MIB Research 01

Evidence of AI and generative AI adoption in Italian firms

Grazia Garlatti Costa
Roberto Pugliese
Francesco Venier

MIB Trieste
School of
Management

MIB Research 01

Evidence of AI and generative AI adoption in Italian firms

Grazia Garlatti Costa
Roberto Pugliese
Francesco Venier

MIB Trieste
School of
Management

Copyright © 2024 by MIB Trieste School of Management.
All rights reserved.

Published by MIB Trieste School of Management
Largo Caduti di Nassiriya 1, 34142 Trieste, Italy

Contents

Executive Summary

This research paper provides a thorough exploration into the adoption of Artificial Intelligence (AI) within Italian businesses at the beginning of 2024, detailing the extent of AI integration, its effectiveness, the readiness of companies, and the impact on the workforce. The study surveyed a diverse group of 237 respondents, encompassing a range of positions from C-level executives to technical specialists across various sectors, including manufacturing, IT services, healthcare, and finance. The companies represented in the survey vary in size from small startups to large multinational corporations, offering a comprehensive view of AI's penetration and influence across different business models and scales.

The initial findings highlight that AI integration varies significantly across departments, with a notable number of companies engaging as end-users of AI technologies. These applications span from operational efficiency improvements to innovation in product and service offerings. The paper reports a positive trend towards increased AI investment, with a majority of companies planning to enhance their AI budget allocations, demonstrating the strategic importance attributed to AI in the Italian business context.

However, the journey towards AI integration is not without its challenges. The research identifies critical hurdles such as data availability and structuring issues, a significant skills gap, and the absence of clear use cases for AI deployment. Despite these obstacles, there's a prevailing optimism about AI's capability to positively impact the workforce, with expectations leaning towards job creation rather than displacement.

The research advocates for a multi-faceted approach to AI adoption, emphasizing the need for cross-functional AI initiatives, the establishment of specialized AI teams, and the crucial role of AI in fostering creativity and enhancing operational processes. It also underscores the importance of ethical considerations and stringent data quality management in navigating the complexities of AI adoption. Through this analytical lens, the paper presents a nuanced understanding of the transformative potential and challenges of AI in the Italian corporate sphere, offering strategic insights for businesses navigating the evolving landscape of digital innovation.

Authors:

Grazia Garlatti Costa

University of Trieste - Assistant Professor - GRAZIA.GARLATTICOSTA@units.it

Roberto Pugliese

MIB Trieste School of Management - Adjunct Faculty - pugliese@mib.edu /

Elettra Sincrotrone Trieste - Director of ICT - roberto.pugliese@elettra.eu

Francesco Venier

MIB Trieste School of Management - Dean of Executive Education – venier@mib.edu /

University of Trieste - Associate Professor - venier@units.it

Introduction

In recent years, the business environment has been a witness to an unparalleled technological metamorphosis, propelled by the rapid advancements in domains such as Artificial Intelligence (AI), data analytics, robotics, digital platforms, social media, and blockchain technology, just to name a few. These agents of digital transformation harbor the capacity to fundamentally alter the structural and operational paradigms of organizations, ushering in an epoch marked by augmented innovation, efficiency, and competitive prowess (Bharadwaj et al., 2013).

The rapid evolution and widespread interest in Large Language Models (LLMs) underscore the growing interest in AI, representing a key shift in the business landscape and emerging as game-changers for organizations striving to sustain their competitive edge (Rogers, 2021).

The ramifications of AI extend beyond the mere enhancement of operational efficiencies, contributing to improving customer experiences and brand loyalty, and facilitating proactive risk management and strategic planning (Agrawal et al., 2018).

Nonetheless, the journey towards AI integration is fraught with challenges, including ethical dilemmas, workforce re-skilling, and the need for data governance frameworks to safeguard sensitive information (Bostrom & Yudkowsky, 2014).

The significant potential of AI necessitates a comprehensive analysis of its role in various workplace sectors, highlighting both opportunities and obstacles. Additionally, understanding AI adoption rates across industries and the factors influencing this adoption is essential for assessing industry readiness for an AI-driven future (IBM, 2022, 2023).

Our research investigates the extent of AI integration within Italian businesses, aiming to uncover the trends that will shape the coming year. By focusing on MBA alumni of MIB Trieste School of Management, we gathered insights from 237 graduates in high-level managerial positions through a web-based survey. The findings reveal a diverse landscape of AI adoption, reflecting a range of perspectives on the utilization of Generative AI and its implications for the future of work and organizational strategy.

Theoretical Framework

Artificial Intelligence Integration

The narrative of Artificial Intelligence (AI) in the business realm is one marked by extraordinary breakthroughs and the occasional hurdle, illustrating a domain in constant evolution. The genesis of AI can be traced back to the 1950s, and by the 1980s AI had begun to seep into the economic landscape through the development of expert systems, although this period also witnessed a temporary disillusionment due to the technology's nascent limitations. The revival of AI in the late 1990s and early 2000s was propelled by the advent of the internet and significant advancements in machine learning and data analytics, propelling AI into spheres like customer relationship management and business analytics (Zhang & Lu, 2021). In recent years, AI's trajectory has been marked by exponential growth, with innovations such as DALL-E and PaLM showcasing its sophisticated capabilities in language and image processing. Presently, AI stands as a pivotal force, redefining business models and operational strategies across various industries (Gozalo-Brizuela & Garrido-Merchan, 2023).

This evolutionary journey has positioned AI as a paramount technological focus for modern corporations, driven by the proliferation of big data and the advent of advanced algorithms and computational infrastructures (Mikalef & Gupta, 2021). AI-facilitated platforms, including chatbots and conversational agents like ChatGPT, have become increasingly prevalent across diverse sectors, bolstering stakeholder engagement and overall well-being (Manyika et al., 2017).

The widespread adoption of AI in both the private and public sectors has catalyzed a surge of interest among academic and industry practitioners alike. The transformative effects of AI on organizational frameworks, operational processes, and workforce dynamics have ignited scholarly curiosity within organizational studies, highlighting a keen interest in exploring AI's implications in the workplace both on production and managerial aspects (Raisch & Krakowski, 2020). But until November 2022, the use of AI for business process support was basically limited to the large corporations that had access to both the big data needed to train the machine learning applications and the financial power to invest in the data science skills needed to develop these applications and on the related technical infrastructure. The situation changed dramatically in November 2022 with the release of Open AI's ChatGPT, the first publicly available chatbot based on a pre-trained neural network, putting in the hands of anybody the power (and limitations) of generative AI (Noy & Zhang, 2023). This event gave wide access to the innovative potential of AI application to billions of potential users, making the impact of AI on business processes and, eventually, society, one of the most urgent areas to investigate for management scholars.

Toward a Comprehensive Definition of AI

The exploration of AI has produced a diverse array of definitions, reflecting its broad scope and evolving nature. At its core, AI aims to create systems that replicate human intelligence and behaviors. Some scholars describe AI as the design of intelligent agents that perceive their environments and take actions to achieve specified goals, highlighting AI's capacity for reasoning and impactful action in an adaptive manner within various environments (Russell & Norvig, 2010).

AI's definitions continually evolve, including both narrow AI, focused on specific tasks, and strong AI, which seeks to replicate human intelligence fully, thus contributing to automating societal and job tasks (Dwivedi et al., 2021).

Today we can observe that AI encompasses four primary branches:

1. Descriptive, which uncovers patterns in historical data, useful in business analytics (Shmueli & Koppius, 2011);
2. Predictive, as it forecasts future trends using machine learning, critical in finance and healthcare (Jordan & Mitchell, 2015);
3. Prescriptive, recommending actions based on AI forecasts, optimizing decision-making in logistics and supply chain management (Lepenioti et al., 2020);

4. Generative AI, aimed to the creation of new content (Goodfellow et al., 2014), enhancing creativity and productivity in various fields in a pervasive way (Dell'Acqua et al., 2023; Kapoor & Ghosal, 2022; Wong, 2021).

Generative AI and LLMs

Recent advancements in AI research have highlighted the significance of Large Language Models (LLMs) within the Generative AI domain, marking substantial progress in natural language understanding and creation. LLMs, exemplified by OpenAI's GPT series, utilize deep neural networks trained on extensive datasets. These models, rooted in the innovative Transformer Architecture (Vaswani et al., 2017), learn through a vast array of web texts, refining their ability to predict the next word in a sentence using self-supervised learning techniques (Bubeck et al., 2023). The application of Reinforcement Learning from Human Feedback (RLHF) further enables these models to process instructions and produce text that closely mirrors human communication (Brynjolfsson et al., 2023).

GPT-4 marks a significant advancement over GPT-3 with enhanced data processing capabilities, a deeper understanding of language, wider applicability, and efforts to reduce biases present in AI models. The emergence of Chat-GPT and advancements in generative AI, particularly through Large Language Models (LLMs), have sparked diverse reactions, placing these technologies at the forefront of debates on the future of work, job dynamics, and the nature of human labor (OpenAI, 2023).

Aim of the Study and Research Question

The growing fascination with AI's role in modern organizations underscores the importance of investigating the various types of AI and how they are integrated. Academic research focuses on AI adoption rates, the motivations for its adoption, and the mix of challenges and opportunities it presents to businesses (IBM, 2022, 2023). However, there is a notable gap in research on the speed of AI adoption in different sectors within Italy, underscoring the need for a detailed study on how AI is integrated and the specific challenges Italian companies face. Thus, **this study aims to explore how AI technologies are being adopted by Italian companies, highlighting prevalent AI solutions, their level of integration, and key challenges, including technological, organizational, and ethical issues**. It aims to provide insights into the current role of AI in the Italian business practices and to suggest ways for its beneficial implementation.

Sampling and Data Collection

To investigate the adoption of AI within Italian companies, we conducted a web-based survey in October 2023. The data were collected from companies across various industries in Italy. An invitation to participate in a web-based questionnaire was sent to a diverse group of

companies ranging from startups to large corporations. For convenience reasons, the sampling population was represented by all the Executive MBA graduates of an Italian Business School: MIB Trieste School of Management. We received a total of 237 responses, which were considered for analysis.

The questionnaire was divided into sections that included questions on demographic information, current use of AI within the company, perceived benefits and challenges of AI, and the extent of AI integration in business processes. The survey also explored the respondents' attitudes toward AI and its potential impact on their industry.

The survey was administered using Computer Assisted Self-Interviewing (CASI) technology, where respondents were invited via email to fill out the questionnaire online. The questions were structured to obtain both qualitative and quantitative data, providing insights into the practical applications of AI and the strategic importance placed on it by different organizations.

After the survey was closed, the data were rigorously cleaned to ensure all responses were from qualified participants. This step involved filtering out responses from individuals who did not hold decision-making roles in the context of AI implementation in their organizations.

Measurements

The survey's main focus was understanding the AI adoption level within Italian companies. To measure this, we gathered data on the perceived effectiveness of AI in enhancing business processes, creativity, innovation, and competitive advantage. To assess organizational readiness for AI, we included questions on the availability of resources, such as data and skilled personnel, as well as the presence of any structural or cultural obstacles that could impede the adoption of AI technologies.

The survey further explored who within the organization was involved in AI projects, who decided on the budgets, and the expected impact of AI on the workforce. These questions aimed to identify patterns in how AI initiatives are managed and to forecast the technology's influence on future company employment.

The findings from this survey are intended to contribute to a deeper understanding of how AI is being integrated into Italian businesses and to highlight factors that facilitate or hinder its adoption. The results are expected to interest business leaders, policymakers, and researchers focusing on the strategic implications of AI in the corporate sector.

The unstructured data, which is coming from the open questions, has been analyzed with the help of generative AI. This kind of data is usually difficult to analyze efficiently, and the precious information provided is often lost. With the help of a carefully designed prompt, we also managed to extract useful information from this data source.

Questionnaire Results

This section is divided into subsections, each corresponding to a specific part of the questionnaire structure. The map below (Figure 1) represents the geographical distribution of the sample that shows coverage of the whole nation.

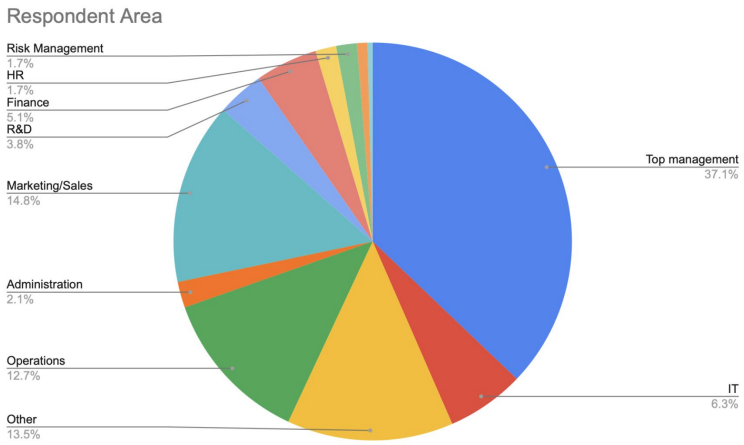
Figure 1
Location of the companies participating to the survey

The distribution of the number of employees in the organizations surveyed reveals a wide range of organization sizes, from very small to very large. The majority of organizations are small to medium-sized. The median value of the size that is more robust than the mean number is 80. This is evident from the distribution's skew towards the lower end.

Respondent's role and area

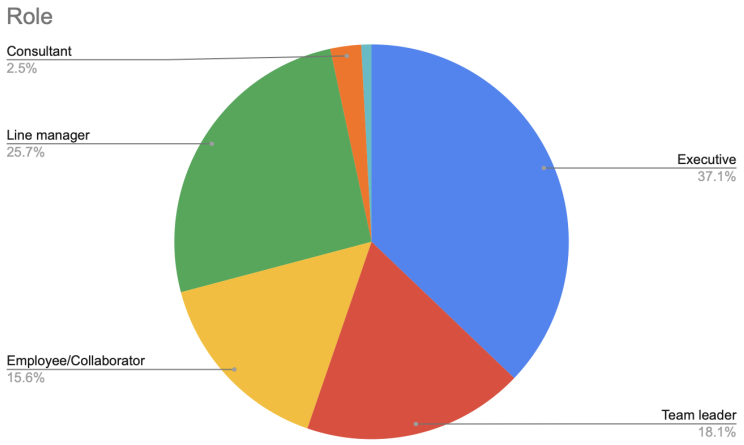
We asked 237 respondents to report their department and their role. Most of the respondents were part of the *Top management* area (37.1%), followed by *Marketing/Sales* (14.8%), *Operations* (12.7%), *IT* (6.3%), *Finance* (5.1%), R&D, HR, Finance and Other (13.5%) departments as you can see from the pie chart in Figure 2.

Figure 2



Among the roles or levels of responsibility held by the respondents within the company, as illustrated in the pie chart in Figure 3, most of the respondent's role was *Executive* (37.1%), followed by *Line manager* (25.7%), *Team leader* (18.1%) and *Employee/Collaborator* (15.6%).

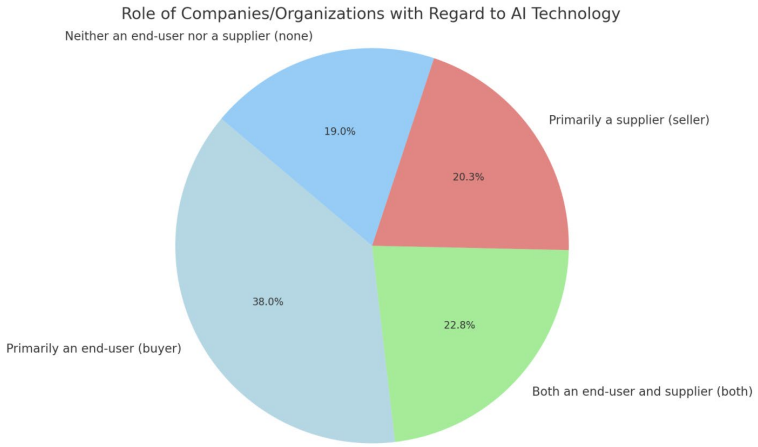
Figure 3



Companies in relation to AI

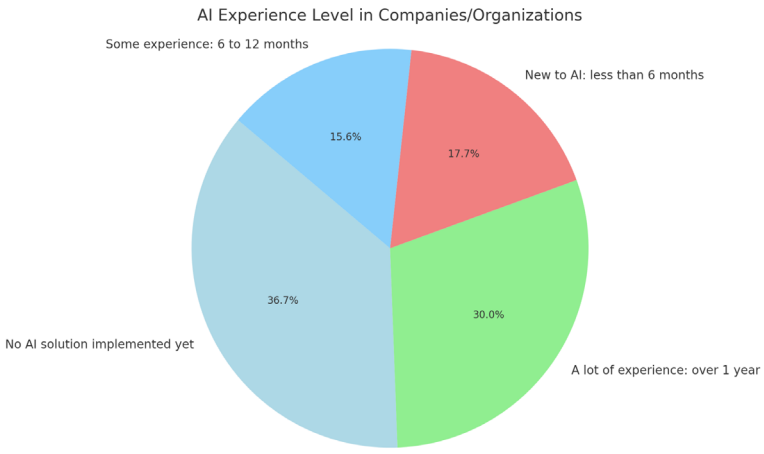
We asked the respondents to describe the role of their Companies/Organisations with regard to AI technology. The pie chart in Figure 4 shows the distribution of respondents based on whether their organization is primarily an end-user, a supplier, both, or neither in the context of AI technology. This visual representation can help understand the landscape of AI engagement among the surveyed organizations.

Figure 4



The pie chart in Figure 5 visualizes the distribution of AI experience levels among the surveyed companies/organizations, categorized into four distinct levels. A large portion of the organizations explored (30%) have been engaged with AI for over a year, indicating significant experience and possibly integration of AI into their operations or product offerings. This group likely has a deeper understanding of AI's challenges and opportunities and may have already realized tangible benefits or identified specific areas for improvement. Another segment of organizations (15.6%) is in the early stages of AI adoption, with experience ranging from half a year to a full year. These companies are past the initial exploration phase and may be in the process of implementing AI solutions at a larger scale, developing use cases, or evaluating the impact of their initial AI projects. A slightly more significant proportion of the sample includes organizations new to AI with less than six months of experience.

Figure 5

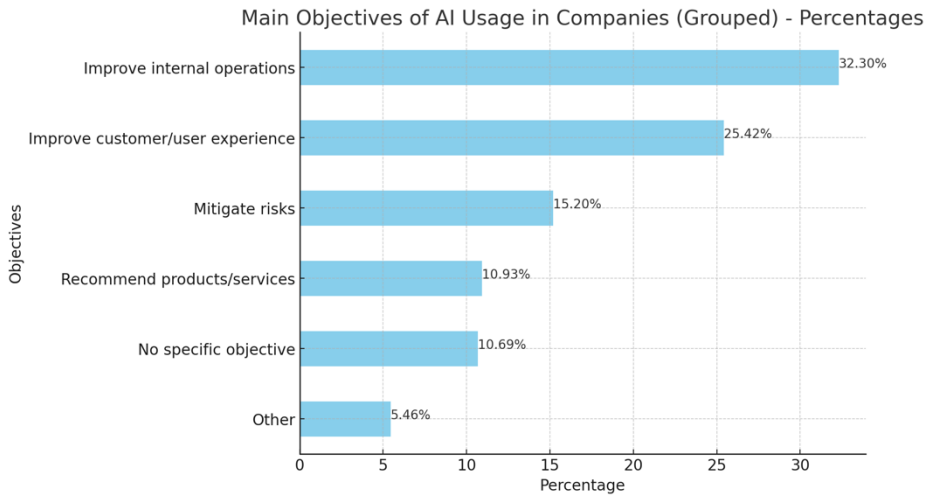


These companies are likely in the exploration or pilot phase, testing AI solutions to understand how AI can benefit their operations, products, or services. Their engagement level suggests a cautious approach, focusing on learning and experimentation. The largest group of respondents (36.7%) indicated that their organizations have not yet implemented any AI

solution. This result could mean several things: they are still in the planning or consideration phase, evaluating potential AI opportunities and challenges; they may lack the resources, expertise, or strategic direction needed for AI adoption; or they may not see AI as a fit for their current needs or goals.

The correlation between the organization's size (as indicated by the number of employees) and the AI adoption level (as encoded from this question and converted in numerical format) is approximately -0.048. This value suggests a very weak negative correlation between these two variables. It indicates that there is no strong relationship between the size of an organization and its stage in adopting AI, at least as per the responses in this dataset.

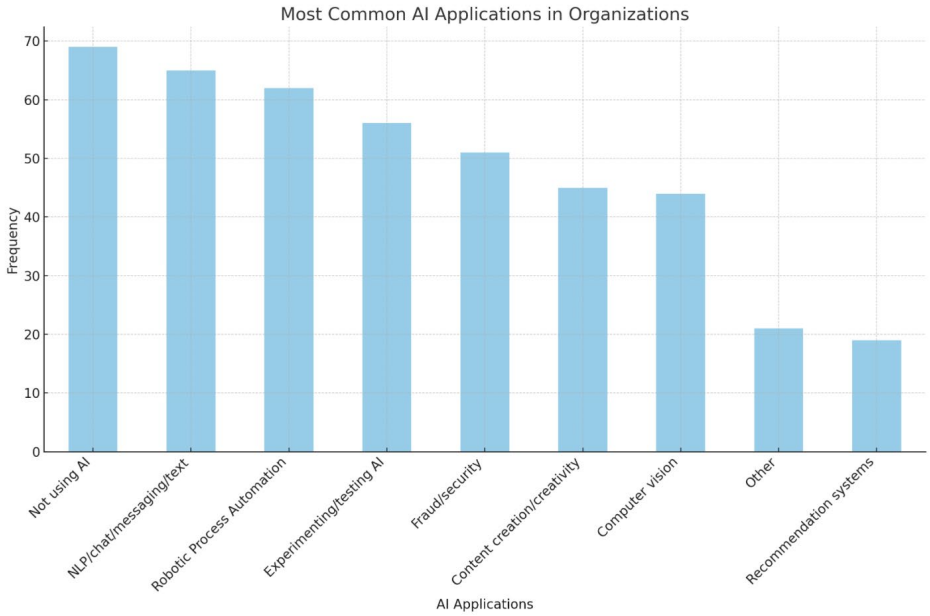
Figure 6



The histogram chart in Figure 6 visualizes the organizations' most common AI objectives. This approach highlights the specific goals that are most frequently pursued by companies in their AI initiatives. The chart clearly identifies which AI objectives are most commonly mentioned by organizations, offering insights into the primary motivations behind AI adoption and their combination. By focusing on the top objectives, we can see a comparative analysis of how prevalent each goal is among the surveyed entities, providing a clearer picture of the collective focus areas in AI applications. If we consider what is the primary intended objective of the companies for using AI, here are the prominent findings: 32.3% aim to "Improve internal operations", 25.4% seek to "Improve customer/user experience", 15.2% focus on "Mitigating risks", 10.9% use AI to "Recommend products/services, while 10.7% of the respondents reported that they "Do not have a specific objective." Many other objectives (5.46%) were listed, each with shallow frequency.

Complementary to this question, we asked the respondents about the most commonly used AI applications in their organizations.

Figure 7

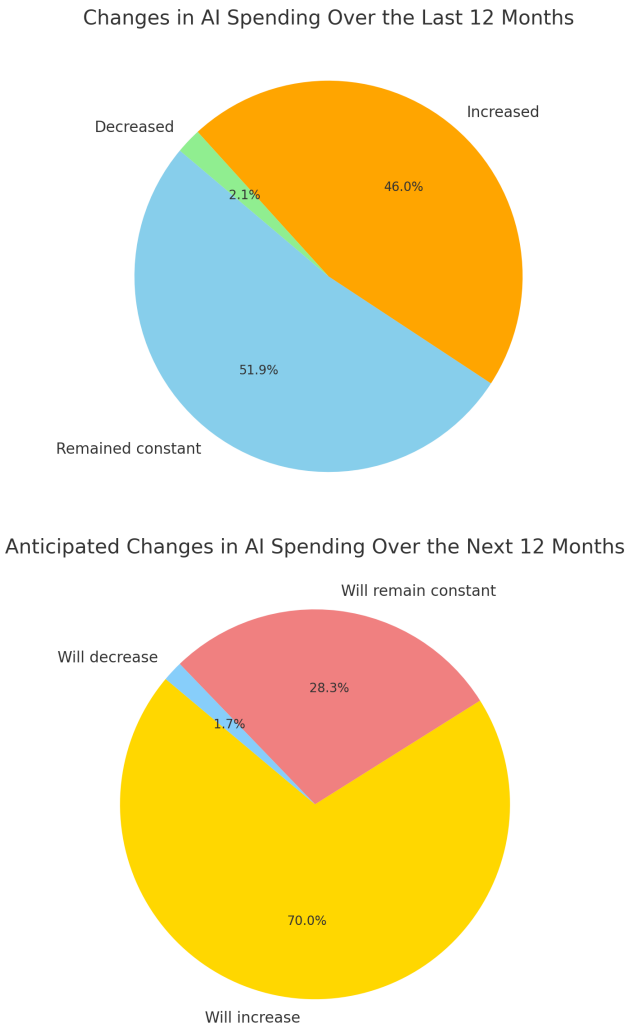


The bar chart in Figure 7 illustrates the frequency of the most common AI applications used within organizations based on the survey responses. The visualization showcases a range of AI applications, from "Fraud/security" to "NLP/chat/messaging/text" and "Computer vision", indicating a broad spectrum of AI technologies being adopted across various sectors. "Fraud/security" and "NLP/chat/messaging/text" applications appear particularly prevalent. This result suggests a strong focus on leveraging AI to enhance security measures and improve natural language processing capabilities, which are crucial for customer service, content interaction, and security. The frequent mention of "Content creation/creativity" as an application highlights an increasing interest in using AI for creative content generation, suggesting that AI's use expands beyond its usual analytical and predictive functions. **The mention of "Experimenting/testing AI" highlights an ongoing exploration within organizations to find new and innovative applications of AI technology, signifying that many companies are still in the discovery or pilot phase of their AI journey. The distribution across various applications underscores the broader adoption and integration of AI technologies into organizational processes and offerings, reflecting the versatility and the perceived potential of AI to address a wide range of challenges and opportunities.** This analysis reveals organizations' still blurred strategic priorities and technological trends in adopting and applying AI.

We asked the respondent about the changes in AI expenditure in the last 12 months. The result is presented in the left pie chart of Figure 8. This visual representation emphasizes the trend toward maintaining or increasing AI investment, with only a few companies reducing their spending on AI technologies. In the same line, we asked them to forecast what will happen in the next 12 months. The data reveals a clear inclination among companies to either increase or maintain their current AI investment levels, with a substantial majority planning for an

increase (right pie chart of Figure 8). **This forward-looking optimism towards AI investment highlights companies' strategic importance on AI technologies**, considering them crucial for future growth, innovation, and competitive advantage. The minimal number of companies expecting to decrease AI spending further underscores the strong belief in AI's potential to drive significant value across various business operations.

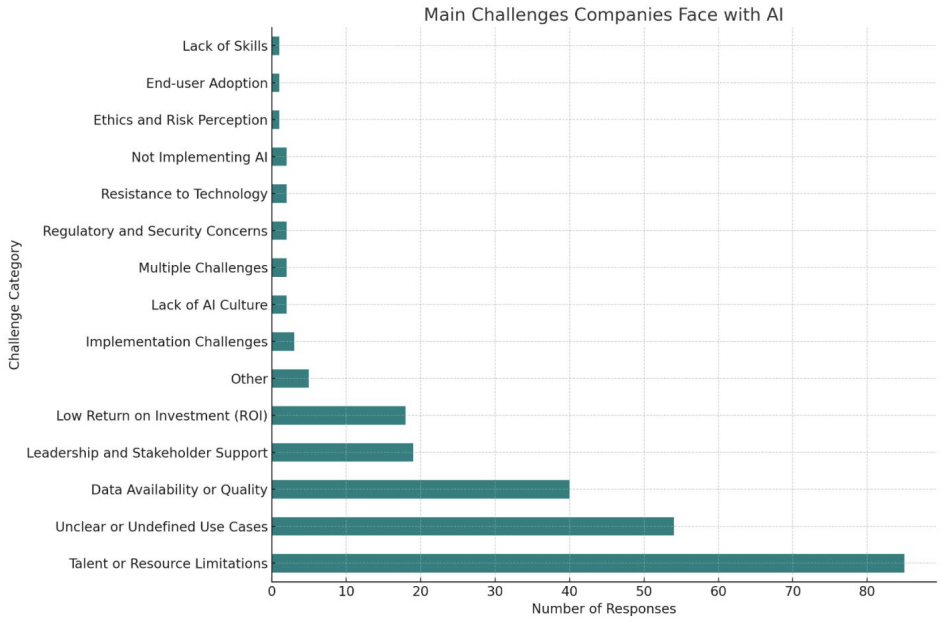
Figure 8



Combining these observations, it appears that AI technologies are moving beyond the hype to become a solid element of business strategic planning. **The shift towards increased AI spending and the strategic maintenance of current investment levels suggests a broad recognition of AI's transformative potential.** As companies plan for the future, AI is clearly seen as a pivotal technology that can drive significant competitive advantage, operational improvements, and innovation. This trend will likely continue, with AI investment becoming increasingly integral to business success.

We asked the participants what they consider the main challenge their company/organization currently faces with AI. The chart in Figure 9 represents the results.

Figure 9

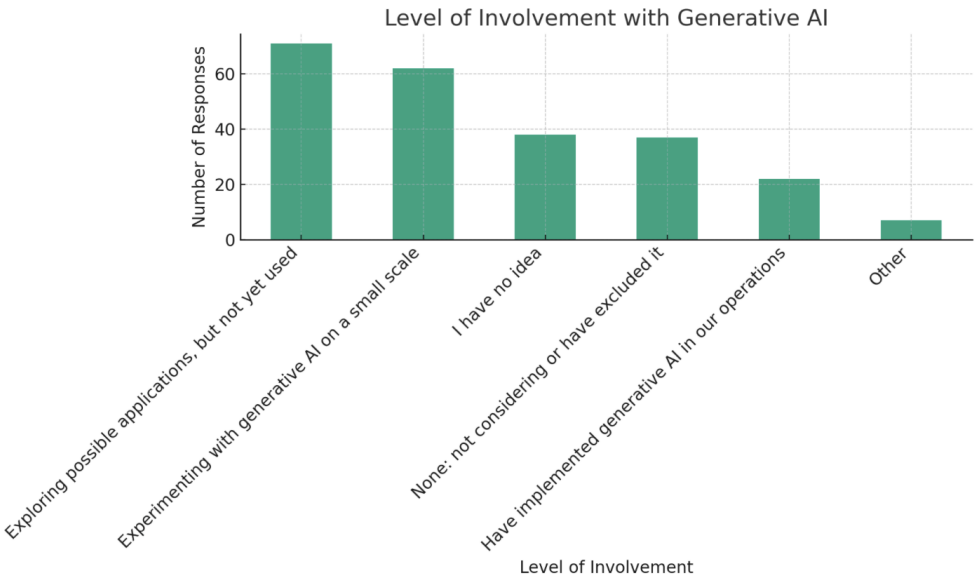


The most frequently cited challenge indicates a significant gap in the availability of skilled workforce, not only AI professionals, but more in general a data mindset and AI diffused basic alphabetization, that are the fundamental resources needed to implement and manage AI projects effectively. The second signal that we observe here is that many companies struggle to identify effective ways to deploy AI within their operations, highlighting the need for strategic clarity. The third challenge is access to high-quality, relevant data, underscoring the foundational role of data in AI's effectiveness. Fourth concern among the respondents is the importance of buy-in from top management and stakeholders, as their support is crucial for allocating resources and strategic direction. Finally we have to mention concerns about the financial outcomes of AI investments, that reflect the difficulty of measuring and proofing the expected benefits. Other challenges, such as regulatory and security concerns, resistance to technology, and lack of AI culture, show the multifaceted nature of hurdles that organizations face when adopting AI. Notably, some respondents indicated facing multiple challenges or could not pinpoint a single main challenge, reflecting the complexity of AI implementation. **These results highlight the multifaceted nature of challenges in AI adoption, ranging from technical and strategic to cultural and operational issues. Addressing these challenges requires a holistic approach, including investing in talent development**, enhancing data management capabilities, clarifying strategic objectives, and fostering a culture of innovation and openness to change. Leadership commitment and a clear vision for how AI can drive value are pivotal in overcoming these hurdles, ensuring successful AI integration, and leveraging its potential to transform business operations.

Companies in relation to Generative AI

In order to understand the current impact of generative AI on Italian companies and organizations, we asked the survey participants about their companies' and organizations' level of involvement with generative AI. The chart in Figure 10 describes the distribution of their responses.

Figure 10



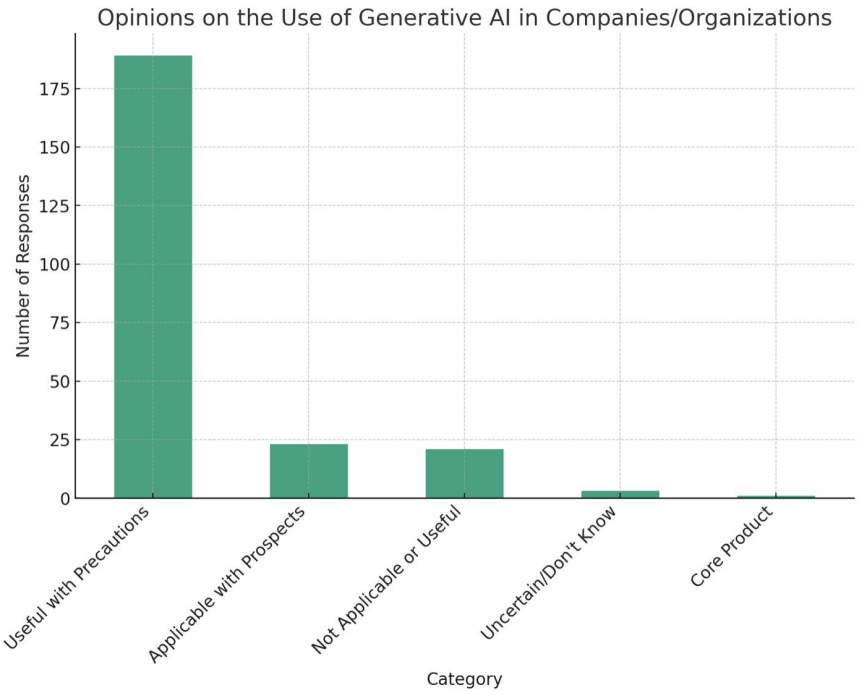
The less frequent responses have been grouped under "Other". Exploring possible applications by not yet used (71 responses, 29.9%) is the most common response, indicating that a large number of organizations are currently in the exploratory phase regarding generative AI. They are interested in its potential applications but have not yet implemented it in their operations. Many organizations (62 responses, 26.2%) are taking proactive steps by experimenting with generative AI technologies, albeit on a small scale. This result suggests a willingness to innovate and test the waters with new AI capabilities. A significant number of respondents (38 responses, 16%) are unaware of their organization's involvement with generative AI, highlighting a potential communication gap within organizations or a lack of engagement with AI initiatives. A notable portion of the respondents (37 responses, 15.6%) indicated that their organizations are not considering or have actively decided against adopting generative AI. This could be due to various factors, including perceived irrelevance, resource constraints, or strategic decisions. A smaller group (22 responses, 9.3%) of organizations has already integrated generative AI into their operations, showcasing early adoption and potentially gaining a competitive edge through innovative applications of AI. The results illustrate a wide range of engagement levels with generative AI across the surveyed organizations, from preliminary exploration to full implementation. **The significant interest in exploring and experimenting with generative AI suggests that many organizations**

recognize its potential value and are cautiously assessing how it can be applied to their operations. The presence of respondents unaware of their organization's AI activities points to the importance of internal communication and involvement in innovation initiatives. Meanwhile, the decision by some organizations not to pursue generative AI highlights the varied approaches to technology adoption based on individual organizational contexts and strategies.

Overall, these findings underscore the evolving nature of generative AI adoption in the business context, with organizations at different stages of exploration, experimentation, and implementation. As awareness and understanding of generative AI's capabilities continue to grow, we can expect to see shifts in these patterns of involvement.

The responses to the question "What do you think about the use of generative AI for your company/organization?" (Figure 11) cover a range of opinions. To simplify the analysis and visualization, we have categorized them into broader sentiments or themes for better representation.

Figure 11



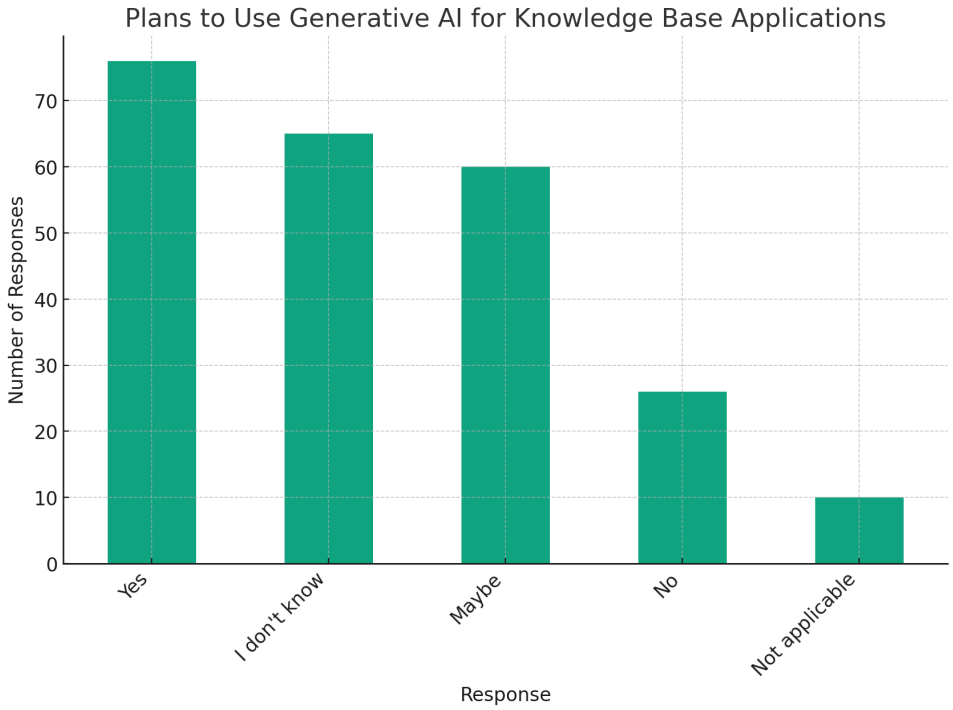
The majority of respondents (189) believe generative AI can be useful for their companies or organizations, provided that adequate precautions are taken. This data indicates a positive outlook towards the technology, emphasizing the need for responsible implementation. A smaller group (23 respondents) sees generative AI as applicable and potentially beneficial for their business, acknowledging its prospects but considering the challenges in reliability or safety. Twenty-one respondents feel that generative AI is not applicable or useful for their business. This could reflect the nature of their industries or their assessment of current AI capabilities. A minimal number (3 respondents) are uncertain or don't

know enough about generative AI to form an opinion, suggesting a gap in awareness or understanding that could be addressed through more information and education. Only one respondent views generative AI as a core product of their business, indicating a niche but potentially deep integration of AI technologies in their operations. These results suggest a general optimism towards the potential of generative AI in various sectors, with a significant emphasis on cautious and responsible adoption. The need for precautions and responsible use underscores the awareness of ethical, safety, and reliability concerns associated with AI technologies. The minority of respondents who do not see generative AI as applicable or useful to their operations highlight the diverse applicability of AI across different industries. The few uncertain responses indicate an opportunity for further education and exploration of AI's potential benefits and limitations.

The chart in Figure 12 illustrates the distribution of responses regarding plans to use generative AI for knowledge base applications.

A total of 76 respondents indicate that their organizations plan to use generative AI in accessing and leveraging the company's knowledge base. This shows a considerable interest in adopting AI technologies for enhancing knowledge management processes. 65 respondents are still determining their organization's plans to use generative AI in this context. This uncertainty may reflect a need for more information or ongoing decision-making processes within these organizations. 60 respondents are considering using generative AI for their knowledge bases but have yet to make a definitive decision. This category suggests a cautious interest, pending further exploration or evaluation of generative AI's benefits and challenges. A smaller group of 26 respondents plan to use something other than generative AI for their knowledge bases. This group may not see generative AI’s immediate applicability or benefit for their specific knowledge management needs or may have concerns about its implementation. Finally, 10 respondents believe that the use of generative AI for knowledge base applications is not applicable to their organizations, possibly due to the nature of their operations or the absence of a relevant knowledge base.

Figure 12

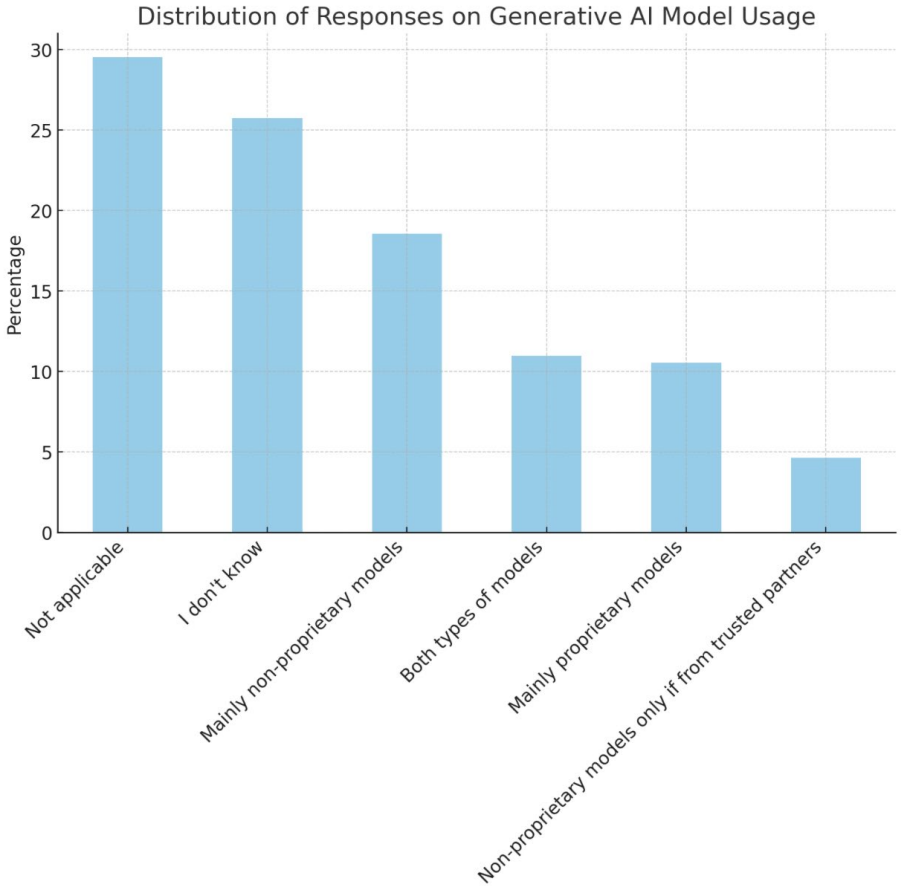


These results highlight a mixed but generally positive outlook toward the potential of generative AI in enhancing knowledge base applications. While a significant number of organizations are open to or actively planning to adopt generative AI technologies, a notable proportion still needs to be made aware of this step. The "I don't know" and "Maybe" responses constitute a large segment, indicating that there's still room for growth in awareness and confidence regarding the use of generative AI in knowledge management.

The interest in generative AI for knowledge bases underscores the technology's perceived value in improving information access, processing, and utilization within organizations. However, the response variation also suggests the need for more information, clearer implementation strategies, and perhaps demonstrations of tangible benefits to increase adoption rates and reduce uncertainty.

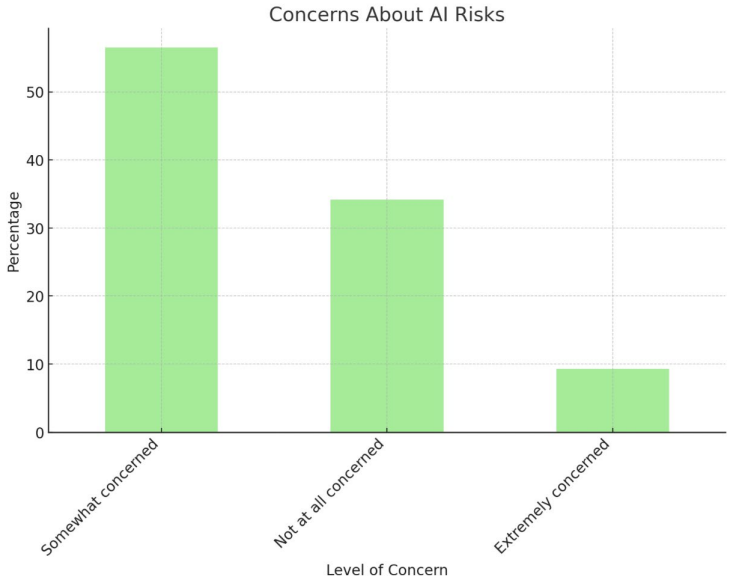
We asked the participants "If your company/organization uses generative AI, are you using non-proprietary models like ChatGPT, or are you using proprietary models that do not involve sharing company data with others?". The distribution of these responses is represented in the chart in Figure 13.

Figure 13



A portion of the organizations reports mainly using proprietary models, indicating a preference for in-house or exclusive technologies that likely offer more control over data and intellectual property. Some organizations utilize both types of models, showcasing a balanced approach to leveraging the strengths of both proprietary and non-proprietary AI technologies. There is also a notable mention of organizations primarily using non-proprietary models, such as those publicly available or provided by third parties, which may offer benefits in terms of cost, accessibility, and community support. A unique category mentions using non-proprietary models only if from trusted partners, indicating a cautious approach towards external AI technologies with a focus on reliability and trustworthiness. Responses indicating "I don't know" suggest that not all respondents have complete visibility or involvement in the decision-making process regarding AI technology adoption within their organizations. Lastly, a significant portion of respondents marked "Not applicable", which could imply that their organizations do not currently use generative AI, or it is not relevant to their role or department. The chart in Figure 14 illustrates the distribution of concerns about AI risks among the respondents.

Figure 14



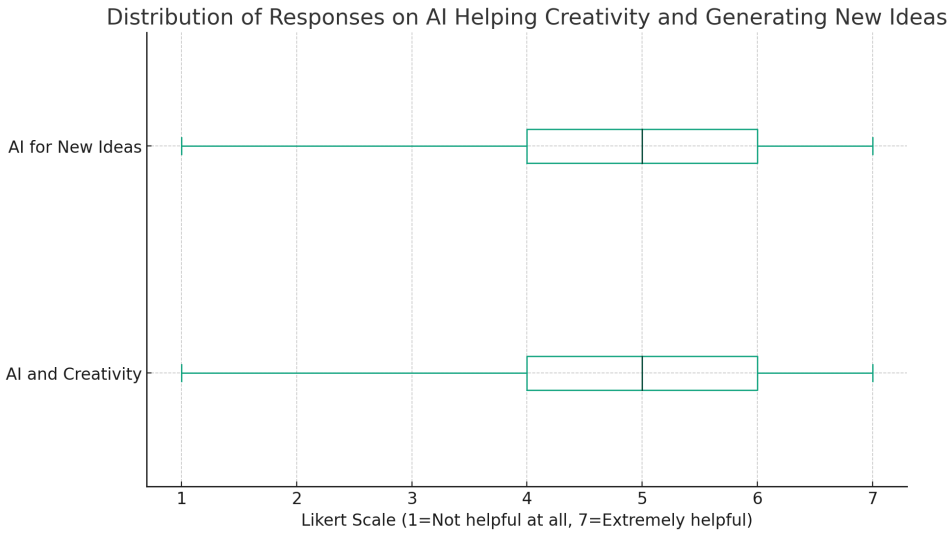
A significant portion of the respondents expressed 'Somewhat concerned' views regarding the risks associated with AI, including biases, accuracy issues, plagiarism, and hallucinations. This indicates a cautious awareness of the potential negative impacts of AI technologies. Another group is "Extremely concerned," showing a significant level of apprehension regarding the ethical and operational risks associated with AI. This highlights the importance of addressing these concerns through ethical AI development practices, transparency, and regulation. A smaller segment of respondents is "Not at all concerned" about the risks of AI. This could reflect confidence in current AI technologies, ethical standards, mitigation strategies, or a lack of awareness of potential issues. The results underline the varied perspectives on AI risks, emphasizing the need for ongoing dialogue, education, and policy development to manage these concerns effectively. The diversity in levels of concern also suggests the importance of involving multiple stakeholders in developing and deploying AI technologies to address ethical, technical, and societal challenges comprehensively.

AI and creativity

Regarding the role of artificial intelligence in fostering creativity, there is a growing scholarly trend to explore whether AI can enhance individual creativity. In line with this research trend, we asked respondents the following questions: “How much do you think AI is capable of aiding creativity within a company/organization?” and “How much do you believe that the use of AI facilitates the production of new and useful ideas for enhancing the processes of the company/organization?”

The participants were asked to respond using a 7-point Likert scale where 1 = "not helpful at all" and 7 is "extremely helpful".

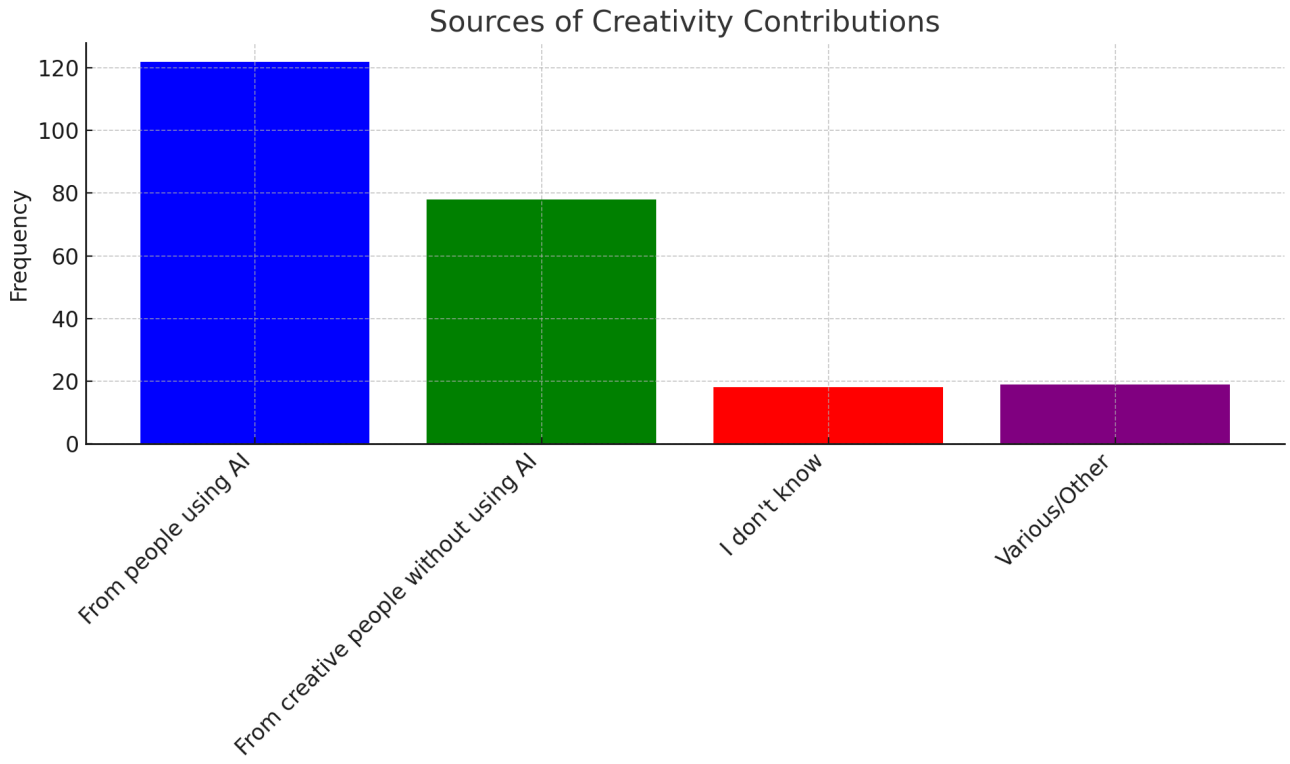
Figure 15



The boxplot visualization in Figure 15 and statistical analysis provide insights into how participants view the role of AI in enhancing creativity (mean = 4.93, standard deviation = 1.48) and generating new ideas (mean = 4.89, standard deviation = 1.50) within their organizations. The analysis reveals a generally positive perception among respondents regarding the capacity of AI to foster creativity and generate new, valuable ideas for improving organizational processes. Both categories ("AI and Creativity" and "AI for New Ideas") show a mean score close to 5 on a 7-point Likert scale, suggesting that on average, respondents lean towards viewing AI as helpful rather than not helpful in these areas. The median value of 5 for both questions further supports this positive inclination, indicating that at least half of the respondents rated AI's helpfulness at or above the midpoint of the scale. The boxplots likely show a concentration of responses between 4 and 6, indicating a common agreement on AI's utility, with fewer respondents at the extremes of the scale. **This pattern suggests that while there are enthusiasts and skeptics, most respondents recognize some level of usefulness in AI for creative and innovative purposes within their organizations.**

We asked the participants the question: "In general, where do you think the greatest contributions to the company's/organization's creativity can come from?". Given the diversity and specificity of some answers, we grouped the unique responses into a "Various/Other" category. The chart in Figure 16 visualizes the perceived sources of the most significant contributions to company/organization creativity.

Figure 16

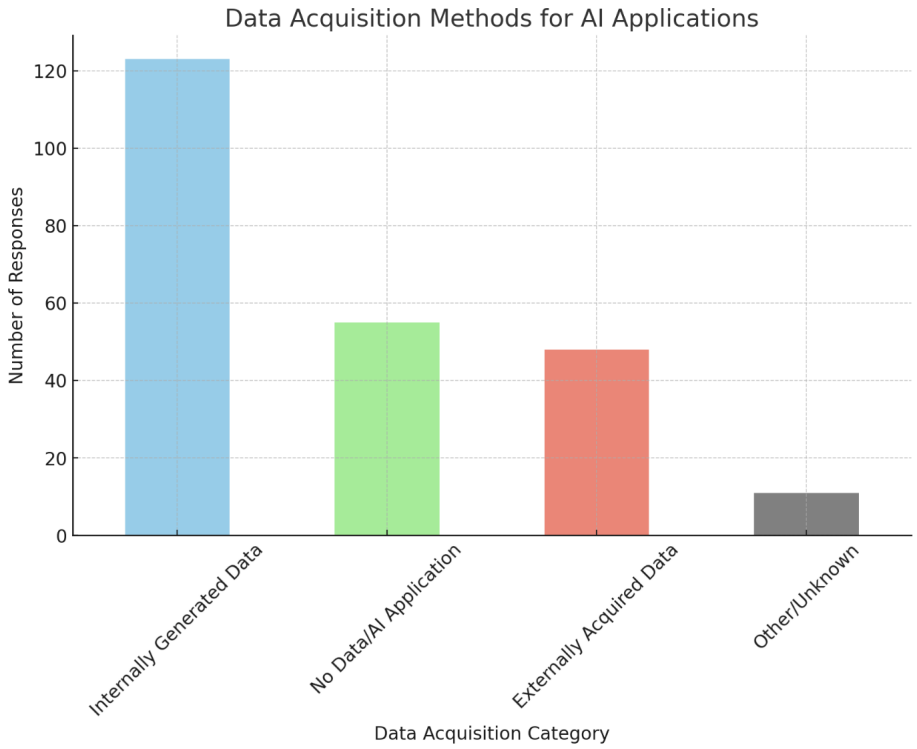


The most cited source of creativity contributions, indicating a strong belief in the synergy between human creativity and AI tools to enhance organizational creativity. The second most popular view underscores the value of inherent human creativity without the assistance of AI tools, highlighting the importance of human insight and innovation on its own. A smaller proportion of respondents are unsure about the source of creativity contributions, indicating uncertainty or a lack of opinion on the matter. The Various/Other category encompasses a variety of specific and unique responses that suggest a nuanced view of creativity sources, including combinations of human and AI contributions, sector experience, and operational simplification. In conclusion, **the analysis reveals a balanced appreciation for both human creativity and AI's potential to contribute to organizational innovation, with a tilt towards leveraging technology as a significant enhancer of creative processes**.

Implementing AI solutions

This section of the survey was dedicated to implementing AI, which is quite essential to transforming wishful thinking into real value. We first asked the respondents "How did you obtain the data necessary for your AI applications?". Given the diversity and complexity of responses, we have categorized them into broader categories.

Figure 17



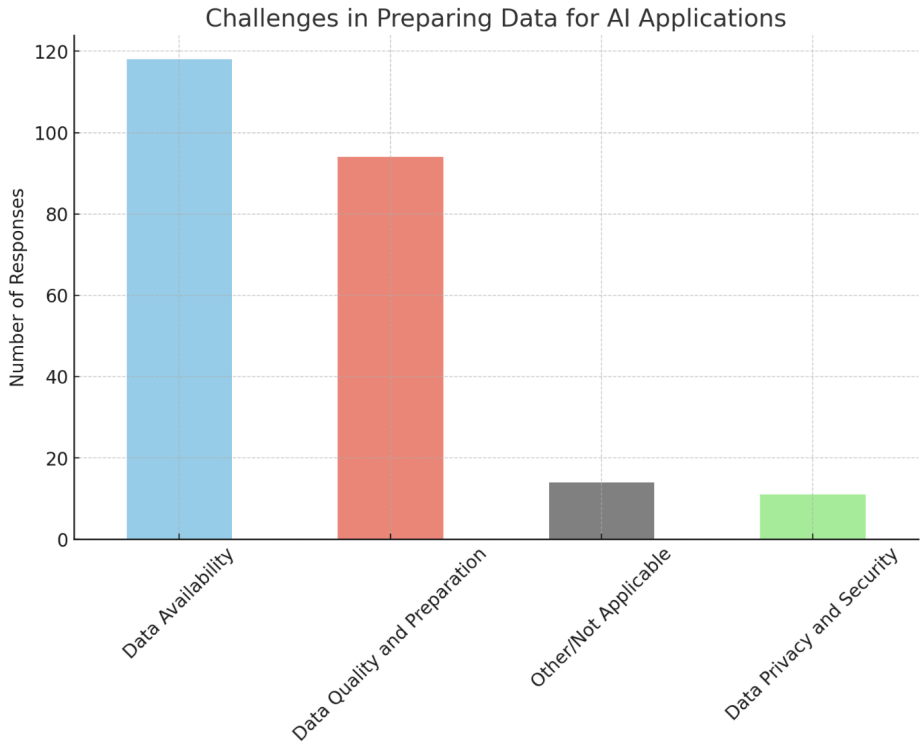
.

As the bar chart in Figure 17 shows, a majority of organizations rely on internally generated data for their AI applications, underscoring the significance of internal data sources and the ability to generate and collect data in-house. A significant number of responses fall under no data/AI application, indicating either a lack of AI initiatives or challenges in obtaining the necessary data for AI applications. Externally acquired data is also a crucial method for organizations, showcasing the reliance on external sources, including purchasing data, using synthetic data, and other means to supplement their AI applications. A smaller portion of responses is categorized as other/unknown, which might include unique or less common methods of data acquisition not captured in the broader categories. This analysis underscores the varied approaches organizations take toward data acquisition for AI, with a strong preference for leveraging internally generated data. It also highlights the challenges and barriers some organizations face in adopting AI due to data-related issues.

In the same line, we asked the respondent what are the major challenges are in preparing the data necessary for AI applications. The unique responses to the question about the significant challenges in preparing data for AI applications reveal a wide range of issues, including but not limited to Data Privacy, Data normalization, Data labeling, Data quality, Lack of data, Lack of structured data, Data distortion, Lack of data scientist expertise. Given this variety, we have categorized these challenges into broader, more general categories to facilitate analysis. The re-categorized data can be visualized in the bar chart in Figure 18. As evident, the most significant challenge pertains to Data Availability, suggesting that numerous organizations face difficulties with either insufficient data or the absence of structured data required for AI

applications. This suggests that data collection and organization are critical areas for improvement. Data Quality and Preparation challenges are also significant, with many organizations facing issues related to data normalization, labeling, quality, and distortion. This underlines the importance of robust data preparation processes to ensure AI systems can effectively learn and perform. Data Privacy and Security challenges, while less frequent than the others, are nonetheless crucial, pointing to concerns around safeguarding sensitive information while leveraging data for AI. A smaller number of responses fall into the Other/Not Applicable category, which includes various other challenges not specifically categorized or instances where data preparation for AI is not applicable.

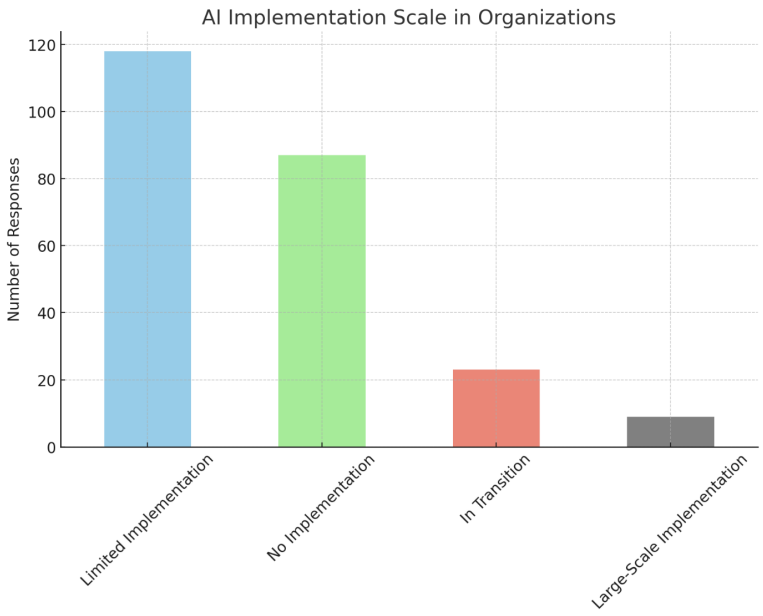
Figure 18



In order to further understand possible technical implementation issues, we asked the respondents if their company implements AI on a large scale, i.e., integrated throughout the company/organization. The chart in Figure 19 illustrates the scale of AI implementation within the surveyed organizations. A significant number of organizations (118) are implementing AI, but not on a large scale, indicating selective or department-specific AI projects rather than organization-wide integration. A considerable number of responses (87) indicate that AI is not being implemented at all, suggesting that a substantial portion of organizations are either in the early stages of considering AI or have yet to find a compelling use case. Some organizations (23) are in the process of moving towards large-scale AI implementation but have yet to achieve this goal fully. This indicates a commitment to integrating AI more broadly and highlights the challenges in achieving full-scale implementation. A smaller group of

organizations (9) report that they implement AI on a large scale integrated throughout the company. This suggests a more advanced stage of AI adoption, where AI technologies are embedded in multiple aspects of the organization's operations.

Figure 19

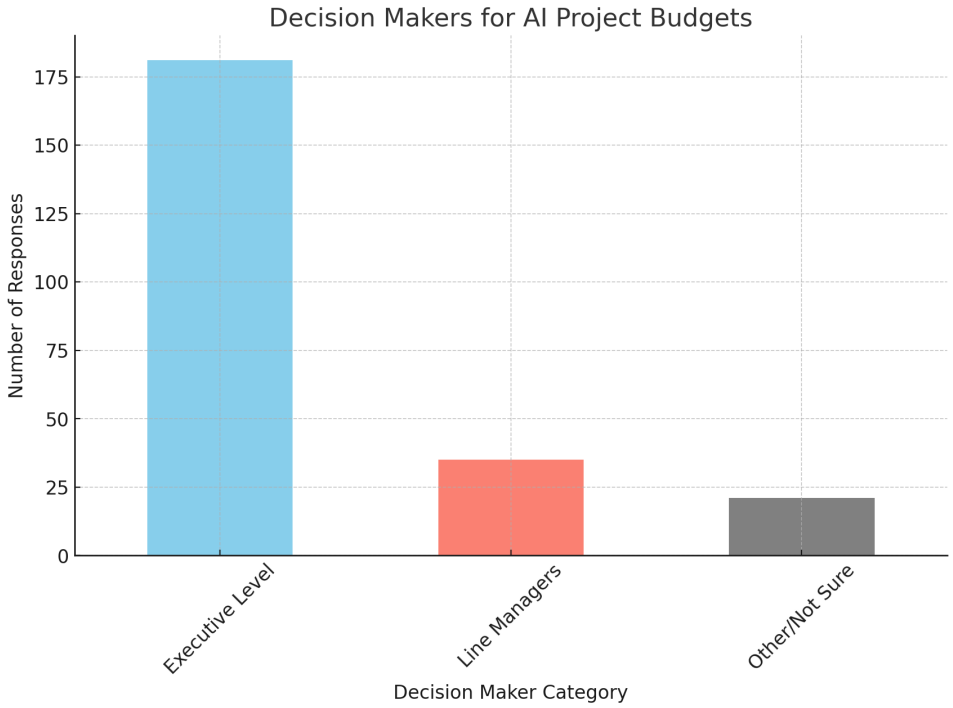


This analysis indicates a diverse landscape of AI adoption among organizations, with many still exploring or gradually integrating AI capabilities. The data points to the potential for growth in AI adoption as organizations transition from limited or no implementation towards broader, more integrated applications of AI technology.

AI projects and company organization

This section is dedicated to understanding the decision-making process inside companies and organizations. We asked the respondents who decide the AI project budgets in organizations (Figure 20). A dominant number of responses (181) indicate that the decision regarding AI project budgets is made at the highest levels of the organization, such as by CEOs, CTOs, or equivalent executive roles. This sets the strategic importance of AI investments, which often require top-level approval due to their impact on the organization's direction and resources. A smaller number of organizations (35) delegate the decision-making power for AI project budgets to line managers. This suggests that AI projects may be seen as department-specific initiatives rather than strategic investments requiring executive oversight. A few responses fall into the "Other/Not Sure" category, which includes those who are unsure who makes the decision, as well as unique or less common scenarios not covered by the main categories.

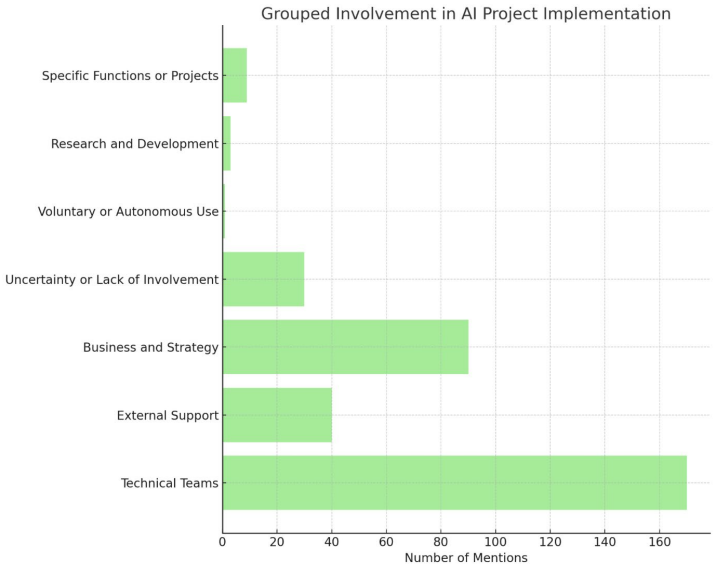
Figure 20



This means that AI project budget decisions are predominantly made by the executive leadership within organizations, reflecting the strategic significance and potential investment scale of AI initiatives. In some cases, line managers' involvement indicates a varied approach to AI project governance, possibly influenced by organizational structure, culture, and the nature of specific AI projects.

In order to further understand the implementation aspect of AI we asked the respondents to tell us who is involved in the implementation of AI projects in their company/organization. We have then grouped the answers into consolidated categories. The grouped visualization in Figure 21 provides a clearer picture of involvement in AI project implementation across organizations, emphasizing the primary roles and highlighting areas of uncertainty or lack of formal involvement.

Figure 21

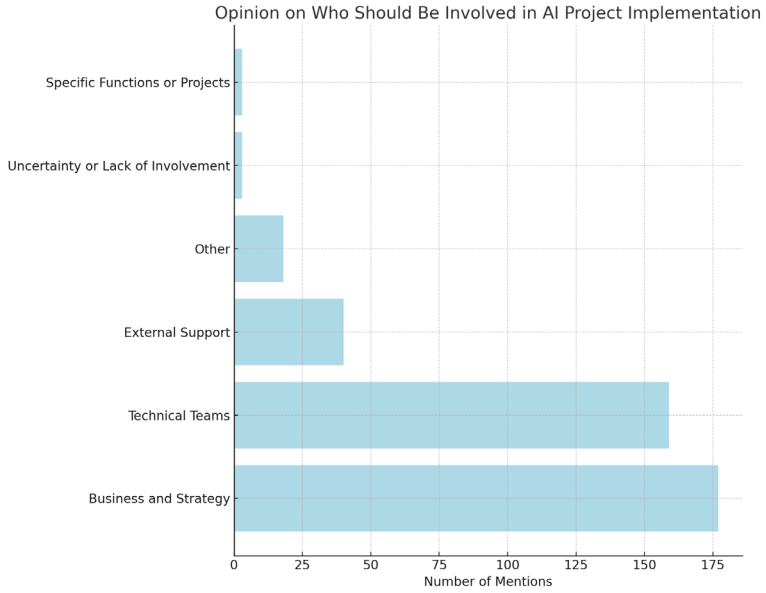


Technical Teams are the most involved in AI project implementation, with 170 mentions. This category consolidates the IT Team, AI Team, and other technical groups, underscoring the central role of technical expertise in driving AI initiatives. Business and Strategy entities are also significantly involved, with 90 mentions. This group includes business development, executive roles (e.g., CEO, CFO/COO), and strategic business units, indicating that AI projects are not just technical endeavors but also key strategic initiatives within organizations. External Support, including consultants and specific external individuals mentioned, has 40 mentions, showing the reliance on external expertise for AI projects, likely for specialized skills or additional capacity. Uncertainty or Lack of Involvement received 30 mentions, highlighting a noteworthy segment of respondents needing clarification about involvement in AI projects or indicating no ongoing AI implementation within their organizations. This reflects varying degrees of AI adoption and awareness across different organizations. Research and Development and Specific Functions or Projects have fewer mentions (3 and 9, respectively), suggesting that while R&D and specific business functions like marketing or quality management play roles in AI initiatives, they are less frequently cited as the primary stakeholders compared to technical teams and business strategy roles. Voluntary or Autonomous Use was mentioned once, pointing to individual or small-scale experimentation with AI technologies without formal project structures.

This analysis illustrates the multi-faceted approach to AI implementation, involving a blend of technical prowess, strategic vision, external insights, and, to a lesser extent, individual initiative. It also underscores the importance of aligning AI projects with both the technical capabilities and strategic goals of an organization, while also highlighting areas where there may be uncertainty or a lack of active AI engagement.

We then asked the respondent, in their opinion, who should be involved in implementing AI projects in their company/organization; the answers are portrayed in Figure 22.

Figure 22



The analysis of opinions on who should be involved in AI project implementation reveals a strong emphasis on both Business and Strategy roles and Technical Teams, with 177 and 159 mentions, respectively. This suggests a balanced view among respondents that successful AI implementation requires not only technical expertise but also strategic direction and involvement from business leaders. The Business and Strategy category received the highest number of mentions, indicating a widespread belief that AI initiatives should be closely aligned with the company's strategic goals and involve senior business leadership (e.g., CEO, CFO/COO), business development, and strategic business units. This reflects an understanding that AI projects can significantly impact business models, operations, and competitive positioning, requiring top-level strategic oversight. Close behind, the technical teams (including IT, AI teams, and other technical departments) are also viewed as crucial, reinforcing the notion that the implementation of AI technologies demands deep technical knowledge and skills. This underscores the importance of having dedicated technical expertise to drive the development and integration of AI solutions. With 40 mentions, external support from consultants or specialized external individuals remains an important consideration, suggesting that external expertise is valued for its ability to provide specialized knowledge, fill gaps in internal capabilities, or offer an objective perspective on AI projects. 18 responses fell outside the predefined categories, which might include specific roles or functions not captured in the broad groupings but still considered relevant by respondents. Uncertainty or Lack of Involvement and Specific Functions or Projects received minimal mentions, indicating a consensus that involvement should be clearly defined and actively include key business and technical stakeholders rather than being left to voluntary or ad hoc involvement.

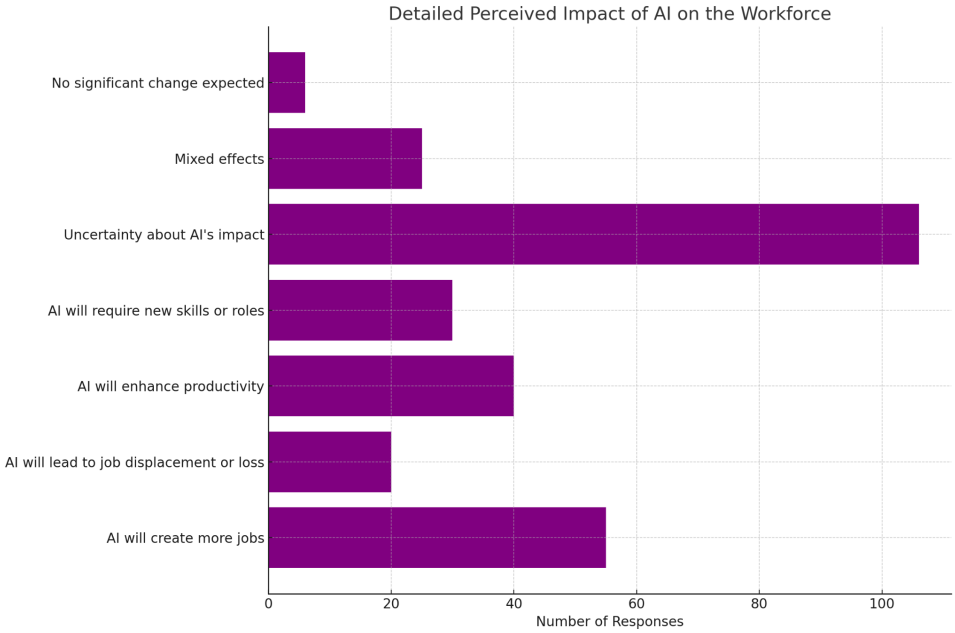
The comparison between current involvement and the perceived ideal involvement in AI project implementation reveals several meaningful differences. There is a slight decrease in the perceived ideal involvement (-11), suggesting that while technical expertise is crucial,

respondents believe there might be an overemphasis on technical teams in the current state. There is a significant increase in the ideal involvement (+87), highlighting a strong sentiment that business and strategic roles should be more involved in AI projects than currently. This reflects a desire for greater alignment between AI initiatives and overall business strategy, emphasizing the importance of leadership and strategic oversight. A slight decrease in the ideal involvement (-3) suggests a perception that R&D, while important, is currently given a level of emphasis that slightly exceeds what is considered ideal by some respondents. A substantial decrease (-27) in this category for ideal involvement underscores a clear message that respondents believe there should be less uncertainty or non-involvement in AI projects, advocating for more defined roles and active participation. A small decrease (-6) indicates a slight adjustment in how specific functions or projects are currently involved compared to what is deemed ideal, suggesting a preference for more integrated or strategic involvement rather than project-specific or functional silos. **These differences underline a desire for stronger strategic and business leadership in AI initiatives, balancing technical expertise with broader business objectives and reducing uncertainty or non-involvement in AI projects. It points towards a vision for AI implementation that is more integrated, strategic, and aligned with organizational goals, emphasizing the need for clear roles, collaboration across departments, and strategic leadership.**

An eye on the future of AI in companies

This last session of the survey is dedicated to the analysis of the perception of the future impact of these technologies. At first, we asked the respondents how they think AI will influence the workforce of their company/organization in the future. The detailed visualization in Figure 23 offers a nuanced perspective on the perceived impact of AI on the workforce.

Figure 23

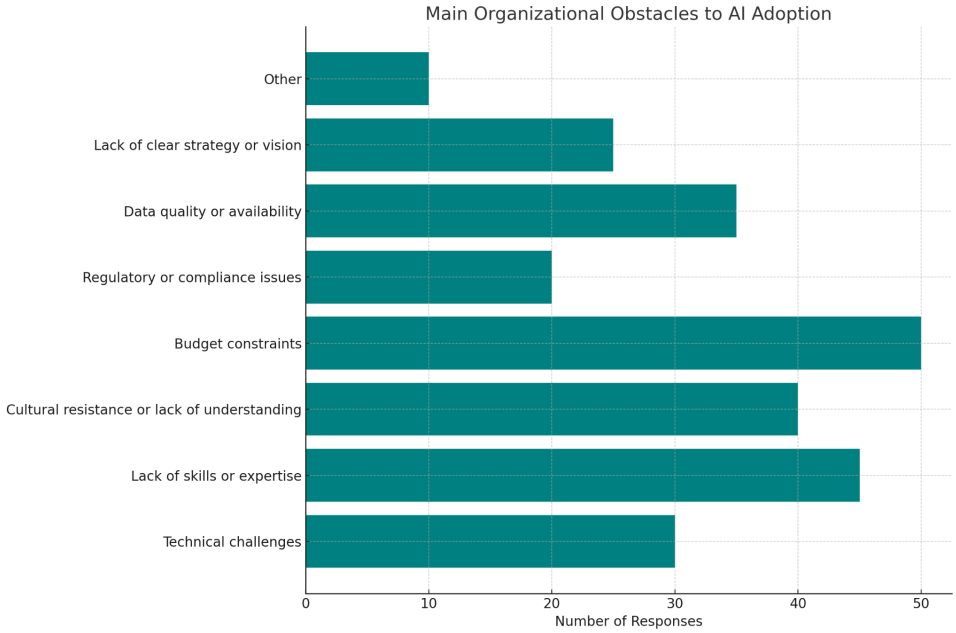


Uncertainty about AI's impact remains the most prominent response, with 106 mentions. This highlights widespread uncertainty or ambiguity about the future effects of AI on jobs and work processes. A group of 55 respondents are optimistic that AI will create new job roles, suggesting a positive outlook on the potential for AI to drive job growth. A group of 40 responses indicate a belief that AI will primarily augment existing jobs, increasing efficiency and productivity. This suggests optimism about AI's role in enhancing human work rather than replacing it. While 30 mentions reflect the expectation that AI will transform the skill set requirements for the workforce, necessitating upskilling and reskilling to adapt to new technological demands, 25 respondents acknowledge both the potential for job creation and job displacement, recognizing that AI's impact on the workforce will likely be complex and multifaceted. Finally, 20 responses express concerns about job loss due to automation, indicating apprehension about the potential for AI to replace human roles. A minority, with six mentions, believe that AI will not drastically alter the workforce landscape, suggesting either skepticism about AI's transformative potential or confidence in the adaptability of the workforce.

This more detailed analysis pinpoints the diversity of opinions on AI's future impact on the workforce. It reflects a balance between optimism for innovation and job creation, concerns about displacement and the need for new skills, and a significant degree of uncertainty about what these changes will entail. This complexity highlights the importance of proactive planning, education, and policy-making to navigate the transition toward an AI-enhanced workplace.

We finally asked the respondents what they think are the main organizational obstacles to adopting AI in their company/organization (Figure 24).

Figure 24



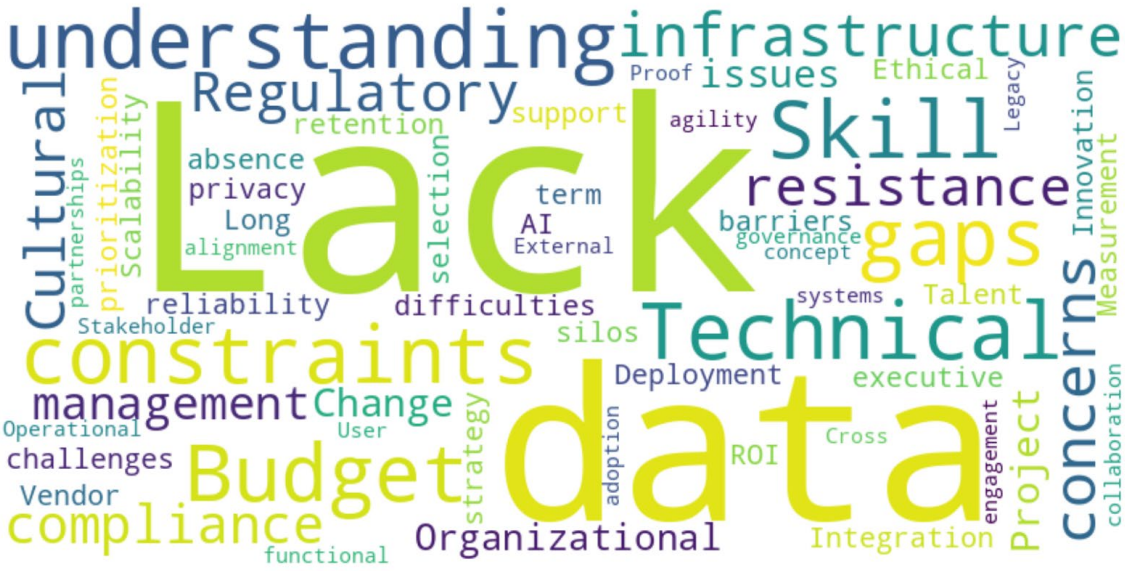
Analyzing the main organizational obstacles to AI adoption reveals various challenges that companies and organizations may face. With 50 mentions, Budget Constraints is identified as the most significant barrier, highlighting the financial investments required for AI initiatives, including technology acquisition, training, and integration costs. Lack of Skills or Expertise, with 45 responses, points to a critical gap in AI-related skills and expertise within organizations, underscoring the need for education, training, and hiring to build AI capabilities. Cultural Resistance or Lack of Understanding, with 40 mentions, suggests that organizational culture and a lack of understanding about AI's benefits and applications can hinder adoption. This indicates the importance of change management and education in overcoming resistance. Data Quality or Availability, with 35 responses, emphasizes challenges related to the availability and quality of data necessary for effective AI implementations, reflecting the foundational role of data in AI success. Technical Challenges is mentioned 30 times, technical obstacles include issues with integrating AI into existing systems, scalability, and the complexity of AI technologies. Lack of Clear Strategy or Vision, with 25 mentions, indicates that the absence of a strategic direction or clear vision for how AI fits into the organization's overall goals can be a significant barrier to adoption. Regulatory or Compliance Issues, with 20 responses, highlight concerns about navigating the regulatory landscape, including privacy, security, and compliance challenges related to AI technologies. Finally, ten mentions cover a variety of other obstacles not explicitly categorized, indicating that organizations may face unique challenges in AI adoption beyond the most common issues identified.

Hence, the multifaceted nature of the obstacles to AI adoption, ranging from financial and technical challenges to cultural and strategic considerations. Addressing these obstacles requires a holistic approach, involving investments in skills development, strategic planning,

data management, and change management, alongside efforts to understand and navigate regulatory environments.

A text analysis of open-ended responses to identify common themes or concerns about AI adoption, generates the word cloud in Figure 25.

Figure 25



The word cloud reveals several key themes. Frequent mentions of terms like 'sponsorship' and 'leadership' indicate that many respondents perceive a need for greater support and engagement from the top levels of their organizations. Words like 'training' and 'skills' suggest a perceived gap in skills or knowledge as a significant barrier. Other notable terms include 'culture', 'resources', and 'strategy', pointing towards broader organizational challenges in embracing AI. These insights can help understand the perceived barriers to AI adoption from the perspective of different organizations. The grouping of textual responses about AI adoption obstacles by the respondent's role (area of belonging) reveals some initial insights. For roles like Administration, a common concern is the need for more skills. In Corporate Affairs and Administration, a notable theme is insufficient sponsorship from leadership. The Administration, Finance and Control, and Technical Area also mention lack of skills and resources as key challenges. These findings suggest that perceptions and concerns about AI vary significantly with the respondent's role, highlighting the multifaceted nature of AI adoption challenges across different organizational domains.

Open Questions about AI adoption

These are the results of the analysis of the Open question "What do you generally think about the adoption of AI-based technologies, particularly generative AI and trends for the near

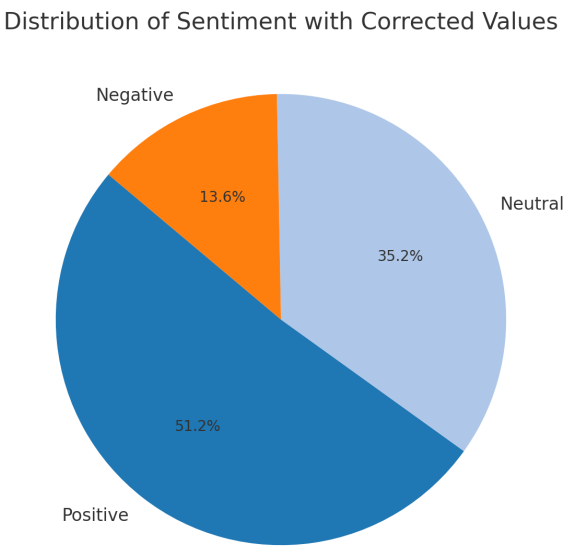
future?" This question seeks the respondent's general opinion on adopting artificial intelligence technologies, focusing on generative AI and anticipated trends.

We analyzed these answers with the help of generative AI in order to be as objective as possible and take into account important considerations. The responses provided express a wide array of sentiments and perspectives regarding adopting AI, particularly generative AI, and its trends for the near future. Here is a summary and analysis of the key points:

1. *Cautious Optimism*: Many respondents find AI, especially generative AI, to be a fascinating advancement that should be approached with caution. There is a call for establishing regulatory frameworks to guide its use.
2. *Selective Adoption*: Some believe that AI will be adopted, but not universally. A few respondents think that only a small number of people will know how to extract true benefits from it, implying that the success of AI adoption will depend on the knowledge and expertise of the users.
3. *Disruptive Potential*: There is a recognition that AI is a disruptive technology that could change business operations and the workplace significantly and rapidly.
4. *Shift in Organizational Dynamics*: AI is seen as shifting importance from some functional units to others, potentially reducing the need for certain roles while creating new ones, like AI departments.
5. *Concerns About Quality*: A few respondents express concerns about the quality of data and the potential negative effects it might have on AI's output, citing examples such as the perceived decline in ChatGPT's abilities due to poor data sources.
6. *Ethical and Efficiency Concerns*: While some respondents view AI as a tool that could efficiently identify wasteful practices, there are concerns about the lack of universally valid regulations, particularly in generative AI.
7. *Revolution in Business Processes*: Many believe that generative AI will revolutionize business processes and models, with creativity, ethics, and human skills becoming even more important.
8. *Potential for Improvement*: There is a belief that AI can facilitate and speed up processes, allowing for more time to be spent on truly interesting projects and reducing time on low-value tasks.
9. *Concerns and Hype*: Some responses are skeptical, mentioning "only problems" or stating that AI "should not be used." Others note the current hype around generative AI, especially in regulated industries like finance and insurance, with a need to understand its industrial use cases better.
10. *AI as a Consultant*: A few respondents think AI should be used as a consultant to expand idea generation based on the analysis of available information, with humans making the final, critical selections.
11. *Mixed Expectations*: The responses range from seeing AI as an inevitable part of future efficiency and productivity to concerns about the potential replacement of human jobs. There is an acknowledgment of the short-term challenges despite the long-term positive outlook.

12. *Training and Skill Gap*: A substantial number of responses highlight the need for training and developing new skills to use AI effectively. Some responses cite industry predictions about the future economic impact of AI, emphasizing the need for education to bridge the skill gap.
13. *Diverse Applications*: Respondents see AI being applied across various fields, from pharmaceutical research to process engineering, and emphasize the importance of understanding and using AI with caution.
14. *Implementation Challenges*: Integrating AI into routine business operations is seen as a non-trivial challenge, and there is a call for a strategic vision combined with operational competence.
15. *Support for Creativity*: AI is viewed as a critical asset for enhancing individual and corporate creativity, particularly in the content creation and digital experience sector.
16. *Regulatory Aspects and Creativity*: There is an emphasis on regulatory aspects affecting AI adoption and concerns about AI possibly diminishing human creativity if not managed well.
In summary, while there is significant enthusiasm for the potential benefits of AI and generative AI, there is also caution about its ethical use, the quality of the data it relies on, and the need for clear regulations. The perspectives underscore a need for a balanced approach that leverages AI's strengths while mitigating its risks, fostering creativity, and ensuring human oversight. The overarching sentiment is that AI is a transformative tool that, if adopted and managed wisely, can lead to substantial benefits for businesses and society.
In order to extract as much information as possible from this open question, we decided to perform a sentiment analysis of each response provided by the respondents. Among the respondents, 47.3% did not provide any answer to the open question, which means that the respondents did not express any further opinions about AI. The pie chart in Figure 26 illustrates the results of the sentiment analysis on the actual responses to the open questions.

Figure 26



The sentiment distribution highlights a generally positive outlook towards AI among those who provided a sentiment, mixed with a significant level of neutrality or indecision. The low level of negative sentiment is encouraging but warrants further investigation to address any underlying issues.

For organizations and stakeholders interested in the adoption and impact of AI technologies, these insights could inform strategies to enhance positive perceptions, address neutrality through education, and mitigate negative concerns.

We tried to correlate the sentiment with the Organization size (Number of Employees), Level of responsibility and Area of belonging or department of the respondent, and Level of AI adoption or engagement within the organization. The Chi-square tests for independence between the "Sentiment" column and other selected categorical columns were executed. The p-values for all three tests are above the commonly used threshold of 0.05, suggesting that we do not have sufficient evidence to reject the null hypothesis of independence. In other words, there is no statistically significant association between respondents' sentiment and their area of belonging, level of responsibility, or the categorized number of employees within the organization. This indicates that the sentiment towards the survey's subject matter (presumably AI adoption and perception) is not strongly influenced by these factors, at least not in a way that's detectable with this analysis. It suggests that sentiments might be more universally spread across different areas of belonging, levels of responsibility, and organization sizes or that any potential influence these factors have on sentiment is not captured within the limitations of this dataset and analysis technique. We have not been able to establish a reliable correlation between the sentiment and the size of the company due to the constraints and limitations of the available data.

Conclusions

In this contribution, we present the results of a survey we designed and analyzed on AI adoption in Italian companies, focusing on levels of integration, effectiveness, readiness, and its impact on the workforce. We were trying to identify key players in AI initiatives, budgeting, and challenges faced in data preparation and AI implementation.

The research provides comprehensive insights from a survey on AI adoption in Italian companies. Key findings include a diverse level of AI integration across departments, with a significant portion of companies being end-users. Various AI applications are employed, such as recommendation systems and robotic process automation. There is a trend towards increased AI investment, with most companies expecting to raise their AI budgets. Challenges include data availability and structuring, lack of skills, and clarity in use cases. AI's impact on the workforce is seen optimistically, with many expecting job creations. The survey reveals a push for cross-functional AI implementation, involvement of specialized AI teams, and a belief in AI's role in enhancing creativity and operational processes. Overall, there is cautious optimism about AI's potential, coupled with an awareness of the need for ethical considerations and data quality management. In our comprehensive analysis of artificial intelligence (AI) adoption within Italian companies, we have highlighted the diverse degrees of AI integration across departments and the widespread application of AI technologies, such as recommendation systems and robotic process automation. Our findings indicate a positive trajectory towards increased AI investment, with the majority of companies expressing plans to enhance their AI budgets. This underscores a growing acknowledgment of AI's potential to improve operational efficiencies and drive innovation. Our research has highlighted the challenges that organizations face in adopting AI, including data availability, skill development, and the clarity of use cases. Despite these hurdles, we remain optimistic about AI's impact on the workforce, anticipating job creation rather than displacement. This optimism is reinforced by our findings on the push for cross-functional AI implementation and the involvement of specialized AI teams, suggesting a collaborative approach to integrating AI within organizational structures. We have noted AI's role in augmenting creativity and operational processes, signaling a shift towards leveraging AI for strategic advantage. Nevertheless, we also recognize the critical need for ethical considerations and data quality management in AI adoption, highlighting the complex landscape that companies must navigate. Based on our analysis, we propose several directions for future research that deserve further exploration:

1. *Skill Development and Training*: How can we more effectively bridge the AI skills gap within organizations? Future research could investigate the most effective training programs and strategies for equipping employees with essential AI competencies.

2. *Cross-Functional Integration*: What are the best practices for encouraging cross-functional collaboration in AI initiatives? Further studies might analyze successful case studies of AI integration across various departments, identifying key success factors.
3. *Ethical Considerations and Data Management*: How can we ensure the ethical use of AI and uphold high data quality standards? Future research could focus on developing ethical frameworks and data governance models specifically designed for AI applications.
4. *Impact on Workforce and Job Creation*: What specific roles does AI create, and how does it transform existing job functions? We suggest conducting more detailed analyses on the types of jobs AI is generating and the implications for workforce development.
5. *AI and Organizational Creativity*: To what extent can AI contribute to organizational creativity, and how can we maximize this potential? Investigating how AI tools can foster creativity could provide insights into how organizations can leverage AI to enhance innovation.
6. *Long-Term Adoption Trends*: How will AI investment and integration trends evolve over the long term, and what factors will influence these changes? We advocate for longitudinal studies that track the progression of AI adoption over time, identifying emerging trends and shifts in organizational strategies.

These questions reflect the dynamic nature of AI adoption in the workplace and highlight the necessity for continuous research to navigate the evolving challenges and opportunities presented by AI technologies.

Finally, we have found interesting the use of generative AI as an effective method in analyzing the responses to the open questions that permits capturing precious information otherwise quite difficult to extract.

In conclusion, our survey of 237 Italian companies reveals a burgeoning interest and adoption of AI technologies, signifying a pivotal shift towards digital transformation within the Italian business landscape. This research underscores the critical need for Italian companies to embrace AI, not only as a tool for operational efficiency but as a strategic asset to foster innovation, competitive advantage, and sustainable growth. The challenges identified, including skill gaps, data management issues, and ethical considerations, highlight areas for immediate action and further research. As we stand on the cusp of a new era in business technology, it becomes imperative to continue exploring these avenues, ensuring that the integration of AI is both effective and responsible. Establishing a permanent observatory for the impact of AI on Italian companies is a recommended step forward. This entity will be crucial in monitoring ongoing trends, facilitating knowledge exchange, and guiding policy development. By doing so, we aim to not only keep pace with global advancements but to position Italian enterprises at the forefront of innovation and ethical AI use. This paper lays the groundwork for future research and sets a clear agenda for the continuous evaluation of AI's role in shaping the future of Italy's corporate sector.

Appendix

Lo stato dell'AI nelle imprese italiane

Obiettivo del sondaggio è valutare il livello di adozione delle tecnologie basate sull'Intelligenza Artificiale (AI), in particolare l'AI generativa e le tendenze per il prossimo futuro. Il tempo stimato per la compilazione del sondaggio è di circa 10 minuti. Il sondaggio è strutturato in 5 sezioni principali.

- La prima sezione è dedicata a raccogliere informazioni generali sull'organizzazione di appartenenza e sul profilo di chi partecipa al sondaggio.
- La seconda sezione è dedicata a comprendere il livello di adozione delle tecnologie AI.
- La terza sezione è dedicata in particolare all'AI generativa.
- La quarta sezione è dedicata agli aspetti implementativi dell'AI
- La quinta e ultima sezione è dedicata agli aspetti organizzativi dell'AI

* Indicates required question

1. Nome dell'organizzazione/azienda *

2. Numero di dipendenti *

3. Codice Attività (ATECO)

4. CAP *

5. Email (della persona che compila il questionario se desidera ricevere i risultati della ricerca)

6. Area di appartenenza (della persona che compila il questionario) *

Mark only one oval.

- ◯ Top management IT
- ◯ IT
- ◯ HR
- ◯ Marketing/Sales
- ◯ Operations
- ◯ R&D
- ◯ Other: _____

7. Livello di responsabilità (della persona che compila il questionario) *

Mark only one oval.

- ◯ Top management IT
- ◯ Responsabile di funzione
- ◯ Responsabile di team

- ( ) Dipendente/Collaboratore
- ( ) Consulente esterno
- ( ) Other: _____

Conoscenza e adozione delle tecnologie AI nella tua azienda/organizzazione

8. Cosa descrive meglio il ruolo della tua azienda/organizzazione per quanto riguarda la tecnologia AI? *
   Mark only one oval.
   - ( ) La mia azienda/organizzazione è principalmente un end-user (buyer)
   - ( ) La mia azienda/organizzazione è principalmente un fornitore (seller)
   - ( ) La mia azienda/organizzazione è sia end-user che fornitore (both)
   - ( ) La mia azienda/organizzazione non è ne end-user ne fornitore (none)

9. Qual è il livello di esperienza della tua azienda/organizzazione l'AI? *
   Mark only one oval.
   - ( ) Non abbiamo ancora implementato alcuna soluzione di AI
   - ( ) Siamo nuovi nell'AI: meno di 6 mesi
   - ( ) Abbiamo una certa esperienza con l'AI: da 6 a 12 mesi
   - ( ) Abbiamo molta esperienza in AI: da oltre 1 anno

10. Quali sono gli obiettivi principali dell'utilizzo dell'AI nella tua azienda/organizzazione?*
    Check all that apply.
    - [ ] Migliorare la customer/user experience
    - [ ] Migliorare l'operatività interna
    - [ ] Raccomandare i prodotti/servizi
    - [ ] Mitigare i rischi
    - [ ] Non abbiamo un obiettivo specifico
    - [ ] Other: _____

11. Quali delle seguenti applicazioni AI utilizzate nella tua azienda/organizzazione? *
    (seleziona tutto ciò che si applica)
    Check all that apply.
    - [ ] Antifrode/sicurezza
    - [ ] Visione artificiale
    - [ ] PNL/chat/messaggistica/testo…
    - [ ] Creazione di contenuti/creatività…

- [ ] Robotic Process Automation…
- [ ] Sistemi di raccomandazione
- [ ] Stiamo sperimentando/testando l'AI
- [ ] Non stiamo utilizzando l'AI
- [ ] Other: _____

12. Come è cambiata la spesa per l'AI della tua azienda/organizzazione negli ultimi 12 mesi?*
Mark only one oval.

- ◯ È rimasta costante
- ◯ È aumentata
- ◯ È diminuita

13. Come prevedi che cambierà la spesa per l'AI della tua azienda/organizzazione nei prossimi 12 mesi? *
Mark only one oval.

- ◯ Rimarrà costante
- ◯ Aumenterà
- ◯ Diminuirà

14. Qual è la sfida principale che la tua azienda/organizzazione si trova ad affrontare con l'AI? *
Mark only one oval.

- ◯ Supporto insufficiente da parte dei leader o delle parti interessate
- ◯ Disponibilità o qualità dei dati inadeguata
- ◯ Talento o risorse limitati
- ◯ Casi d'uso non chiari o non definiti
- ◯ Basso ritorno sull'investimento
- ◯ Other: _____

Adozione dell'AI generativa (come ChatGPT, Midjourney, Copilot, Dall-E, Bard, Claude, ...) in azienda

15. Come descriveresti il livello di coinvolgimento della tua azienda/organizzazione * con l'AI generativa?
Mark only one oval.

- ◯ Non ne ho idea
- ◯ Nullo: non la stiamo considerando o l'abbiamo esclusa
- ◯ Stiamo esaminando possibili applicazioni, ma non l'abbiamo ancora utilizzata …
- ◯ Stiamo sperimentando l'AI generativa su piccola scala

- ( ) Abbiamo implementato l'AI generativa nelle nostre operazioni
- ( ) Other: _____

16. Che cosa pensi dell'utilizzo dell'AI generativa per la tua azienda/organizzazione? *
Mark only one oval.

- ( ) Penso che possa essere utile, con adeguate precauzioni
- ( ) Penso che non sia applicabile o utile per la mia attività
- ( ) Penso che sia applicabile ma non abbastanza affidabile o sicura per la mia attività
- ( ) Other: _____

17. La tua organizzazione prevede di utilizzare l'AI generativa nell'accesso e nello sfruttamento della base di conoscenza della tua azienda/organizzazione? *
Mark only one oval.

- ( ) Sì
- ( ) No
- ( ) Forse
- ( ) Non lo so
- ( ) Non applicabile

18. Se la tua azienda/organizzazione utilizza l'AI generativa, state utilizzando modelli non proprietari come ChatGPT o state utilizzando modelli proprietari che non prevedano di condividere i dati aziendali con altri? *
Mark only one oval.

- ( ) Principalmente modelli non proprietari
- ( ) Entrambi i tipi di modelli
- ( ) Modelli non proprietari solo se di partner di cui mi fido
- ( ) Principalmente modelli proprietari
- ( ) Non lo so
- ( ) Non applicabile

19. Sei preoccupato per i rischi dell'AI, ad esempio pregiudizi, accuratezza, plagio, allucinazioni? *
Mark only one oval.

- ( ) Estremamente preoccupato
- ( ) Un po' preoccupato
- ( ) Per nulla preoccupato

20. Quanto pensi che l'AI sia in grado di aiutare la creatività in azienda/organizzazione? *
Mark only one oval.

	1	2	3	4	5	6	7	
Per niente	◯	◯	◯	◯	◯	◯	◯	In modo determinante

21. L'utilizzo dell'AI permette di produrre idee nuove e utili per migliorare i processi dell'azienda/organizzazione? *
Mark only one oval.

	1	2	3	4	5	6	7	
Per niente	◯	◯	◯	◯	◯	◯	◯	In modo determinante

22. In linea generale da dove pensi possano arrivare i maggiori contributi alla creatività dell'azienda/organizzazione?
Mark only one oval.

- ◯ Dalle persone creative senza utilizzare l'AI
- ◯ Dalle persone che utilizzano l'AI
- ◯ Dalla sola AI
- ◯ Non saprei
- ◯ Other: _____

Implementare l'AI nella tua azienda/organizzazione

23. Come avete ottenuto i dati necessari alle vostre applicazioni di AI? *
Check all that apply.

- ☐ Abbiamo utilizzato i nostri dati
- ☐ Abbiamo utilizzato il crowdsourcing
- ☐ Abbiamo utilizzato dati sintetici
- ☐ Li abbiamo acquistati
- ☐ Non siamo riusciti ad ottenere i dati necessari
- ☐ Abbiamo utilizzato i motori di ricerca
- ☐ Other: _____

24. Quali sono le maggiori sfide nel preparare i dati necessari alle applicazioni AI? *
Check all that apply.

- ☐ Mancanza di dati
- ☐ Mancanza di dati strutturati

- [ ] Privacy dei dati
- [ ] Distorsione dei dati
- [ ] Normalizzazione dei dati
- [ ] Etichettatura dei dati
- [ ] Qualità dei dati
- [ ] Other: _____

25. La tua azienda implementa l'AI su larga scala, ovvero integrata in tutta l'azienda/organizzazione?*
Mark only one oval.

- ◯ Non stiamo implementando affatto l'AI
- ◯ Stiamo implementando l'AI principalmente non su larga scala
- ◯ Siamo in procinto di passare all'AI su larga scala, ma non siamo ancora arrivati a questo livello
- ◯ Realizziamo l'AI su larga scala (integrata in tutta l'azienda)

Processi organizzativi e AI nella tua azienda/organizzazione

26. Chi decide i budget dei progetti AI nella tua azienda/organizzazione? *
Mark only one oval.

- ◯ Il livello esecutivo (CEO/CTO)
- ◯ I line manager
- ◯ I singoli utilizzatori
- ◯ Other: _____

27. Chi è coinvolto nell'implementazione dei progetti di AI nella tua azienda/organizzazione? *
Check all that apply.

- [ ] Ogni linea di business
- [ ] Il team di IT
- [ ] I consulenti
- [ ] Il team di AI
- [ ] Other: _____

28. Secondo te, chi dovrebbe essere coinvolto nell'implementazione dei progetti di AI nella tua azienda/organizzazione? *
Check all that apply.

- [ ] Ogni linea di business
- [ ] Il team di IT

- [ ] I consulenti
- [ ] Il team di AI
- [ ] Other: _____

29. In che modo pensi che l'AI influenzerà la forza lavoro della tua azienda/organizzazione in futuro?*
Mark only one oval.

- ◯ L'AI creerà più posti di lavoro
- ◯ L'AI ridurrà il numero di posti di lavoro
- ◯ Non ne sono sicuro
- ◯ Other: _____

30. Quali sono secondo te i principali ostacoli organizzativi per l'adozione dell'AI nella tua azienda/organizzazione? *
Check all that apply.

- [ ] Troppo poca sponsorizzazione da parte della leadership ...
- [ ] Mancanza di competenze
- [ ] Poche risorse
- [ ] Altre priorità più elevate
- [ ] Mancanza di casi d'uso
- [ ] Mancanza di disponibilità di dati adeguati
- [ ] Other: _____

31. Cosa pensi in generale dell'adozione delle tecnologie basate sull'Intelligenza Artificiale, in particolare l'AI generativa e sulle tendenze per il prossimo futuro?

_____

_____

_____

_____

_____

This content is neither created nor endorsed by Google.

Google Forms

References

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital Business Strategy: Toward a Next Generation of Insights. *MIS Quarterly, 37*(2), 471-482.

Bubeck, S., Chandrasekaran, V., Eldan, R., Gehrke, J., Horvitz, E., Kamar, E., ... & Zhang, Y. (2023). *Sparks of artificial general intelligence: Early experiments with gpt-4*. arXiv preprint arXiv:2303.12712.

Brynjolfsson, E., & McAfee, A. (2014). The second machine age: Work, progress, and prosperity in a time of brilliant technologies. WW Norton & Company.

Dell'Acqua, F., McFowland, E., Mollick, E. R., Lifshitz-Assaf, H., Kellogg, K., Rajendran, S., . . . Lakhani, K. R. (2023). Navigating the jagged technological frontier: Field experimental evidence of the effects of AI on knowledge worker productivity and quality. *Harvard Business School Technology & Operations Mgt. Unit Working Paper*(24-013).

Goodfellow, I., Pouget-Abadie, J., Mirza, M., Xu, B., Warde-Farley, D., Ozair, S., ... & Bengio, Y. (2014). Generative adversarial nets. *Advances in neural information processing systems*, 27.

Gozalo-Brizuela, R., & Garrido-Merchan, E. C. (2023). ChatGPT is not all you need. A State of the Art Review of large Generative AI models. *arXiv preprint arXiv*:2301.04655.

IBM Global AI Adoption Index, 2023. https://it.newsroom.ibm.com/aiadoption2023

IBM Global AI Adoption Index, 2022. https://www.ibm.com/downloads/cas/GVAGA3JP

Jan, Z., Ahamed, F., Mayer, W., Patel, N., Grossmann, G., Stumptner, M., & Kuusk, A. (2023). Artificial intelligence for industry 4.0: Systematic review of applications, challenges, and opportunities. *Expert Systems with Applications*, 216, 119456.

Jordan, M. I., & Mitchell, T. M. (2015). Machine learning: Trends, perspectives, and prospects. *Science*, *349*(6245), 255-260.

Kapoor, R., & Ghosal, I. (2022). Will Artificial Intelligence Compliment or Supplement Human Workforce in Organizations? A Shift to a Collaborative Human–Machine Environment. *International Journal on Recent Trends in Business and Tourism*, *6*(4), 19-28.

Lepenioti, K., Bousdekis, A., Apostolou, D., & Mentzas, G. (2020). Prescriptive analytics: Literature review and research challenges. *International Journal of Information Management*, 50, 57-70.

Manyika, J., Chui, M., Miremadi, M., Bughin, J., George, K., Willmott, P., & Dewhurst, M. (2017). *A future that works: AI, automation, employment, and productivity.* McKinsey Global Institute Research, Tech. Rep, 60, 1-135.

Mikalef, P., & Gupta, M. (2021). Artificial intelligence capability: Conceptualization, measurement calibration, and empirical study on its impact on organizational creativity and firm performance. *Information & Management, 58*(3), 103434.

Mikalef, P., Pappas, I. O., Krogstie, J., Jaccheri, L., & Rana, N. (2021). Editors' reflections and introduction to the special section on 'Artificial Intelligence and Business Value'. *International Journal of Information Management*, 57, 102313.

Noy, S., & Zhang, W. (2023). Experimental evidence on the productivity effects of generative artificial intelligence. *Science,* 381(6654), 187-192. doi:doi:10.1126/science.adh2586

Shakked Noy, S. & Zhang, W. (2023). Experimental evidence on the productivity effects of generative artificial intelligence. Science 381,187-192. DOI:10.1126/science.adh2586

OpenAI, (2023). GPT-4: OpenAI's Latest Advancements in Language Understanding and Generative AI. OpenAI Blog.

Raisch, S., & Krakowski, S. (2021). Artificial intelligence and management: The automation–augmentation paradox. *Academy of management review, 46*(1), 192-210.

Rogers, S. (2021). The Rise of Large Language Models in Business Strategy. J*ournal of Business and Technology, 8*(1), 134-145

Russell, S. J., & Norvig, P. (2010). *Artificial intelligence a modern approach*. Prentice Hall, London.

Shmueli, G., & Koppius, O. R. (2011). Predictive analytics in information systems research. *MIS quarterly*, 553-572.

Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. N., ... & Polosukhin, I. (2017). Attention is all you need. *Advances in neural information processing systems*, 30.

Wong, Y. K. (2021). *Advanced Skills Mapping and Career Development Using AI*. Paper presented at the CS & IT Conference Proceedings.

Zhang, C., & Lu, Y. (2021). Study on artificial intelligence: The state of the art and future prospects. *Journal of Industrial Information Integration, 23*, 100224.

Printed in March, 2024

MIB Trieste
School of
Management

www.mib.edu