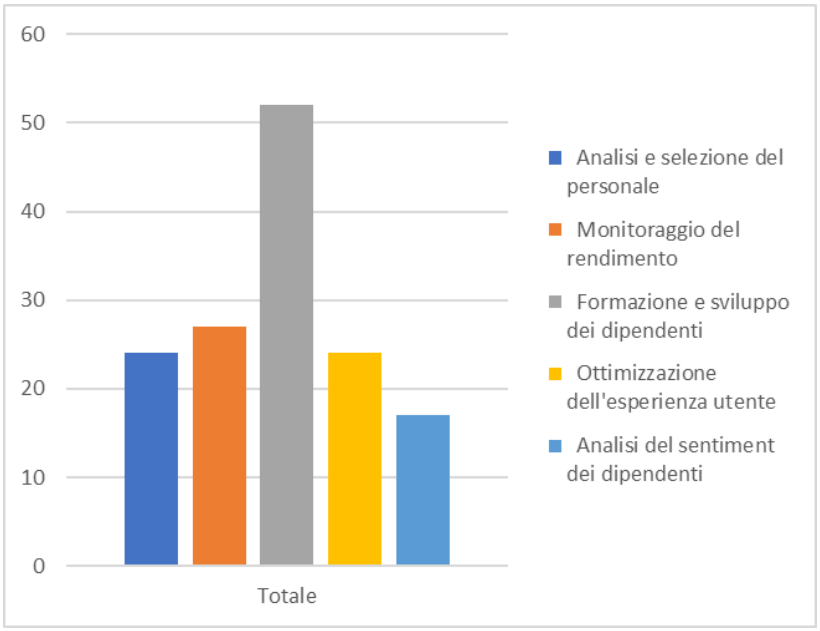


*Figure: 15*

*Source Minsait & Università Luiss Guido Carli. (2024). Intelligenza Artificiale in Italia: La rivoluzione che sta cambiando il business.*

One observation is that it is surprising to see how artificial intelligence has been adopted more in areas outside the core fields of HR, such as talent sourcing and the recruiting process. Instead, it has focused on topics like training, thus upskilling, and performance monitoring. Training, upon closer examination, is not entirely surprising and represents a very positive aspect of using this new technology. Indeed, as highlighted in Stanford's AI Index Report, education is the area where society, and thus people, see the most possible positive impacts.

Therefore, this can be interpreted as a winning move by Italian companies, as they manage to align with the needs of their personnel. On the other hand, performance and performance monitoring are more sensitive and complex areas. In this case, drawing conclusions and judgments about the correctness or efficiency of this approach is more delicate. It remains a fact that many HR professionals still heavily rely on human judgment to choose candidates. Perhaps companies receiving many applications can use AI for initial screening, but the data shows that when it comes to actual selection, HR professionals are still hesitant to use this type of technology.

In summary, while the adoption of AI in training represents a positive progress and is in line with societal expectations, the use of AI for performance monitoring requires greater caution. Despite the potential benefits, candidate selection continues to be an area where human judgment plays a predominant role.

## Case Study: SACE and AI for Employee Upskilling - A Growth Path Aligned with the Individual, its Position, and Company Needs

A system that has achieved excellent results in implementing tailored corporate training paths aimed at the specific needs of employees, roles, and the company is certainly "Craft Your Growth: Career GPS." It is an innovative and certainly credible system, developed by Sace in partnership with Accenture, which has won the HR Innovation Award from the Osservatorio HR Innovation Practice of the Politecnico di Milano[50].

Sace is a professional services company that supports major organizations in their digital transformation journeys. Leveraging the potential of new Generative Artificial Intelligence technologies, Sace guides people's development and growth paths within the company. The Craft Your Growth: Career GPS system integrates data and algorithms to support both Human Resources and individual employees, enhancing the potential of Sace's resources.

The system combines mapping of current skills within the company with mapping of potential skills needed for the company's development. This allows each employee to navigate within the organization, akin to using an intelligent satellite navigator, discovering their positioning, growth potential, and constructing their career path.

The described case study is particularly compelling as it underscores the potential for synergy between artificial intelligence and the human element. It reveals a convergence

[50] *SACE. (2024). SACE vince l'HR Innovation Award. https://www.sace.it/docs/default-source/comunicati-stampa/2024/sace-vince-l'hr-innovation-award.pdf?sfvrsn=fc0fe6b9_1*

that transcends mere performance and efficiency, demonstrating how technology can directly enhance human-centric dimensions. This example illustrates that AI, human resources, and the human element can coexist harmoniously, highlighting the transformative impact of technology on organizational dynamics and employee engagement.

## 4.5 Information Systems (IS) and Information Technology (IT)

In the context of the Italian IT landscape, there are multiple issues to address. AI in IT is primarily focused on monitoring and maintenance activities. Approximately 50% of Italian companies report using AI in IT. As the data shows, AI usage is still mainly concentrated on monitoring infrastructure capacity, projects, and applications, accounting for 55%. Application maintenance, currently at 25%, is also expected to grow. This is because AI allows for simplified and almost automatic management of first-level help desk structures and more efficient work on second-level structures.

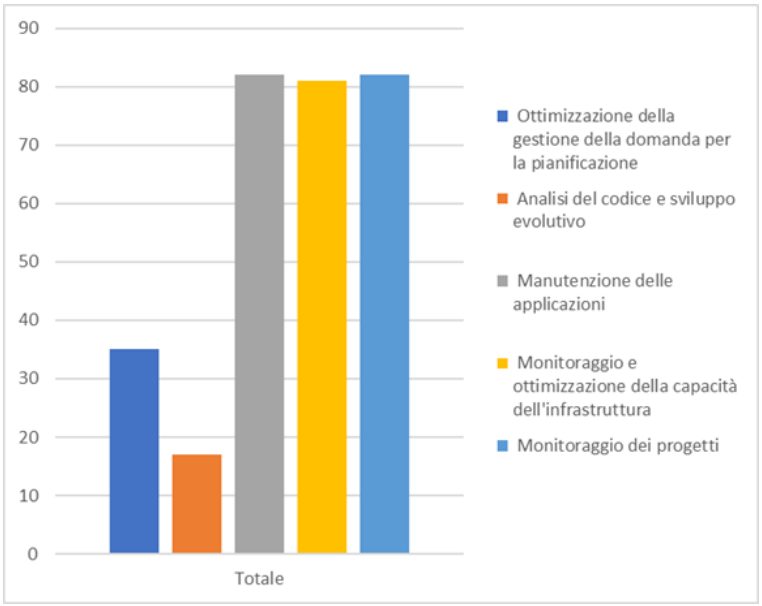


*Figure: 16*

*Source Minsait & Università Luiss Guido Carli. (2024). Intelligenza Artificiale in Italia: La rivoluzione che sta cambiando il business.*

However, a more concerning figure is that the percentages for code analysis and evolutionary development are around 6%. Where stronger skills are required, Italy begins to falter. Nevertheless, there is a significant growth opportunity in this sector, as the new generative AI algorithms, recently introduced, will provide increasing support in the analysis and development of evolutionary systems.

When addressing the IT sector, we are approaching one of the most sensitive areas for Italian companies today. In fact, it is in this domain that companies currently perceive the greatest risks. According to the Allianz Risk Barometer 2024[51], cybersecurity represents the second largest risk for businesses in 2024, having been the foremost risk in 2023, surpassed only by concerns over business interruption. This reinforces the findings presented in the KPMG Report, analysed in the "Risks and Challenges of AI Adoption for Companies" subchapter of the thesis.

Indeed, cyberattacks are continuously increasing globally: according to the Clusit report[52] (Associazione italiana per la Sicurezza Informatica), there were 1,382 serious incidents in the first half of 2023 alone, an 11% increase compared to the same period in 2022, the highest number ever recorded globally. In Italy, this escalation is even more pronounced, with 132 attacks in the first half of 2023 (+40% compared to 2022). 74% of large Italian organizations have detected an increase in attack attempts, and 12% have suffered tangible consequences from a cyber incident.

But what is the state of cybersecurity in Italy today? According to the annual report by the Cybersecurity and Data Protection Observatory of the Politecnico di Milano[53], in 2023, the Italian cybersecurity market reached a new development peak, with a total value of 2.15 billion euros, growing by 16% compared to the previous year. This growth is due to the increasing interest of Italian companies in cybersecurity, which remains the primary investment priority in digital for small and medium-sized enterprises, the need to protect new digital projects, and the requirement to comply with current regulations.

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[51] *Allianz Commercial. (2024). Allianz Risk Barometer 2024: Identifying the major business risks for 2024. Allianz SE. https://commercial.allianz.com/news-and-insights/reports/allianz-risk-barometer.html*

[52] *Clusit. (2024). Rapporto 2024 sulla sicurezza ICT in Italia. https://clusit.it/rapporto-clusit/*

[53] *Osservatorio Cybersecurity and Data Protection. (2023). Cybersecurity & Data Protection. Politecnico di Milano. Retrieved from https://www.osservatori.net/it/ricerche/osservatori-attivi/cybersecurity-data-protection*

## Case Study: Exein and Innovation in Cybersecurity for the IoT Ecosystem

When discussing the topic of corporate security in the IT area, it is evident that we mainly talk about maintenance and monitoring of technological infrastructure. However, this technology can be approached from a myriad of different perspectives. Opportunities in this field for new companies arise from the immense spaces present in the sector, each of which is crucial as it often involves sensitive issues and data or technological infrastructures that form the backbone of digital assets. These assets are becoming increasingly important in the twenty-first century.
This theme will be exemplified through the case study of Exeix, a Roman startup that has effectively addressed a unique and specific challenge within a highly demanded area: IoT device security. Specifically, Exein focuses on monitoring and protecting embedded systems. Embedded systems are computing devices integrated within larger systems, designed to perform specific control functions and often not programmable by the end user. They are found in devices like routers, phones, and cars and are increasingly vulnerable to cyber attacks.

A Gartner Report[54] predicts that by 2022, 70% of organizations will risk breaches due to vulnerabilities in firmware, the low-level software that controls device hardware. Exein addresses this challenge with open-source tools for the protection and remote monitoring of devices, helping them recognize and counteract unwanted behaviors. This approach, which acts as an internal immune system, is particularly relevant for an estimated 30.9 billion IoT devices by 2025.

In conclusion, Exein not only operates in a very sensitive and essential field, security, but also solves a specific issue within a more complex system: IoT device security, a concern shared by much of society. This context, along with the company's core competences, has allowed Exein to fully exploit the opportunities created by artificial intelligence in information systems.

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[54] *Gartner. (2019). How to Mitigate Firmware Security Risks in Data Centers, and Public and Private Clouds.*

## 4.6 Legal

In general, the legal sector covers approximately 50% of the companies surveyed, and, as shown by the data below, the use of AI in the legal domain is particularly relevant in the area of privacy, with around 35% of responses. This topic has been highly sensitive for companies for several years, especially with the introduction of the GDPR. However, in this field, the use of AI can grow significantly in the coming years, as its impact on legal processes can lead to substantial operational efficiencies. Consider, for example, use cases such as automated searches across vast databases of case law, automated reading of legal and contractual documents, automated compliance analysis, and automated drafting of legal documents. These are just some of the new frontiers that the legal sector will have to face in the near future.

It is noteworthy how the application of AI in the legal sector is much more significant than commonly discussed. This is not surprising: companies' strategies and actions are usually business-driven, meaning they respond to business needs. In this case, the areas of application align precisely with the companies' needs. In fact, revisiting previous studies conducted when analyzing the major perceived risks of companies approaching AI, we observed that the greatest concerns lie in compliance with regulations and policies (since technological transformation is policy-driven, with the public pushing and companies following the proposed structure) and, secondly, in the proper management of data to ensure strong security that protects the data itself. In this chapter, however, we can see how companies' perceptions, in this case regarding risks, have concretely materialized, as demonstrated by the proposed data:

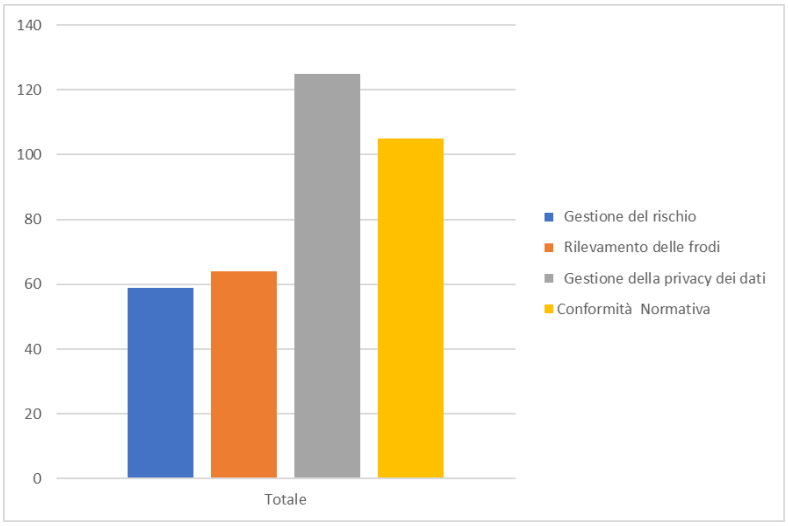


*Figure: 17*

*Source Minsait & Università Luiss Guido Carli. (2024). Intelligenza Artificiale in Italia: La rivoluzione che sta cambiando il business.*

Therefore, there are significant opportunities in implementing AI in the legal field for companies that approach it, as this is the area where the main risks of AI in the corporate sector can be addressed. At the same time, the same space of opportunities may harbour potential risks. It is essential to understand the degree of freedom that companies can grant this technology. It is important to remember that, when we talk about AI, especially powerful AI, its reasoning processes are challenging to comprehend. This is referred to as the 'AI black box', which denotes an AI system whose internal mechanisms or decision-making processes are opaque or not easily understandable by humans. In other words, when data is input into the AI black box and outputs are generated, we do not truly know how the AI arrived at its conclusions or decisions.

Since both data security and regulatory compliance are highly delicate activities, involving public laws and sensitive personal data, errors cannot be made lightly. The classic business and finance dynamic of learning from mistakes becomes more difficult. Companies must be cautious in determining the optimal degree of freedom that still allows close monitoring of AI decisions and ensuring the accuracy of outputs. As a last resort Italian companies, operating in a territory where AI regulations are stricter

compared to other countries, must be very careful in the event of an AI error, as they are the entities that must be accountable.

## Case Study: Aptus.AI - Legal Information Made More Accessible Through Artificial Intelligence

Aptus.AI is an artificial intelligence startup founded in 2018 in Pisa. The company utilizes RAG (Retrieval-Augmented Generation) to enhance accessibility in the legal sector by transforming legal documents into machine-readable formats and training the Daitomic platform. This platform leverages RAG to analyze and comprehend regulatory texts, providing simplified and comprehensive access to legal information.

RAG is a generative AI technique that optimizes the responses of language models using targeted information and specific databases. Proposed by Facebook AI Research in 2020, RAG has garnered attention from researchers and developers for its potential to improve text generation.

The startup implements machine-readable systems capable of adapting to various types of textual content, thereby making legal documents more accessible.
Thus, it is a technology that supports humans. Moreover, it aids companies in adapting to regulations. Daitomic utilizes AI to render banking regulations machine-readable, optimizing impact analyses and enabling the anticipation of regulatory trends. This allows compliance professionals to make quicker and more accurate decisions. Daitomic automates the collection and analysis of regulatory updates, streamlining the workflows of financial compliance and increasing the ability to predict the impact of banking regulations on business.
Given the demand for their services, the startup has experienced exponential growth, with revenue increasing eightfold from 2022 to 2023 and the number of users growing tenfold[55].

[55] *Wired Italia. (2024). Una startup italiana ha addestrato un'intelligenza artificiale a interpretare i documenti legali. https://www.wired.it/article/intelligenza-artificiale-rag-aptus-ai/*

What is interesting to understand from this case study is that AI is not primarily useful for making decisions but rather for supporting, in this case, legal professionals. Additionally, anticipating new regulatory challenges for companies, so they are prepared, is becoming increasingly important for companies to avoid legal repercussions and remain competitive in the event of a legal paradigm shift. To address both objectives/risks, the use of AI is certainly a fundamental technique, as it can interpret and rewrite texts thanks to LLMs and predict potential developments using historical data. As with any market need, startups are emerging to seize this market opportunity.

***Concluding Remark – Chapter IV:***

In the chapter just examined, it is explained how this technology has been effectively implemented within Italian companies in their business processes. The analyses carried out allow us to understand how the technology has concretely contributed to the prosperity and progress of companies, beyond the variables and dynamics that may obscure its visibility due to the significant general interest, whether driven by enthusiasm or concern.

The analyses have thus shed light on the current state of implementation, allowing us to glimpse future opportunities. Regarding the ESG (Environmental, Social, and Governance) field, the greatest opportunity identified in applying AI is the ability to achieve win-win outcomes, meaning simultaneously enhancing the company's responsibility towards its surroundings and increasing business efficiency. An example is the proper management of energy resources, efficient logistics and transport management, or optimal inventory management. This would allow companies to save on expenses, enhance their efficiency, and, at the same time, be more sustainable.

In terms of marketing, the analyses have shown that, given the increasingly stringent regulatory context in Italy and Europe for privacy protection and the correct but limited use of consumers' personal information, companies will have fewer data available. To turn these challenges into opportunities, Italian companies will need to improve their capabilities in data storage and management. By investing in this area, companies can not only counter regulatory limitations but also become more innovative and competitive in the domestic and international markets. Actually, a better ability to capture consumer preferences can support other business areas, such as product design, where consumer knowledge brings benefits not only to companies but also to consumers by providing solutions closer to their needs. Ultimately, higher sales lead to a larger market, so AI can act as a stimulator of the Italian market.

AI has already brought and can certainly bring significant improvements to various business processes, but it remains a complex technology that requires technical skills for its propulsion. However, an opportunity highlighted is that AI itself can support the acquisition or enhancement of these skills. It has been found that AI facilitates training, both upskilling and reskilling, by personalizing training paths based on the specific needs of the task, the company, or the individual. Additionally, it can follow the trainee in a direct and tailored way, providing immediate feedback and facilitating access to resources.

## Conclusion:

The findings of this thesis demonstrate that artificial intelligence, when applied in a business context, can have a significant impact, improving the company's key activities: from offering products and services more aligned with customer expectations to enhancing the efficiency of their production and creation. This results in greater competitiveness, with increased revenues and reduced costs.

At the core of these results is the ability of AI to improve process efficiency through more effective automation and closer relationships with customers. The latter is made possible by better capturing their needs through more powerful data analysis, enabling personalized offerings and more effective communication through the extraction and generation of texts, images, videos, and voice messages.

The expansion of artificial intelligence, its adoption, and its effectiveness represent a new tool available to companies. This tool has been observed to significantly enhance business activities, leading to a shake-up in the structure and foundations of the market, opening new commercial opportunities, and increasing competition intensity. This has triggered an arms race, with leading companies striving to maintain their position and emerging ones trying to challenge them. The introduction of this technology has therefore fertilized the market, opening and closing commercial spaces and creating opportunities, allowing for the rise and fall of market shares and corporate leadership. In this context, support entities, both financial and consulting, emphasize that despite market instability, growth opportunities are considerable as the market is destined to grow and expand its overall size, encouraging companies to invest.

At the same time, a significant portion of the global society, while recognizing the efficiency and benefits of AI, expresses concerns about the security of personal information and privacy, as well as the fear of job loss.

Analyzing the Italian market, the introduction of AI brings with it an inevitable transformation. Italian companies must participate in this change to maintain their internal and international competitiveness. In particular, the manufacturing sector, which represents a significant portion of the Italian market, must adopt AI to remain competitive. The introduction of AI has the potential to represent a great opportunity for the Italian industry, allowing it to address the weaknesses of the Italian economy and strengthen its strong sectors.

The Italian industry has not fully exploited the opportunities offered by emerging technological industries in recent decades, remaining anchored to traditional sectors. However, the correct implementation of AI could lead to increased efficiency in production processes, while simultaneously reducing costs (increasing competitiveness even in this area, where Italian companies have never been particularly competitive). Additionally, AI creates opportunities for companies and startups in the field of

technological innovation, as the sector's structure and its leadership, along with many tangible and intangible assets accumulated over time, are challenged, opening spaces and

opportunities for a new market structure and landscape. Capturing these opportunities and correctly aligning implementation allows Italian companies to potentially compete in the field of technological innovation as well. An example is Bending Spoons, which, thanks to AI, competes with market leaders in smartphone apps, leveraging their technological and commercial expertise.

This highlights the opportunity for Italian companies to acquire and expand their competitiveness in the field of technological innovation, as well as to strengthen their offerings in the traditional sectors of their reference market. However, in the Italian context, even more so than globally, the risks associated with managing customers' personal information and transparency must be addressed, in an increasingly stringent Italian and European regulatory environment. This can pose a challenge compared to other regions such as the United States and China, where corporate competitiveness often prevails over citizen protection and business ethics. In this context, Italian companies must improve their ability to utilize available data and the effectiveness of their interpretations.

The implementation of artificial intelligence in Italian business processes offers the opportunity to achieve win-win results, improving activity performance and production efficiency. It is up to companies to identify the areas where the introduction of this technology can have a positive impact on both fronts, thereby enhancing their competitiveness, for a stronger and more competitive Italian industry in the international context.

# Bibliography


Accenture. (2024). *Accenture acquisisce Ammagamma per accelerare l'innovazione delle aziende italiane grazie all'Intelligenza Artificiale* [Press Release]. Accenture. https://newsroom.accenture.it/it/news/2023/cs-accenture-acquisizione-ammagamma-28112023

Allianz Commercial. (2024). *Allianz Risk Barometer 2024: Identifying the major business risks for 2024*. Allianz SE. https://commercial.allianz.com/news-and-insights/reports/allianz-risk-barometer.html

Alteryx. (2023, May 25). *Believe the hype: Real-world data on generative AI adoption and perception*. Alteryx. https://www.alteryx.com/blog/believe-the-hype-real-world-data-on-generative-ai-adoption-and-perceptionpee

Antonelli, N. (2024, Marzo). *Dietro le quinte di LuisaViaRoma: come trasformare i dati in clienti di valore.* Think with Google. https://www.thinkwithgoogle.com/intl/it-it/strategie/marketing-automation/luisaviaroma-intelligenza-artificiale-moda/

AvePoint, Inc. (2024). *AI & information management report: The data problem that's stalling AI success.* AvePoint, Inc.

Bain & Company. (2024). *Global M&A report 2024: Gaining an edge in a market reset*. Bain & Company. https://www.bain.com/about/media-center/press-releases/2024/total-ma-market-dropped-to-$3.2-trillion-in-2023-leaving-a-backlog-of-deals-that-will-shape-the-2024-ma-agenda/

Bass, D. (2023, January). *Microsoft invests $10 billion in ChatGPT maker OpenAI*. Bloomberg.

BCG. (2023). *CCI Global Consumer Sentiment Survey 2023*. https://www.bcg.com/publications/2024/consumers-know-more-about-ai-than-businesses-think

Bostrom, Nick (ed.) (2014). *Superintelligence: paths, dangers, strategies.* Oxford University Press.

Brittin, M. (2024, February). *Sblocca la crescita nel 2024: preparati a un nuovo modo di fare marketing.* Think with Google. https://www.thinkwithgoogle.com/intl/it-it/strategie/dati-e-misurazione/crescita-marketing-2024/

Capgemini Research Institute. (2023, June). *73% of consumers globally say they trust content created by generative AI.* https://www.capgemini.com/be-en/news/press-releases/73-of-consumers-globally-say-they-trust-content-created-by-generative-ai/

Cisco. (2021). *2021 Consumer privacy survey.* https://www.cisco.com/c/dam/en_us/about/doing_business/trust-center/docs/cisco-cybersecurity-series-2021-cps.pdf

Clusit. (2024). *Rapporto 2024 sulla sicurezza ICT in Italia*. https://clusit.it/rapporto-clusit/

Cui, H., & Yasseri, T. (2024*). AI-enhanced collective intelligence: The state of the art and prospects*. 1(1).

Edelman. (2024). *Edelman 2024 Trust Barometer Global Report.*

European Commission. (2020). *White paper on artificial intelligence: A European approach to excellence and trust.*

European Commission. (2024). *Regulatory framework proposal on AI. Digital Strategy.* https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai

ESG360. (2023, May 18). *Misurare l'impatto sostenibile dell'AI nella ristorazione: il case study CIRFOOD.* Retrieved from https://www.esg360.it/digital-for-esg/misurare-limpatto-sostenibile-dellai-nella-ristorazione-il-case-study-cirfood/

Future of Life Institute. (2024). *High-level summary of the AI Act. EU Artificial Intelligence Act.* https://artificialintelligenceact.eu/high-level-summary/

Gartner. (2019). *How to Mitigate Firmware Security Risks in Data Centers, and Public and Private Clouds.*

Gillespie, N., Lockey, S., Curtis, C., Pool, J., & Akbari, A. (2023). *Trust in artificial intelligence: A global study*. The University of Queensland and KPMG Australia. https://doi.org/10.14264/00d3c94

Goldman Sachs. (2023, April 10). *Generative AI could raise global GDP by 7 percent*. Goldman Sachs. https://www.goldmansachs.com/intelligence/pages/generative-ai-could-raise-global-gdp-by-7-percent.html

Goldman Sachs. (2023, August 1). *AI investment forecast to approach $200 billion globally by 2025*. Goldman Sachs. https://www.goldmansachs.com/intelligence/pages/ai-investment-forecast-to-approach-200-billion-globally-by-2025.html

Human, S., & Cech, F. (2020*). A Human-centric Perspective on Digital Consenting: The Case of GAFAM*. https://doi.org/10.1007/978-981-15-5784-2_12

IAPP. (2023). *Privacy and Consumer Trust Report 2023.*

IAPP. (2023). *Privacy and Consumer Trust Report 2023.* https://iapp.org/resources/article/privacy-and-consumer-trust-summary/

IBM. (2022, May). *IBM Global AI Adoption Index 2022.*

IBM Newsroom. (2024, January 10). *Data suggests growth in enterprise adoption of AI is due to widespread deployment by early adopters*. https://newsroom.ibm.com/2024-01-10-Data-Suggests-Growth-in-Enterprise-Adoption-of-AI-is-Due-to-Widespread-Deployment-by-Early-Adopters.

Il Sole 24 Ore. (2023). Sternfels (McKinsey): *How to become world leader with quality and speed. But inequalities are a big worry*. https://www.ilsole24ore.com/art/sternfels-mckinsey-how-to-become-world-leader-with-quality-and-speed-but-inequalities-are-big-worry-AFW19qBB?refresh_ce&nof

Ipsos. (2022, January). *Global opinions and expectations about AI.*

ISTAT. (2023). *Rilevazione sulle Tecnologie dell'Informazione e della Comunicazione nelle Imprese.* https://www.istat.it/it/files//2023/12/report-imprese_2023.pdf

Istituto Nazionale di Statistica. (2023). *Censimento permanente delle imprese 2023: primi risultati.* https://www.istat.it/it/files//2023/12/report-imprese_2023.pdf

KPMG. (2023). *Trust in artificial intelligence: Global insights 2023.* https://kpmg.com/au/en/home/insights/2023/02/trust-in-ai-global-insights-2023.html

Lloyd's Register Foundation, & Gallup. (2022). *2023 AI Index Report*.

Maslej, N., Fattorini, L., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Ngo, H., Niebles, J. C., Parli, V., Shoham, Y., Wald, R., Clark, J., & Perrault, R. (2023). *The AI Index 2023 annual repor*t. AI Index Steering Committee, Institute for Human-Centered AI, Stanford University.

Maslej, N., Fattorini, L., Perrault, R., Parli, V., Reuel, A., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Niebles, J. C., Shoham, Y., Wald, R., & Clark, J. (2024). *The AI Index 2024 Annual Report*. AI Index Steering Committee, Institute for Human-Centered AI, Stanford University.

McKinsey & Company. (2022*). Global survey on digital trust.*

McKinsey & Company. (2023). *The state of AI in 2023: Generative AI's breakout year*. https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-ais-breakout-year

Milano Finanza. (2024, February 16). Bending Spoons vara il riassetto e riorganizza tutte le partecipazioni. Retrieved from https://www.milanofinanza.it/news/bending-spoons-vara-il-riassetto-e-riorganizza-tutte-le-partecipazioni-202402160123131559

Microsoft. (2023). *Work Trend Index (WTI) Report: Will AI fix work.*

Microsoft News. (2024, April 19). *AI and SMBs: An analysis of their adoption and impact.* https://news.microsoft.com/en-ca/2024/04/19/ai-and-smbs-an-analysis-of-their-adoption-and-impact/

National AI Initiative Office. (2020*). National AI Initiative Act of 2020*.

Osservatorio Artificial Intelligence. (2024, February 1*). Intelligenza artificiale, crescita record del mercato in Italia: +52%*. https://www.osservatori.net/it/ricerche/comunicati-stampa/intelligenza-artificiale-italia

Osservatorio Cybersecurity and Data Protection. (2023*). Cybersecurity & Data Protection.* Politecnico di Milano. https://www.osservatori.net/it/ricerche/osservatori-attivi/cybersecurity-data-protection

Peeters, M.M.M., van Diggelen, J., van den Bosch, K. et al. *Hybrid collective intelligence in a human–AI society*. AI & Soc 36, 217–238 (2021). https://doi.org/10.1007/s00146-020-01005-y

PwC (2020). *Sizing the Prize. What's the Real Value of AI for Your Business and How Can You Capitalise?* https://www.pwc.com/gx/en/issues/analytics/assets/pwc-ai-analysis-sizing-the-prize-report.pdf

Roberts, H., Morley, J., Barham, H., et al. (2019). *The Chinese approach to artificial intelligence: An analysis of policy, ethics, and regulation*.

SACE. (2024*). SACE vince l'HR Innovation Award*. https://www.sace.it/docs/default-source/comunicati-stampa/2024/sace-vince-l'hr-innovation-award.pdf?sfvrsn=fc0fe6b9_1

Soni, D. (2020). *The U.S. AI Initiative and its impact on technology policy.*

Unioncamere. (2024, March 4). *Intelligenza artificiale: meno del 10% delle imprese la utilizza già.* https://www.unioncamere.gov.it/comunicazione/comunicati-stampa/intelligenza-artificiale-meno-del-10-delle-imprese-la-utilizza-gia

Watts, R. (2023, July 20). *Over 75% of consumers are concerned about misinformation from artificial intelligence.* Forbes. https://www.forbes.com/advisor/business/artificial-intelligence-consumer-sentiment/

Wired Italia. (2024). *Una startup italiana ha addestrato un'intelligenza artificiale a interpretare i documenti legali*. https://www.wired.it/article/intelligenza-artificiale-rag-aptus-ai/