THE IMPACT OF ARTIFICIAL INTELLIGENCE IN ITALY

Artificial Intelligence Working Group

Full Report

September 2019

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INTRODUCTION

For years, the American Chamber of Commerce in Italy has been in the forefront of promoting analysis, observations and proposals that can contribute to improve Italy’s competitiveness and the attractiveness of its economy for American investors.

One of the themes that has been examined extensively in the global discussions about the evolution of economic and productive systems is unquestionably that of Artificial Intelligence (“AI”), an element that is gaining interest not only among major economic players, but also those on a geopolitical level who see in this development tool one of the factors on which productive and technological leadership will depend over the coming years.

For these reasons, thanks to the proposal developed with Microsoft and McKinsey, our organization has decided to launch a working group dedicated to this topic. The group would be sparked by the input of American and Italian companies with the goal of bringing our contribution to the discussion currently underway on an international, economic and social level.

The working group, led by Silvia Candiani (CEO of Microsoft Italia and a member of our board), has decided to develop an analysis project articulated in two steps. The first—of which this document is the product—is an analysis of Italy’s positioning in this area, highlighting the opportunities that would result for companies and the country and its economy from an effective and systematic implementation of AI projects, including quantification of the improvements in terms of economic aspects and competitiveness, while beginning to introduce a number of policy proposals.

The second document, which will follow this first one, is designed to create a map of policy guidelines, starting from those highlighted in this report, to promote the adoption of AI within the Italian economic system. It will examine each proposal to make it clear and easy to deploy by companies which will increasingly need to adopt these projects to withstand the growing pressure of global competition, as well as public sector decision-makers who will be called upon to create a clear-cut and simple regulatory system that is oriented towards innovation and growth.

At the American Chamber of Commerce in Italy, we hope this document is not used only as an informational source, but will also become an integral part of the ongoing debate on this issue, with the certainty that, if requested, our organization will be available to the Italian government to collaborate in the creation of an effective political framework regarding AI in order to promote innovation, investment and training in one of the key areas for the future of Italy.

Enjoy your reading.

Simone Crolla
Consigliere Delegato – American Chamber of Commerce in Italy
EXECUTIVE SUMMARY

Understanding the potential of Artificial Intelligence (AI) is crucial for any company wanting to survive in today’s evolving economic environment; an environment in which traditional business models and processes increasingly become data driven, and digital transformations reshape the market’s landscape.

Machine learning and analytics are already an integral part of several industries and their presence is only expected to grow in the years ahead; a growth that will bring with it significant economic benefits to companies able to optimally utilize the new technologies.

This paper aims to contribute to the debate on the future of AI in Italy by providing a new estimate of the potential of AI in the Italian economy and to highlighting the factors that will be key to success in implementing AI programs at a company and country level. It is the result of a concerted effort by a working group initiated by AmCham and led by McKinsey & Company and Microsoft Italia, with significant contributions from Accenture, Egon Zehnder, and the collaboration of other Italian companies who are leaders in AI.

This paper relies on concrete analysis focused on the Italian private sector, and conclusions are mainly based on real life examples and interviews. Although we report simulated figures based on analysis, the numbers should not be read as forecasts, but are rather intended to provide a general estimate on the potential economic impact of AI. Our analysis covers four key areas: (1) an estimate of the full potential of AI in Italy by 2030 (2) an understanding of what key success factors will play a part in implementing AI in a selection of best practice projects, (3) an exhaustive look at the AI vision in selected Italian companies, and (4) an overview of what the benchmarks are in terms of external enablers at the country level.

The second chapter of this report focuses on what AI adoption could mean for Italian industry in terms of potential. We chose to center our analysis on ten industries: telecom and high tech, financial services, automotive and assembly, consumer packaged goods, energy, transport and logistics, retail, travel and tourism, professional services, and construction. Together, these industries cover about 77 percent of Italy’s total turnover for 2017.

The potential has been calculated in terms of annual additional revenue growth by 2030 and is expected to vary significantly by industrial sector, e.g., 1.7 percentage points in construction compared to 5.4 percentage points in telecom and high tech. Future AI adoption is also expected to vary by sector: For instance, within telecom and high tech, 64 percent of the companies are likely to adopt AI technologies; in construction, automotive and assembly, and CPG, on the other

1. Afiniti, Amgen, CDP, Citi, Coop Italia, Eon Reality, Generali, HPE, Invitalia, Legance, Leonardo, Ludovici Piccone & Partners, Medtronic, Whirlpool
hand, the share of adopter companies is likely to be just above 30 percent. It is estimated that AI adoption will have a significant impact on expected annual revenue growth:

Industry growth averages could increase by up to 2.8 percentage points for adopters vs. nonadopters. It could also have a substantial impact on value-added growth, with an expected increase of up to 5.3 percentage points (in case of AI adoption).

In other words, the impact of adopting AI techniques for companies operating in Italy, as per this evaluation of the Italian economy structure and its business mix, may be EUR 570 billion in terms of turnover (approximately 23 percent higher than the 2017 baseline).

The third chapter of this paper describes the seven core factors considered key to driving the successful implementation of AI projects. These are: strategic vision, talent readiness, project governance, project maturity, cybersecurity/data privacy, capital adequacy, and ecosystem role.

In order to identify the most important among these factors, we conducted an in-depth analysis of a panel of 33 successful client stories from Microsoft and Accenture and closely examined the characteristics of each individual company and its AI implementation project. The average score for the entire panel was 4.3 out of 7.0, pointing to the fact that despite the overall progress achieved, there still remains significant room for improvement.

Success cases showed that the underlying strategic vision seemed to be the key success factor in all the projects examined. Regardless of industry sector and company size, the success of implementing AI projects is believed to depend mostly on the extent to which the organization perceives such projects to be a strategic priority.

Moreover, on analysis it was found that the other two success factors that contributed most to the success of the AI projects were: cybersecurity/data privacy (compliance with the most advanced standards related to this area) and project maturity (ability of companies to approach AI projects as immediately operational).

The analysis also uncovered three interesting insights:

1. Small (up to 50 employees) or very large companies (over 1,000 employees) have better success scores than medium or large companies, as they can leverage respectively ease at implementation and scale.

2. Projects originated by a line of business or directly by the Chief Executive Officer (CEO) perform better than projects originated by the Chief Information Officer (CIO) or the Chief Data Officer (CDO).

3. Projects focused on employee empowerment are more successful: Almost one point higher than projects aimed at product innovation, customer engagement, or operational efficiency.

In the fourth chapter, we focus on strategic vision, the most impactful factor among the seven analyzed, through a survey that we conducted to assess the internal readiness of Italian companies in terms of AI.
We surveyed approximately 190 executives from different companies and industries. Most of these respondents (86 percent) are already implementing AI projects, though only 3 percent are at an advanced stage of maturity with implementation. Almost 40 percent of the respondents expect to achieve cost optimization and internal process efficiency from this, whereas less than 20 percent are aiming to build better customer experiences or increase employee efficiency.

AI is considered highly relevant by almost half of the respondents, who confirm that the top three crucial aspects that foster internal readiness to AI solutions are:

1. An enlightened leadership that understands the importance of AI, supports its implementation, and leads by example by going through training.
2. Promotion of a cultural shift and an open-minded safe culture where experimentation is allowed.
3. Enhancement of competence for a broad portion of the employee population.

Interviews with Italian company leaders heading the AI projects at their respective organizations have confirmed that AI automation tools and algorithms are significant to 1) foster efficiency and interaction with customers, 2) help clients to identify and solve problems, 3) improve customer service and 4) facilitate reskilling among employees in order to enhance their learning capability.

At the same time, survey respondents have identified two main risks related to the implementation of AI projects: uncertainty over the maintenance costs of AI solutions (including process alignment, IT integration, training) and impact on employees. Interestingly, the latter is perceived as a much lower risk (by almost 50 percent) by companies that have already experimented with AI solutions. These companies realize that the biggest challenge of AI projects is how to reskill employees and are apparently addressing this area.

The fifth chapter focuses on the influence of external enablers – i.e., opportunities available and amount of support received at a fundamental level for the development and adoption of AI techniques – on companies' AI strategy. In order to have a benchmark, we compared ten countries with different levels of AI maturity on six elements measured by quantitative and qualitative indicators: digital adoption, data infrastructure, education and skills, innovation ecosystem, regulation, and investment. The analysis confirmed that the US and China are the global leaders in AI and, within the European Union, the Nordic countries precede the UK, France, and Germany in terms of strength of external enablers.

More specifically, in the US, a significant portion of GDP (0.3 percent versus the 0.05 average) is privately invested in AI initiatives by the ecosystem of venture capitalists, start-ups, and private equity funds. The UK ranks first in the European Union with 0.04 percent of GDP invested.

Italy, with only EUR 19.9 million invested as compared to the UK's EUR 1.1 billion, for example, shows potential for improvement in most of the six indicators. Having said that, Italy did begin to take its first steps towards fostering AI advancement in 2017 with AgID launching its three-year plan to foster digital ecosystems and cybersecurity, and the Italian Institute of Technology
increasing its AI development activities. Several Italian local entities are also now carrying out initiatives on AI, e.g., the province of Modena is creating an academy to relaunch AI research in the field of machine and deep learning funded by the government (EUR 4 million). On this evidence, it is apparent that this is a country which, while not at quite the level of the best performers, is willing and poised to do everything in its power to successfully launch AI, and the level of experimentation in the corporate environment proves that there is huge potential and interest to do this. In order to accelerate, we believe that a set of measures should be put in place for Italy that will allow it to access the full potential of AI adoption. These measures will need to support and accelerate the adoption of AI techniques as well as internalize the productivity benefits offered.

In particular, Italian AI could benefit from a significant improvement on three dimensions, which could be achieved by instituting a combination of initiatives with the help of the public and private sectors:

1. Developing a strategic vision and understanding of AI’s disruption potential. The private sector could support this by developing an exchange of best practices, while the government could create an agency to disseminate AI knowledge;

2. Ensuring talent readiness necessary to drive transformation. Collaboration between companies, universities, and the government would be key to training and attracting AI-experienced professionals;

3. Providing direct investment and innovation support. The government could support this by creating an agency to allocate investments as well as providing an incentive scheme on AI, e.g., based on Industry 4.0 incentives.

This report was developed in July 2019 with an experimental approach focused on the Italian private sector. The guidelines here contained are intended as a preliminary draft and are conclusions drawn directly from our analysis. In August 2019 the Italian Minister of Economic Development (MISE) has published for consultation the first draft of Italian National AI strategy developed by a working group of 30 experts. We have noticed substantial alignment on suggestions and guidelines, and hope that our report will be of further support to accelerate Italian growth in this important challenge.
1. INTRODUCTION AND APPROACH

Recent advances in robotics and Artificial Intelligence (AI) are pushing the frontier of how machines can contribute to the economy. Although it still may take years for smart machines to master sophisticated tasks and to completely substitute humans, there is no doubt that AI is radically changing companies in different industries and is even likely to impact economic systems in the long run.

AI is commonly defined as the ability of a machine to perform cognitive functions such as perceiving, reasoned learning, interacting with the environment, problem solving and even exercising creativity.

As of today, AI mainly focuses on five technology systems: robotics and autonomous vehicles, computer vision, language, virtual agents and machine learning, which includes deep learning.

The Italian economy and its businesses have lagged behind their peers when it comes to capturing the full potential of current and previous generations of digital tools. As a matter of fact, the digital portion of the Italian ICT sectors in 2017 accounted for only 1.2 percent of GDP, significantly lower than the European average of 1.7 percent (3.3 percent in the United States). Being able to harness the potential of digital technologies is becoming ever more crucial with AI having the potential to disrupt the economy and create substantial economic benefits for early adopters. What is more, most companies now recognize this imperative, as confirmed by a survey in which 80% of companies reported AI to be as important or more important than other digital priorities. Therefore, in order to keep up, it is that much more crucial to be equipped to do so.

At present, only 15% of Italian companies have deployed AI beyond early stage pilots (as compared to 32% on average for their European peers) and Italy is currently ranked second to last in Europe when it comes to the adoption of AI technologies.

Having said that, some Italian companies are now slowly beginning to pilot new technologies, particularly in machine learning and smart robotics, and these are likely to drive the largest growth opportunities in the country. This is important since AI techniques can be a strong enabler for GDP growth and Italy cannot risk falling further behind the world’s leaders as the US and China, together with the more advanced European economies – such as the Nordic – continue to invest in AI adoption and diffusion.

This paper aims to identify a reasonable path forward which will help the country accelerate its adoption of AI techniques and maximize the growth potential available by leveraging initiatives both in the private and public sector realms.
1.1 THE CONTEXT

The impact of AI on a country’s economy can be assessed using different approaches, ranging from a reconstruction of its macroeconomic factors to a bottom-up assessment of the potential productivity levers available. Existing research is very useful when comparing AI’s potential impact in different countries throughout the world, and provides a broad overview of the main levers involved in realizing AI’s full potential. At the same time, we believe that in order to calculate AI’s impact in Italy, we need to adjust these approaches to the country’s particular characteristics and create a map of impact by industrial sector.

In parallel with the industrial and economic development of AI, it is important to also focus on ethical principles and address the issue of the relationship between technological development in the era of AI and the socio-economic impact that this innovation will have. All ongoing efforts and dialogues must ensure that AI can benefit people’s lives, amplify human capabilities, and improve society as a whole. Today, more than ever, it is necessary to guarantee a human-centric vision of this technological-social evolution, of a technological future where human beings and machines will increasingly work together, but where human intelligence will continue to govern. This vision can be implemented by putting three main principles at the forefront of AI development: 1) building an AI that can increase human capabilities, i.e., the ability to reason and manage a vast amount of data - to help society improve and advance; 2) emphasizing the importance of trust, both as a parameter to be infused into AI technology, and as an integral part of the relationship between private providers and users; 3) positing security and privacy as fundamental human rights that will act as safeguards for the technological-social architecture of AI.

Defining and pursuing a set of ethical principles in the development of AI has been taken into serious consideration by the European Union (EU). The high-level expert group on AI (AI HLEG) at the European Commission has recently published ‘Policy and Investment Recommendations for trustworthy AI.’ These aim to ensure that all European citizens and businesses can reap the benefits of innovative AI technologies. Three areas in particular are crucial: skills, data sharing, and governance. An essential principle underpinning the development of AI-based technologies as part of Europe’s data economy is data sharing. However, both internal siloes and limitations on external data sharing mean that many organizations are unable to use data to generate new insights, identify new business opportunities, or better serve their customers. The Commission’s recommendations rightly highlight how overcoming such obstacles depends on responsibly governing the development and sharing of datasets intended for training models. But to ensure companies can feel confident sharing data both internally and externally, we also need a framework encompassing standards, licensing models, and solutions, where necessary, that

guarantee data confidentiality.

Ultimately, people will only use technology that they trust. To increase trust in AI, we must observe principles that will facilitate the responsible development and deployment of AI. Technology companies will have to abide by these principles. But we will also need a sound governance model that includes risk management frameworks and is accompanied by legislation where necessary. Such a model will help ensure that AI products or services are trustworthy throughout their lifecycle. Tools that promote more responsible development and use of AI should also be encouraged.

This acquires even more importance when we consider the rapid development of AI-based technologies such as facial recognition, where regulation is sorely needed. Indeed, creating a regulatory framework that guards against risk while still ensuring effective use of the technology will require a thoughtful approach, rooted in a clear understanding of how the technology works, what it can or cannot do, and how best to achieve accurate results. For instance, regulation should state that companies developing and marketing such technology in Europe are required to undergo third-party testing for accuracy and unfair bias. Moreover, tech companies that offer facial recognition services should be required to provide documentation that explains the capabilities and limitations of the technology in terms that customers and consumers can understand.

1.2 OUR APPROACH

Our approach begins with an overview of AI and the full potential that can be captured by the industrial sector, estimated as equivalent to the expected additional revenue growth rate in a best-practice economic, political, and cultural scenario. Our working hypothesis is that this can only be realized if two conditions are met:

- Full company readiness in terms of strategy, vision, skills, internal culture, and investments;
- Full country readiness in terms of incentives, regulation, and infrastructure.

Failing to meet or only partially meeting these conditions will influence the real potential of AI-led growth by a factor that is theoretically calculated as the delta between the current and ideal scenario.

The key internal and external conditions operating at the time will also play a pivotal role in determining how successfully AI can be harnessed to function optimally. We closely examined all of these conditions and identified what specifically would enable each company to reach its full potential when implementing AI projects. To analyze their feasibility (i.e., internal conditions), we used a fact-based approach and analyzed a panel of 33 Italian success stories in terms of AI implementation. Our aim was to identify the key success factors and their link to project performance.

In addition, we decided to further examine the importance of having a strategic vision with a
larger survey addressed at 190 executives in leading roles across 96 Italian companies. We finally concluded that there were six key external success factors (i.e., also known as enablers) centered around country policies as well as governmental initiatives. These included: digital adoption, data, skills, innovation, regulation and investments. We believe that these are necessary to foster AI transformation. During this analysis, we compared different countries at both the non-European (US, China) and European level (France, Germany, Italy). On the one hand, we discovered that the US leads in terms of key success factors. And, on the other, that Italy is second to last in terms of enablers. Having said that, Italy is currently striving hard to change that damning statistic by employing governmental driven strategies mainly in the public sector with the Agenzia per l’Italia Digitale focusing on the ecosystem and the Italian Institute of Technology on robotics.

To conclude, we identified a combination of possible initiatives from the public and the private sectors that helped us put together some initial guidelines that will set Italy on the path to developing its full potential in terms of AI.

2. FULL POTENTIAL OF AI

In this chapter, we focus on the increased adoption of AI techniques in Italy and the potential growth in revenue it could bring about by 2030. We start by estimating what the full potential at the global level would be indicated as additional growth in percentage points and compared to our baseline. We then use this estimate to calculate the actual turnover potential in Italy.

The definition of AI tends to vary depending on the context of discussion. For the purpose of this discussion we take into account at least five broad AI technologies, namely, computer vision, natural language, virtual assistants, robotic process automation, and advanced machine learning.

2.1 INTRODUCTION

Full potential is defined as the highest growth rate a company can achieve by 2030 on adopting AI within a best-practice scenario, assuming the following criteria are fulfilled:

- Full company readiness in terms of internal culture, vision, and the possibility to invest in innovation;
- Full country readiness in terms of incentives, regulation, and infrastructure.
- The full potential estimation makes three key assumptions as its starting points:
- Impact is calculated at the industry level and takes into account key differentiating factors (e.g., level of possible automation) with the aim of obtaining a complete yet specific and differentiated view of country potential.
• In each industry, the share of companies adopting AI is simulated by using a diffusion model based on a realistic scenario of AI adoption in best-practice countries by 2030 and is therefore lower than 100 percent.

• The mix of companies considered is average in terms of size and maturity (i.e., the share of start-ups included in the panel is negligible).

We decided to analyze ten key industries, covering in total about 77 percent of the Italian companies’ turnover in industry, services, and financial sectors in 2017. We focused on the following:

1. Telecom and high tech
2. Financial services
3. Automotive and assembly
4. Consumer packaged goods (CPG)
5. Energy
6. Transport and logistics
7. Retail
8. Travel and tourism (including accommodation and food services)
9. Professional services
10. Construction

Other relevant industries, such as Pharmaceuticals, have not been included in this analysis since the annual turnover in Italy is significantly lower than the turnover of the 10 considered sectors. Moreover, such a list does not include the public sector or the government even if AI has the potential to significantly foster their efficiency, productivity and service quality (as demonstrated by the Invitalia case, detailed in paragraph 4.1). This is because we chose to focus our paper mainly on the impact that AI could have on private company growth.

2.2 AI ADOPTION

We started our analysis by using a diffusion model to estimate the share of companies adopting AI in each industry. The diffusion model was built by using the results of a microeconometric analysis and the responses to three company surveys launched in 2017/2018. For the sake of simplicity, adopter companies in this research include both companies that will fully absorb different AI technologies and integrate them into their enterprise processes as well as companies that will choose to experiment with and narrowly apply one or more of the AI-related technologies, either for efficiency purposes or because they are striving for more growth from innovation and reinvention.

From our model, we could determine the different adopting trends according to sector: Telecom
and high tech are expected to lead the rankings with approximately 64 percent of companies adopting AI technologies, while construction and automotive are at the other end of the spectrum with an expected share of only 33 percent [Figure 2.1].

2.3 IMPACT OF AI

In this paper, the impact of AI is defined as the additional growth enabled by the adoption of AI techniques and is compared to a basic scenario, which accounts for expected industry growth under the current economic trends and assumptions.

In order to fully estimate the impact of AI techniques by 2030, we have compared estimates of sector growth from two points of view. This has allowed us to take into account all the different AI levers and effects:

- Revenue growth: This refers to the expected additional yearly revenue growth of AI adopter companies from 2017 to 2030, as estimated by the McKinsey Global Institute report ‘Tackling Europe’s gap in digital and AI’, February 2019.2 Extrapolated from survey results and drawn from predictions about AI competitive dynamics and the AI diffusion curve. Although revenue growth could be considered a partial metric since it excludes the impact of AI on cost reduction and increased productivity, it is a better indication of potential growth when looked at from a company perspective.

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**Estimated share of AI adopter companies by 2030 by industrial sector**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Construction</td>
<td>33%</td>
</tr>
<tr>
<td>Professional services</td>
<td>36%</td>
</tr>
<tr>
<td>Travel and tourism</td>
<td>38%</td>
</tr>
<tr>
<td>Retail</td>
<td>55%</td>
</tr>
<tr>
<td>Transport and logistics</td>
<td>48%</td>
</tr>
<tr>
<td>Energy</td>
<td>60%</td>
</tr>
<tr>
<td>CPG</td>
<td>34%</td>
</tr>
<tr>
<td>Automotive and assembly</td>
<td>33%</td>
</tr>
<tr>
<td>Financial services</td>
<td>61%</td>
</tr>
<tr>
<td>Telco and high tech</td>
<td>64%</td>
</tr>
</tbody>
</table>

*Including firms likely to be “AI absorbers” and “AI adopters”*

*SOURCE: “Tackling Europe’s gap in digital and AI”, McKinsey Global Institute, February 2019*
• Value-added growth: This alludes to the additional annual value-added (VA) growth rate resulting from investment in intelligent technologies (i.e., AI, robotics, and big data/analytics), as estimated by Accenture in the report ‘Impact of intelligent technologies, Global and Italy,’ May 2019. This analysis is based on data from the world’s 14 largest economies and assumes that investments in intelligent technologies per worker in each industry will reach the current US investment levels in traditional technologies per worker in the respective industries. Value added can be considered a close approximation of GDP, since it is an output measure accounting for the value of goods and services produced in a certain sector (and calculated as revenue less intermediate consumption). It can also be thought of as the contribution of different sectors to economic growth.

The analysis results suggest that AI adoption may boost revenues throughout industry, with a boost, in particular, for telecom, high tech, financial services, and automotive. Value-added growth will follow a similar path, also showing significant potential in travel and retail [Figure 2.2].

AI may be able to foster a new era of growth for companies throughout industry, avoiding low-profit trends altogether. However, in order for companies to be able to capture this growth potential, it will be key that AI technologies are adopted at scale. Our estimates show that the annual revenue growth gap between the industry average (considering all companies, adopters and non-adopters) and AI adopter companies could range between 1.1 percentage points and 2.8 percentage points [Figure 2.3].

An interesting output of the analysis also shows how the AI adoption rate in an industry is moderately correlated to the full achievable potential in the same industry in terms of revenue growth [Figure 2.4]. We can see that there is a substantial correlation between the two variables, automotive and assembly and CPG being the exception.

### Estimated annual revenue growth 2017-2030 for AI leaders vs. non-adopters by industrial sector

<table>
<thead>
<tr>
<th>Percent</th>
<th>Construction</th>
<th>Professional services</th>
<th>Travel and tourism</th>
<th>Retail</th>
<th>Transport and logistics</th>
<th>Energy</th>
<th>CPG</th>
<th>Automotive and assembly</th>
<th>Financial Services</th>
<th>Telco and high tech</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.7</td>
<td>2.3</td>
<td>2.5</td>
<td>2.6</td>
<td>3.0</td>
<td>3.8</td>
<td>4.2</td>
<td>4.2</td>
<td>4.7</td>
<td>5.4</td>
<td></td>
</tr>
</tbody>
</table>

1. Most plausible countries from “Tracking Europe’s gap in digital and AI 2020”, McKinsey Global Institute
3. Data for Manufacturing sector

Figure 2.2
This suggests that companies tend to invest in the adoption of AI with the expectation of increasing revenues. It is also our observation, based on the analysis, that these industries can be classified into four groups based on the following analyzed variables:

- **Non-AI industries** with low potential and few adopters: Construction, professional services, travel and tourism. Companies in this group may not prioritize the adoption of AI tools since the return on investment might not be high.

- **AI-selective industries** with high potential but low adoption: Automotive and assembly and CPG. Companies belonging to this group that act as first movers will have a significant competitive advantage over their non-adopting peers.

- **AI-enthusiast industries** with high adoption and medium to low potential: Transport and logistics and retail. Companies in this category might risk having to fight for the narrow benefits gained through adopting AI.

- **AI-savvy industries** with high adoption and high growth potential: Energy, financial services, telecom, and high tech. Companies in this category are already front runners in AI.

**Correlation between expected AI adoption and revenue growth at industry level**

This diagram visualizes the correlation between the expected AI adoption and revenue growth at different industry levels.

**Figure 2.3**

**Figure 2.4**
2.4 FULL POTENTIAL IN ITALY

To understand the magnitude of the potential effect of AI adoption in the Italian economy, we need to apply the expected revenue growth calculated in the earlier part of the chapter to the structure of the Italian economy and its business mix.

As a baseline, we considered the current total turnover of Italian companies by sector (Eurostat), amounting to a total of approximately EUR 2.5 billion. We then applied the full potential estimate of the industry average annual revenue growth. We found, on taking into account Italy’s business mix, that the total potential additional growth driven by AI technologies by 2030 could be in the approximate range of 23 percent, when compared to the 2017 baseline [Figure 2.5].

2.5 ADDITIONAL POSITIVE EFFECTS OF AI - ENVIRONMENT, CLIMATE AND INCLUSION

So far, we have only focused on the economic impact of AI in terms of enhanced productivity and efficiency.

However, other key aspects should be taken into consideration when discussing the potential effects of AI, including the opportunities that arise in fields such as ethics, cybersecurity, sustainability, and inclusive growth. In addition, AI technologies have the potential to increase consumer surplus by enabling a higher quality of life for every individual, e.g., limiting the time needed to do automatable tasks or enabling a healthier lifestyle.

AI can actually make the difference in today’s environmental challenges, thereby helping sort out tomorrow’s problems. There is meaningful evidence supporting this across the world but, importantly, in Italy as well, in the form of Fondazione Bruno Kessler (FBK), which was responsible
for developing a proof of concept focused on modeling crop-specific impact of heat waves by deep learning. Heat waves are a natural hazard and a cause for growing concern. In the last century, heat waves increasingly affected public health and the environment, with substantial impact on the agricultural sector in terms of drought, unsustainable irrigation and loss of yield. The potential for damage by heat waves is high and possible at any latitude, with drought regularly affecting maize yields in the US and causing wildfires in Sweden’s forests in 2018. FBK has developed crop-specific heat wave predictive models that allow farmers to use preventive strategies for crops, modeling the impact of heat waves on plant growth and quality/quantity of yield. The foundation proposes to extend the deep learning framework for high resolution nowcasting of precipitation and lightnings by combining it with the European scale global heat wave model developed by the team for the iReact H2020 EU project.

Particularly with reference to the use of AI for greater inclusion and accessibility, there are both direct as well as indirect, less-easily seen effects. Considering that more than 1 billion people worldwide are estimated to experience some form of disability (either temporary, situational, or permanent), designing more inclusive, accessible tools empowered by AI technologies means reaching a greater number of consumers and customers, with the likely potential increase in revenue that it would bring. On the other hand, the new AI-infused technologies represent a game-changer in helping people with disabilities unlock their full potential, so to allow for a more inclusive society. It has increasingly become an imperative to design products and tools with AI-based built-in features with the purpose of leveraging the power of AI to amplify human capability. This has led to designing specific programs for the empowerment of people with disabilities – such as AI for Accessibility led by Microsoft, or the ‘AI and Inclusion’ pilot project of the British Alan Turing Institute, or AI-powered Drishti solution by Accenture aimed at helping people who are blind or have low vision improve the way they experience the world around them and enhance their productivity in the workplace.

3. KEY SUCCESS FACTORS OF AI IMPLEMENTATION

The aim of this chapter is to account for the feasibility of AI implementation, which can be explained as the set of conditions that allow a company to achieve its full potential, as defined in this paper, by implementing AI projects. To identify these factors, we first compiled a large, preliminary list of features which could be linked to the success of AI projects. We then analyzed a panel of client stories with the aim of reducing such a list to the core factors that are most likely to be linked to the project’s performance.
3.1 MAIN HYPOTHESES/IDEAS

The ability for a given business to reach its full potential is based on several factors, both internal and external to the company, and which can be labeled as internal/success enablers (as defined in Section 7.1 of the Appendix and which differ from external enablers, which are related to the country’s readiness). In this chapter, we focus our analysis on these internal, project-enabling factors. External factors related to the market – such as the current domestic and international economic conditions and other relevant characteristics that may structurally affect the above-defined feasibility – were not considered in our qualitative analysis of client cases. External factors at the country level will be further assessed in the chapters that follow.

The hypothesis we wanted to test was that a company achieving its full potential – or the lack thereof – is determined by a set of key success factors or internal enablers that may be related to the company or ascribable to the AI project itself. The presence of certain factors rather than others, their intensity, as well as the way they repeatedly appear in conjunction with other factors, may all contribute to a company reaching its full potential and may thus correspond to providing greater feasibility for the company to do so. This is also to say that there exists an ideal level of key factors and a certain interaction between them that ensures feasibility, thus allowing a given company the freedom to reach its full potential. We assume that the presence and level of such internal enablers contributes to a company’s overall readiness, which, in turn, plays a role in its potential in terms of AI-related growth. Theoretically, complete company readiness is one of the prerequisites – alongside country readiness – to achieving the full potential that occurs when all the key success factors identified as internal enablers are positively present in the company.

3.2 OBJECTIVES AND METHOD

In this section, we describe the results of the qualitative analysis we carried out on a number of business cases where AI was implemented. We also focus briefly on the elements we refer to as success enablers.

We conducted a study that aimed to understand the correlation between successful implementation of AI projects and the elements generally defined as enabling factors. We wanted to understand which factors played a predominant role in the success of the analyzed project initiatives and whether any correlation to the characteristics of the company sample (e.g., size, industry) could be found.

The analysis was conducted using a sample of 33 business cases of Microsoft and Accenture clients who had successfully implemented AI solutions. Based on the Accenture Digital Dividends Diagnostic and after consultation with the Microsoft and Accenture experts specializing in AI.

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adoption, we identified seven factors that could drive the successful take-up of a new technology:

1. **Strategic vision**: This highlights whether AI is considered a real point of differentiation and a strategic priority for an organization.

2. **Talent readiness**: This focuses on the mix of skills required for the successful execution of AI projects, including leadership skills and internally specific expertise related to AI.

3. **Project governance**: This includes the ability to measure success through KPIs as well as assessing the willingness of an organization to reengineer and monitor internal processes, spread the word about the AI project and its objectives internally and externally.

4. **Project maturity**: This refers to the stage of maturity of the analyzed AI project.

5. **Cyber security/data privacy**: This refers to the measure of compliance achieved with the most advanced standards and certification.

6. **Capital adequacy**: This indicates the level and duration of financing of the analyzed project (e.g., if financing is sufficient for the project scope, if it is complete or partial).

7. **Ecosystem role**: This refers to the role leveraging partnerships and networks can play in the implementation of AI.

To analyze the 33 business cases, we created a questionnaire based on these seven factors and administered it to a set of project managers so that clarity was shed on each individual set of characteristics of a company and the success of the particular AI implementation project.

### 3.3 OVERVIEW OF AI IMPLEMENTATION CASES IN ITALY

Based on the progress achieved in the seven dimensions we analyzed, we constructed an index (from 0 to 7) to trace the success of AI projects. The average score for the whole sample was 4.3 out of 7.0, revealing good progress for the projects in our sample, yet at the same time highlighting room for improvement across several factors.

**Average and best project scores by dimension**

![Graph showing the average and best project scores by dimension.](source)
We identified several features shared by companies in our sample that should be noted, as they may play a role in achieving positive results from AI. For example, better success scores were noted for very small (10 to 50 employees) or very large (over 1,000 employees) companies, while the scores dropped considerably for medium and large companies. Regarding the sector, companies in retail and wholesale trade and ICT tended to, on average, demonstrate higher scores, 5.2 and 4.8, respectively. Usually, companies that rely on an external talent pool have a greater chance of success; their scores are 0.2 points higher than companies that draw from an internal pool. This may have something to do with the fact that many companies in Italy still do not have enough expertise and in-house capacity to carry out large AI projects. If an AI project is led by a line of business or by the CEO, it tends to be more successful (see Figure 3.2). This points to the fact that there should be a real business need behind AI implementation; otherwise, AI projects may be difficult to start or execute smoothly. Interestingly, AI projects aimed at employee empowerment demonstrate much higher success scores: almost one point higher than any other type of AI project (see Figure 3.2). This may be indirect evidence for the fact that when employees see the visible results and benefits of AI projects in their immediate sphere of influence, they are more engaged and consequently contribute to the successful implementation of AI. Employee empowerment is an area where results are immediately seen within an organization.

**Success factors of AI projects: key originator and purpose**

![Average project score by key originator/sponsor](image)

<table>
<thead>
<tr>
<th>Originator/Sponsor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEO</td>
<td>4.6</td>
</tr>
<tr>
<td>LDB</td>
<td>4.5</td>
</tr>
<tr>
<td>CIO</td>
<td>4.2</td>
</tr>
<tr>
<td>CDO</td>
<td>4.0</td>
</tr>
<tr>
<td>Other</td>
<td>3.0</td>
</tr>
</tbody>
</table>

![Average project score by purpose of the project](image)

<table>
<thead>
<tr>
<th>Purpose of the Project</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee empowerment</td>
<td>5.63</td>
</tr>
<tr>
<td>Product innovation</td>
<td>4.49</td>
</tr>
<tr>
<td>Customer engagement</td>
<td>4.20</td>
</tr>
<tr>
<td>Operational efficiency</td>
<td>4.13</td>
</tr>
</tbody>
</table>

**KEY SUCCESS ENABLER: STRATEGIC VISION**

An analysis of the results clearly shows that an underlying strategic vision was the main success enabler of almost all the examined AI projects. We consider strategic vision the most essential and differentiating success factor; if such a vision is perceived as a strategic priority by the organization, the implementation of an AI project is more likely to be successful. Indeed, in most cases, AI is viewed as a strategic tool and not just a ‘tech accolade’. This statement applies to all the cases analyzed, regardless of sector or size. In addition, when strategic priority is reinforced...
by real necessity from the line of business, the chances of success are, on average, higher than in any other case (see Figure 3.3).

**LOB or CEO strongly believe that AI is a strategy priority for a client**

<table>
<thead>
<tr>
<th>Line of Business or CEO</th>
<th>CIO, CDO and other</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3</td>
<td>2.5</td>
</tr>
<tr>
<td>4.9</td>
<td>4.6</td>
</tr>
</tbody>
</table>

Average success score, Size of bubble = number of cases

SOURCE: Analysis of 33 Microsoft and Accenture case studies on AI implementation

**FUNDAMENTAL ENABLERS TO SCALE PROGRAMS**

According to our analysis and experience, out of the other dimensions, the most important for bringing programs to scale are:

- **Cyber security/data privacy**
  
  Compliance with the most advanced standards related to cybersecurity and data privacy is critical to the success of an AI project – while noncompliance contributes to failure. A great majority of AI cases demonstrate quite good progress in this area, proving that putting strong cybersecurity and data privacy measures in place helps a company realize its full AI potential. Otherwise, results from AI implementation are partial and ineffective, or even compromised if all necessary technical prerequisites (for example, the certification process for the cloud provider) are not followed.

- **Project maturity**
  
  It is quite interesting to note that project maturity, which is the stage or level of maturity an AI project is at, emerged as the third success enabler. In fact, in most cases, the projects in our sample were already fully operational, with very few of them still in the prototype phase. This suggests that if an organization approaches AI projects as immediately operational, the overall success of the initiative is likely to be greater.
3.4 CONCLUSIONS AND MAIN TAKEAWAYS

We conducted a qualitative examination of a variety of successful stories about the set up and subsequent implementation of AI projects. This examination aimed to determine the core set of factors we deemed crucial for projects to have if they were to result in maximal positive impact for the company in question. Consequently, we labelled these aspects the key success factors. We considered seven macro-dimensions within which several factors relating to the company, the project itself, and the external environment fell. A specific measurement scale was subsequently assigned to each factor and was then applied to each client story. The underlying logic was that if a factor recurred in a majority of cases, we could conclude that it was a possible key success factor, i.e., a necessary condition for the AI project to be successful and for the company to reach its full potential by deploying it. We did not just consider these single factors individually, but we also observed all possible connections and interactions among them, both within the same macro-dimension and in a broader sense.

As a general insight, we found that no individual factor was found in all or most of the stories in our customers’ business cases – with the exception of one factor, i.e., the presence of a strategic vision for the digital transformation of the entire company, of which the AI project was only a part. We thereby concluded that the presence of a comprehensive strategy for a digital transformation is a necessary factor for the success of an AI project.

The pervasive presence of this factor was often related to two or more factors. First, the majority of projects of strategic priority had an adequate budget allocated not only to the design and implementation, but also to its internal and external marketing activities. Second, most projects with strategic priority received sponsorship at the executive level. Together, these factors seem to suggest that the more a project is integrated into a longer-term strategy and – generally speaking – into a company’s culture and vision, the more resources the transformation plan is likely to acquire.

In line with the already existing literature, Italian companies did not seem to be well enough equipped for the more sophisticated digital projects and appeared to lack the suitable talent and ability to estimate the power of the ecosystem.
4. THE AI VISION FOR ITALIAN COMPANIES

This chapter provides a more detailed view of the readiness of Italian companies when it comes to embracing the AI revolution, i.e., implementing AI projects and integrating AI-based strategies into their businesses.

We surveyed 190 executives from 96 Italian companies from across a whole range of sectors as depicted in Figure 4.1.

The roles covered by the leaders surveyed ranged from chief executive officers, to chief technology officers, to business unit leaders, to human resources directors.

4.1 IMPLEMENTATION OF AI PROJECTS AND EXPECTED RESULTS

The survey delivered some interesting results regarding the status of implementation in terms of AI projects: an overwhelming majority of respondents (86 percent) confirmed that they were implementing AI projects, although only 3 percent felt that they were at an advanced stage of maturity. 55 percent are still in the early experimental stage.

Corresponding to the trends of the European survey, Italian companies experimenting with AI technologies do so mostly in the operations (34 percent), product development (24 percent), and commercial (23 percent) functions and intend to directly impact business, operational, and economic performance. As a result, the group staff function is currently less directly involved (19 percent) in the use of these technologies.

To illustrate, an insurance company like Generali Italia has recently launched a comprehensive program aimed at developing AI-powered automation tools touching thirty-five core processes across all their operations, with the objective of improving the efficiency and quality of their responses to clients and agents.
Toyota is using AI to develop a new concept of factory as a natural evolution from the application of lean methodologies to Industry 4.0 and ‘factory-as-a-service’ models with predictive maintenance as one of the key drivers of efficiency gains. In addition, with the support of companies such as E.ON Reality, Toyota is applying Augmented and Virtual Reality technologies combined with AI algorithms to enhance the ability of its Customer Service partners to identify problems and solve them with remote assistance. The same application is also used to train employees in completely safe and realistic environments, enhancing their learning capabilities.

As a general insight, an increasing trend towards the use of Mixed Reality for different business functions can be observed with interesting results, in particular in the customer experience arena. Take Natuzzi Italia, an Italian lifestyle brand, which is developing a new way to interact with customers, combining Virtual and Augmented Reality supported by Microsoft platforms, holographic displays, advanced 3D modelling and interactive product configurators, with existing retail techniques. They have recently opened their first ‘Augmented Store’ in New York.

Call centers of large services companies such as TIM, Vodafone, Enel and Unicredit are being revolutionized with the help of AI-based solutions providers such as, for example, US-based software company Afiniti, which is able to put each customer in contact with the operator who is closest to the expectations of the customer itself. Chat bots and virtual assistants that leverage AI technologies are being used more and more not only to help solve customer service requests, but also to propose new, personalized products and services, thereby eventually increasing customer revenues.

The largest Italian telecommunications services provider, TIM, has recently launched Angie, the new digital assistant which simplifies customer service as well as commercial processes, leveraging the computational power of cloud and its cognitive services to optimize customer support. This project is part of TIM’s broader digital transformation plan, which leverages Artificial Intelligence and Data Analysis technologies for the development of innovative tools, with the goal of customizing products and services, promoting a new customer relationship while at the same time increasing internal process efficiency.

A digital transformation plan has also been initiated by Invitalia, the National Agency for Inward Investment and Economic Development owned by the Italian Ministry of Economy and aimed at boosting Italy’s economic growth through the management of all national incentives for the establishment of new companies and innovative startups. Invitalia is strongly leveraging Cloud Computing, Advanced Analytics and Artificial Intelligence for a variety of purposes. For example Invitalia improved its operational efficiency and safety through an intelligence process platform leveraging RPA and process mining techniques. Big Data analytics is also used to predict impact and risks in specific investments, while text analytics helps extract key information from Public Administration documents. Other AI applications are also customer facing, such as the virtual agent (both a chatbot and a voicebot) developed to support citizens navigate investment solutions based on their requirements. Invitalia is also planning to launch new innovation streams applying reasoning and adaptive case management techniques.
Banking is also another sector that is experimenting the use of AI technologies across various core processes: as an example, Citibank started introducing AI in marketing activities such as prospecting, evaluating propensity to buy, up sell/cross sell and direct sales. A wide array of AI-powered applications is also used in Operations in fields ranging from fraud detection, customer service and complaint management and document management via OCR. While the highly regulated credit risk area has been more of a follower versus the commercial and operations functions, there is an increasing interest and some traction in applying AI to that field, too.

Not surprisingly, when it comes to the benefits companies expect from ongoing AI projects, the most important areas are those of cost reduction and efficiency gains in internal processes (39 percent), improvement in existing products/services and delivery of completely new ones (31 percent). New ways of interacting with customers and delivering better customer experiences in the context of an overall digital transformation strategy is a close third as the most important objective (Figure 4.2).

A top executive at Generali Italia shared that the application of AI-powered tools to existing automation routines on eight core processes allowed an increase of productivity 15 to 20 times higher than that achieved with ‘traditional’ automation.

Services companies in highly competitive industries (e.g., Telco) are experiencing sales / revenue uplifts of at least 5 percent through AI-powered call center solutions, as a result of better customer satisfaction (and retention) and better targeting and relevance of proposed offers.

### 4.2 KEY ENABLERS OF AI

Moving from current projects to a more pervasive use of AI technologies is a current part of the strategy for 42 percent of the companies surveyed, all of whom consider AI a highly relevant topic for their future.

When asked about the key enablers and competence a company will need for the successful design, development, and maintenance of AI solutions, respondents confirmed that the top three crucial aspects are linked to leadership, culture, and human capital (Figure 4.3).

**Expected benefits from implementation of ongoing AI projects**

<table>
<thead>
<tr>
<th>Percent</th>
<th>Cost reduction and internal processes efficiency</th>
<th>Improvement of existing products/services and delivery of completely new ones</th>
<th>Better customer experiences</th>
<th>Improvement of employee efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>39%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In particular, the most important factor (67 percent chose it as first or second choice) is regarded as a well-informed leadership, which understands the importance of leading the spread of AI solutions throughout the organization: Company leaders are expected to be the first sponsors of AI projects, pioneering the way to conducting experiments in their own areas, personally going through inductions and trainings, and facilitating the allocation of resources to properly support the development and maintenance of AI solutions.

A combination of a cultural shift and an open-minded approach to AI is what respondents consider the second most important enabling factor in the success of implementing AI solutions (46 percent chose it as first or second choice): Leaders’ ability to create the prerequisites for a safe, experimental environment in which these projects can take place is a crucial component in the era of machine learning and AI applications. The implementation of AI solutions will transform processes and human interactions.

The enabler taking a close third in terms of importance is still related to human capital (45 percent chose it as first or second choice): In order to allow AI solutions to become more pervasive as well as capture the true potential of their application, basic and advanced skills in data analytics need to become the new ‘alphabet’ of the organization. Competence needs to be enhanced and the scope also widened to cover not only a small group of experts but also a much wider portion of the employee population.

Considering that 88 percent of respondents expressed their interest in organizing specific training sessions and learning journeys to train the company’s employees on AI-specific skills and pre-requisites, it is clear that closing the competence gap is crucial.
4.3 KEY RISKS AND THE IMPACT OF AI ON COMPANIES’ ORGANIZATIONS

While the implementation of AI technologies in a more widespread way is seen by most respondents as one of the tools that could support the company’s future growth, leaders already experimenting with some projects have identified the following aspects as potential risks to be managed (Figure 4.4):

- **Future Costs:** Likely also linked to the fact that current experiments are run using a series of external partners and experts, respondents see future maintenance costs of AI solutions as the most relevant risk. On the one hand, the still unknown territory of AI-enabled processes and the legacy of existing infrastructure poses questions regarding the investments needed to align the current IT and operations and, on the other, the manufacturing infrastructure needed to extend AI solutions to a larger number of areas within the company and what its likely costs are going to be. Partial compensation will come from the fact that while processes may be quite different, the types of AI-solutions applied can be recurring, thus making flexibility and reuse a crucial aspect of cost optimization at the moment of scale-up. Typical recurring technologies (‘meta-cases’) are linked, for example, to document reading and management, natural language processing and interpretation, and image recognition. Some companies are leveraging their initial experiences to build a library of ‘use cases’ that can be reused internally along the same lines; providers of B2B solutions are also devoting attention and resources to build standardized, self-consistent ‘modules’ that could be offered to less structured, smaller companies (e.g., SMEs) that cannot afford to directly invest in internal development. Operating costs connected to the running and maintenance of these solutions as well as the training costs for employees are also largely unexplored. While, on the one hand, a relationship with the network of external partners is considered a value add. On the other, companies are continually stressing the need for their organizations to internalize knowledge via massive training programs for their employees. Having said that, it is possibly a little premature at this stage. Most companies that were interviewed indicated that they have started setting up dedicated and highly skilled teams to act as centralized centers of excellence on developing and maintaining AI-backed algorithms. This, according to these companies, will allow them to work on a shared roadmap to optimize allocated budgets (a crucial enabler in large corporations) as well as to increase the company’s ability to attract top talent in functions with adequate organizational visibility and critical mass. As with other digital roles, this is considered a transition phase as it is believed that AI-based solutions will become the norm in the future and a ‘basic’ level of competence will have to become part of the requested DNA and skill set of a company’s organizational capabilities. In order to achieve this, Corporate Academies are likely to play a big role for large organizations with the more distributed, agile, tech-enabled learning tools supporting AI trainings in a more extensive way.

- **Impact on employees:** The second most important risk is linked to the impact on employees. As current applications of AI technologies are focused on automating repetitive tasks in back office or customer management operations (estimated at more than 50 percent
of ongoing projects), the hypothesis that the increasing number of applications will create significant redundancies in the workforce is an issue leaders see as a risk.

Main risks connected to implementation of AI solutions

<table>
<thead>
<tr>
<th>Problem</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance costs (investments &amp; training cost for employees)</td>
<td>25%</td>
</tr>
<tr>
<td>Impact on employees</td>
<td>21%</td>
</tr>
<tr>
<td>Excess of information/data</td>
<td>16%</td>
</tr>
<tr>
<td>Need to conform the company to a more strict regulation</td>
<td>14%</td>
</tr>
<tr>
<td>Loss of control of internal processes</td>
<td>12%</td>
</tr>
<tr>
<td>Dispersion of resources</td>
<td>12%</td>
</tr>
</tbody>
</table>

From interviews we conducted with some of the most advanced companies in Italy on this front, it was quite evident that a certain amount of ambiguity existed in terms of how organizations felt they should strategically manage the efficiency gains enabled by AI as also a degree of caution in their employing of them.

There was also an interesting schism in terms of risk perception between leaders in companies already experimenting with AI and those that had not (Figure 4.5).

The perception that the introduction of AI technologies and solutions in a company could potentially negatively impact employees and thus create a risk to be managed by leaders was much higher (by 19 percentage points) in companies that had not yet launched an AI-related project than those that had. The interpretation of this result is twofold: on the one hand, even at the executive level, there is still a somewhat negative bias about AI implementation and its impact on jobs, and executives feel the burden of having to manage these negative responses as well as the pressure of bringing about the change demanded by the organization. And, on the other, the more companies experiment with AI solutions, the clearer it becomes that the machines are certainly not substitutes for human beings, but rather a sort of super power that will allow human beings to do their jobs in a more insightful and focused manner.

To corroborate this premise, we’d like to draw attention to the fact that 54 percent of leaders in AI pioneer companies believe that AI will completely change the way companies manage and/or solve complex problems, 22 percent believe AI will create insights to make informed decisions and craft the direction to take, yet only a limited portion (7 percent) feel it will significantly change their relationship with their company’s employees (Figure 4.6).
In the vision of companies like Citibank, for example, AI-based technologies will eventually allow to radically change the way customers will interact with the bank and other constituencies: in particular, new, instantaneous and hyper-personalized value propositions/experiences will be available with “one click”. Companies who will excel at embracing AI in a pervasive way, will eventually command a significant and sustainable competitive advantage.
5. EXTERNAL ENABLERS AT THE COUNTRY LEVEL

This chapter focuses on the analysis of different country level regulations, strategies, and economic environments and their influence on the development of AI in each country.

We started by identifying the six key elements that had a strong influence on AI progress at the country level. We then assessed the maturity of a group of countries with regard to each of these elements, which enabled us to create a comparable AI country readiness index. We also analyzed the most effective measures implemented by best-in-class countries, in order to use them as a guide to establishing a successful AI environment.

5.1 KEY EXTERNAL SUCCESS FACTORS

The policies and overall economic environment operating in a country have a strong influence on whether or not an environment that enables innovation and the successful adoption of modern tools, including digital and AI, is created.

Specifically, we identified six key indicators related to technological advancement, education, policies/regulations, and investment, which we believe are key to enabling a successful AI transformation.

The six external success factors for AI development are:

1. **Digital adoption.** Measuring the level of digitization of governmental services and the government’s awareness of the need to develop a national AI strategy plan as a guideline for sector development.

2. **Data.** Measuring the development of data infrastructure (e.g., internet presence, broadband speed), a key indicator of a country’s digital readiness.

3. **Skills.** Measuring the quality of resources for developing skills and for re-skilling workers. Education is essential in enabling a population to have the right skills to face the technology evolution and introduction of AI in the workplace.

4. **Innovation.** Measuring the level of research and innovation capacity. The development of dedicated hubs supporting AI innovation creates a favorable environment for AI development.

5. **Regulation.** Measuring how current regulations (e.g., in terms of a regulatory framework for AI development) and/or a dedicated government body can ease AI adoption.

6. **Investments.** Relating to flows into AI-related companies or start-ups in a country. The value of investments – from sources such as venture capital, private equity, or mergers and acquisitions – flowing into AI start-ups can be correlated to the AI maturity of a country.
5.2 COMPARISON OF AI ENABLERS

In order to obtain a fact-based comparison of AI enablers in different countries, we carried out an assessment of these six external success factors across a group of ten countries. This analysis was based on a similar analysis carried out by the McKinsey Global Institute but with selected updates and refinements to tailor it to an AI-specific situation.

For each enabler, we identified quantitative indexes to measure at the country level. We then calculated the global average: Countries that were one standard deviation above average were above threshold, and those that had standard deviations below the average were below threshold. The remaining ones were categorized as within threshold.

Enablers were measured in detail as follows:

- **Digital adoption** is the average between:
  - **Digital government index.** Extrapolated from the ‘UN E-Government Survey 2018,’ it measures how governments can use e-government and information technologies to build sustainable and resilient societies. It is related to the level of digital technology used by the government to facilitate access to public services (e.g., health and education).
  - **AI awareness index.** A qualitative measure of the level of definition of AI strategy at the country level (e.g., above threshold if the country has already defined an AI strategy, below threshold if writing an AI strategic plan has not yet been considered).

- **Data** includes information on internet presence, broadband speed, and broadband affordability for households.

- **Skills** is the average between:
  - **Human capital index:** A measure of the learning system capabilities in technology (e.g., by number of scientists or engineers and number of STEM graduates);
  - **Labor-market structure index:** A measure of workplace ability to adapt to AI disruptions (e.g., in terms of trainings set up for workers and active labor market policies).

- **Innovation** is the average between:
  - **AI research activities index:** A measurement of contributions made towards increasing AI knowledge (e.g., AI-related patents).
  - **Innovation foundation index.** A measurement of AI innovation in companies and the monitoring of AI innovation in companies (e.g., R&D expenditures and use of technology to create new business models).

- **Regulation.** This is a qualitative index and a particular country is considered above threshold if it has a designated body or function responsible for enabling growth of the sector and/or technology and a regulation promoting digital and/or AI adoption.
• **Investments.** This compares investments in AI from venture capital, private equity, and mergers and acquisitions.

### Italy lags behind best European and global practices in terms of country enablers

![Figure 5.1](image.png)

Results of this analysis are depicted in Figure 5.1 and indicate that there are different degrees of preparedness in the sample considered. The result is relative and countries could move above or below threshold on each of the indicators based on their choices and actions over the next couple of years.

Of the non-European countries, China and the US emerge as active global leaders. These two countries currently lead the race to supply AI. Scale effects enable more significant investment, and network effects enable these economies to attract the talent needed to make the most of AI. Together, they are responsible for the vast majority of AI-related research activities. They are a long way ahead of other countries when it comes to AI-related patents, publications, and citations. They are also making substantial investments in AI. Although China’s capacity to innovate is increasing, the economy is digitizing quickly, and investment in AI is substantial. China and the United States are also the largest contributors to global trade (in terms of both exports and imports), responsible for more than 20 percent of all the value being traded globally.

Within the European nations, there are three AI-development groups:

• **Economies with strong comparative strengths.** This group includes the UK, the Nordics, France, and Germany. They are relatively well positioned to capture the benefits of AI, given their generally robust foundation of enablers. Many of these economies are highly motivated to embrace AI because they have been experiencing slowing productivity growth. Another incentive is the fact that labor costs tend to be high in these economies. Several large economies— including Germany and the UK – that have the capacity to drive innovation on a major scale and to accelerate the commercialization of AI solutions belong to this group. Smaller, globally connected economies, such as Finland and Sweden, typically score high on their ability to foster productive environments where novel business models can thrive.
• **Economies with moderate foundations.** This group which includes Italy and Spain, has a moderate ability to capture economic benefits from AI. While the potential for economic gains is broadly positive, these countries are in a weaker starting position than those in the first group, but they exhibit comparative strengths in specific areas on which they may be able to build.

• **Economies that need to strengthen foundations.** This group includes Greece. These countries are relatively challenged in their ability to capture the economic benefits of AI. They have somewhat limited automation potential because wages tend to be rather low. Therefore the incentive for substituting labor to boost productivity is weak. They also have a relatively underdeveloped digital infrastructure, innovation and investment capacity, and digital skills, and are comparatively isolated from global trade and data flows. These economies tend to prioritize stimulating economic growth, reducing poverty, and moving away from agriculture to basic and then more advanced manufacturing and services. Initiatives to catch up with best practices may generate a higher return on investment rather than making substantial investments in advanced technologies, which are currently beyond their reach. This does mean, however, that they are at great risk of falling even further behind as other countries embrace AI.

It is important to note that these groups are not static – countries may move from one level to another as a result of the choices they make. It is not inevitable that developed countries will always be at the forefront of AI adoption and impact or that developing countries will continually lag behind. Countries taking active steps to strengthen their AI foundations, capabilities, and enablers can change their AI adoption trajectories. Indeed, our simulation indicates that the potential economic impact of AI can be sensitive to the pace of AI adoption, AI-related investment, and innovation capacity.

### 5.3 BENCHMARK OF GOVERNMENTAL INITIATIVES

Our analysis focused on how different countries utilize different enablers to foster AI development within various regions.

To illustrate, several different concrete initiatives were adopted by the different countries:

• **France.** The French Government announced the national AI strategy ‘AI for humanity (French strategy for artificial intelligence)’ in March 2018. Specifically, this guaranteed that EUR 1.5 billion of public funding would be dedicated to AI by 2022⁷, with the main objective being one of setting up a national AI program coordinated by the National Institute for Research in Computer Science and Control.

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⁷ France to spend $1.8 billion on AI to compete with U.S., China, Reuters Article, March 2018
• **USA.** In 2016, the US developed the ‘National Artificial Intelligence Research & Development Strategic Plan’. The plan’s objectives include prioritizing the research and development of US’s AI capabilities and ensuring that upcoming and novel AI innovations are made in the US. To achieve this, researchers will need to broaden high-quality data sets and environments and enable responsible access to high-quality data sets as well as to testing and training resources.

• **China.** In China, a three-step AI development strategy was launched in an effort led by the State Council as revealed in the ‘China Innovation Funding Report’ which was the State Council’s Plan for the Development of New Generation Artificial Intelligence in July 2017. The Chinese government wants to ensure that by 2020, AI will become an important driver of economic growth, leading enterprises to possess a myriad of technological breakthroughs, thereby helping AI to grow within its territory.

• **Germany.** Germany announced the Federal Government’s Artificial Intelligence Strategy in November 2018. It wants to have a competitive advantage alongside the whole European Union. As part of its many initiatives, the German government is planning to invest a total of EUR 3 billion between now and 2025. Specifically, it is focusing its efforts on data availability, which includes the development of data pools and more advanced methods of anonymizing and synthesizing data.

**The European Union.** The European Union (EU) has already put some elements of an AI strategy in place.

• EU member states have announced their intention to collaborate on AI more actively across borders to ensure that Europe is competitive in these technologies and that they can tackle their social, economic, ethical, and legal ramifications together. All member states and Norway have signed a “Declaration of cooperation on AI” in April 2018, followed by the development of a coordinated plan “AI made in Europe” detailing actions to start in 2019 in order to prepare the ground for the following years. Such plan has prioritized 4 areas of collaboration: i) Maximize investments through partnerships, with the aim to reach EUR 20 billion per year of public and private investments across the EU on AI; ii) Create European data spaces to make sharing data easier, especially in sectors such as healthcare; iii) Support talent development through dedicated scholarships; iv) Develop ethics guidelines for the development of AI.

For additional details on the governmental initiatives of different countries, refer to Appendix 7.2

### 5.4 Italy’s Efforts Thus Far

Italy is mainly focusing on the implementation of AI solutions in the public sector.

AgID (Agenzia per l’Italia Digitale) is the technical agency of the Council Presidency that guarantees the implementation of the Italian digital agenda and contributes to the diffusion of information technology, communication, as well as digital transformation.

AgID is launching several initiatives to support the analysis and deployment of AI within the public administration with the goal of allowing greater accessibility to public services and of
cutting costs and inefficiencies. In March 2018, AgID has decided to allocate EUR 5 million to developing pilot projects in AI for public administration\(^8\).

Within the European framework agenda, AgID created the 2014 to 2020 digital agenda to not only help companies meet their growth objectives but also to increase employment, better the quality of life, and promote democratic participation.

AgID decided to switch its plans from the digital agenda to a three-year plan for information technology, which was approved in 2017. This was a strategic decision implemented by AgID because the agency saw that digital transformations were shifting direction toward assets such as Internet of Things, blockchain, big data analytics, and AI. The plan for Italy is centered around four main pillars:

1. Digital ecosystems or policy areas (health, school, justice);
2. Intangible infrastructures (including the enabling platforms and the data of the PA);
3. Physical infrastructures;

AgID is centering its efforts on the AI ecosystem in order to facilitate access to advanced expertise: according to the last update (May 2018), there are 173 active users or providers of AI in Italy, of which more than 70 percent are start-ups, followed by universities (11 percent), and research centers (10 percent).

In March 2018, AgID decided that in order to follow the objectives of the three-year plan, it needs to create an AI task force, charged with consolidating a relationship between the State and its citizens. The task force is a coordinated team of 30 interdisciplinary profiles. This task force has published a white book with suggestions to the public administration on how to align with international best practices\(^9\).

Within the three-year plan, there are several initiatives that will need to be instituted:

1. **SPID** (Public System of Digital Identity): A service that allows citizens to access all the online services of the public administration with a single digital identity linked to a username and password.
2. **FSE** (Electronic Health Record): A tool that enables citizens to trace, ask for consultation, and share their own health history. This program aggregates all digital health documents to help the patient understand their progress during a medical evaluation.
3. **Electronic invoicing**: A digital document that confirms the participant’s authenticity and integrity via electronic signature. The invoice is sent through a specific system called SDI.

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4. **PagoPa**: An initiative that allows companies and citizens to pay the public administration electronically, while adhering to a precise set of rules defined by AgID and accepted by the PA, banks, and other payment/financial institutions.

5. **Digital security**: A body that operates within AgID and deals with computer security. It automatically activates as intelligence and monitoring organizational units require its assistance.

6. **Open data**: Public data that must be published in a way that is easy to understand and be used. To guarantee this, it is necessary to implement aspects such as: licenses, standardization, quality, and accessibility through automated applications.

Moreover, the Italian government’s efforts to strengthen the adoption of AI-infused technologies also match the guidelines provided by the European Union for the implementation of an EU-orchestrated plan. Following the “Declaration of cooperation on AI” of April 2018, in January 2019 the Italian Minister of Economic Development (MISE) has initiated a working group of 30 experts in the field of AI aimed at drafting an official National Strategy for the use of AI complemented with a number of recommendations for its implementation. The document, which has been made public in August 2019, describes a strategy for the sustainable and long-term economic development of the country leveraging the potentialities of new AI infused technologies and has outlined 9 objectives:

1. **Increase public and private investments in AI and related technologies**: Co-financing programs and public-private partnerships will be implemented to increase private investment in this sector and to support research, innovation and adoption of AI. By 2025, the Government will invest about EUR 1 billion in the public sector. This should encourage an effort on private investments, therefore reaching a total volume of at least EUR 2 billion.

2. **Develop the research and innovation ecosystem**: A close collaboration is required between the public and private sectors, with constant commitment to the revision of established rules. This effort should be realized in the definition of specific data policies for key sectors such as IoT, manufacturing and robotics.

3. **Support the adoption of digital technologies based on AI**: The support of open innovation for SMEs will stimulate demand and recruitment of qualified personnel in AI. The recent establishment of eight Competence Centers by the Ministry of Economic Development and twelve National Technological Clusters by the Ministry of Education, University and Research, constitutes a basis for the formation of a national network of knowledge exchange.

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10. *Ministero dello Sviluppo Economico “Strategia Nazionale per l’Intelligenza Artificiale”, July 2019*
and collaboration between the academic and the industrial world.

4. **Strengthen the educational offer to the work force:** At a primary and secondary education level, the Government intends to relaunch the consultation with the social parts of the National Plan for the Digital School, to reskill teachers and improve programs.

5. **Exploit the potential of data economy:** Making Public Administration (PA) data available to companies and citizens, within the limits of the regulations in force, will foster economic potential for private and public activities.

6. **Consolidate the regulatory and ethical framework:** The Government’s aim is to: 1) develop reliable, robust AI systems and digital infrastructures to enhance cyber threat protection, 2) encourage the possibility of coding, promoting and monitoring of new forms of certification, 3) contribute to the pilot phase of testing ethical guidelines, facilitate the participation of large companies, SMEs, public administrations and national civil society associations.

7. **Promote awareness and trust among citizens:** Information on AI technologies will be favored primarily by organizing information campaigns in schools, companies, public television, and institutional websites.

8. **Relaunch the public administration and make public policies more efficient:** To boost AI solutions applicable to different sectors of the public administration, tools such as pre-commercial procurements and innovative challenges will be used. AI technological solutions based on solving collective challenges, will have a focus towards the United Nations Sustainable Development Goals.

9. **Encourage European and international cooperation for a responsible and inclusive AI:** The Government is determined to facilitate a synergic action for all EU countries.

The IIT (Italian Institute of Technology) supports the development of AI in the country. The IIT is a public research institution that receives special support from the Ministry of Economics and Finance.

The IIT developed a humanoid robot, built specifically to foster research within the field of AI – this is just one of the few initiatives that the IIT focuses on. It also focuses on various development objectives, including advanced electronics, development of different kinds of sensors (touch and visual), and specific algorithms for AI.

The Italian government is also focusing on local initiatives to revive AI within the country. For instance, the objective is to revitalize, at a province level, the city of Modena and bring an innovative outlook to the region. Within this initiative, the government has decided to allocate EUR 4 million to a specific team of research doctorates who specialize in AI. The program was launched in May 2019.

The University of Modena and Reggio Emilia have officially announced the beginning of an international research center for an AI academy.
The project in Modena amounted to EUR 2.7 million in total investments, which will help the AI academy become a research center focused on machine learning and deep learning\(^\text{11}\).

Last but not least, in an attempt to reduce the skill gap which has been reported with reference to both basic and advanced IT and digital skills, increasing attention is being paid by higher education institutions to training and skilling initiatives that aim at encouraging digital and computer literacy at university level. As an example, the Conference of Italian University Rectors (CRUI) has signed a partnership with Microsoft to integrate hands-on labs on AI within selected courses from three pilot universities. More recently, such a framework was further strengthened and the focus shifted towards enhancing employability by inviting private companies to contribute to the training of last-year university students so as to be able to hire them through internship programs. By aligning the interests of all stakeholders involved, this latter framework represents a valid and well-functioning model of private-public cooperation aimed at reducing the current digital skill and competence shortage, which represents a well-known, critical issue hindering full adoption and implementation of AI in Italy.

### 5.5 INVESTMENTS IN AI

As it is possible to see from Figure 5.2, each country has set aside a percentage of its GDP toward the development of AI initiatives. The investment data was focused on AI start-ups in various countries in terms of venture capital, private equity, and mergers and acquisitions. The AI-related investment data was compiled from PitchBook. The relative value was obtained by dividing the AI investment by the country’s GDP.

The results show that the US dedicated more than other countries in terms of GDP (0.304 percent) toward AI initiatives, and was also able to achieve the best investment absolute value (EUR 56 billion). China, on the other hand, dedicated 0.062 percent of its GDP toward AI initiatives, and the UK (third place) allocated 0.042 percent. Italy, however, contributed much less than other countries, amounting to a 0.001 percent GDP contribution and a subsequent investment absolute value of 19.9 million.

The economic impact of AI depends on whether there are sufficient investments to fund new AI companies and research, thus enabling greater corporate investment. Investment in AI is growing rapidly but is still largely concentrated in the US and China. The US still has more AI start-ups than China, but China is making considerable headway in striking equity deals in the AI sphere.

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11. See Il Sole 24 Ore: Modena hub europeo dell’intelligenza artificiale, May 2019
6. INITIAL GUIDELINES FOR ITALIAN AI

As described in the previous chapters, Italian AI could benefit from a significant improvement along three dimensions: (1) strategic vision and understanding of AI’s disruption potential with regard to each sector and every company; (2) analytical skills and talent readiness to drive the transformation; (3) direct investment at scale and innovation support. We believe that improvements in these areas can be achieved by putting in place a combination of initiatives from the public and private sectors. Such initiatives, as briefly outlined in this report, will be the focus of a later dedicated publication.

6.1 STRATEGIC VISION

Top management needs to understand the impact of AI on business and for their specific company, both from an operational angle (e.g., the need to decentralize decision-making processes) and from a business standpoint (e.g., identification of the specific AI application that would create most value). While this remains the specific task of the respective CEOs of the business concerned, the external environment can also help in several ways:

- The private sector could foster an exchange of best practices. Success cases presented in this document are a first example, but this must become a more structured and regular exercise. Italian SMEs, too small in scale to fully benefit from AI, could unite by district to share investments and best practices, for instance.

- The government could support companies through an agency dedicated to AI, with a similar mission to that the Alan Turing Institute in the UK (e.g., leveraging existing research and development associations or institutions). Possible activities carried out by such an agency could be:
These components are essential for companies to jump-start their growth by not just adopting technology, but also by building their own digital capabilities (concept of ‘tech intensity’). Private and public sectors should foster education on AI-related topics with a threefold goal:

- Develop the best AI professionals to contribute to the development of AI techniques within research institutes or companies.
  - Universities are already launching data science and AI courses. It is crucial that they remain as close as possible to the real needs of the private sector. This can be achieved only if the private sector closely cooperates in offering internships, training data, and real-world use cases.
  - At the same time, AI classes should be offered in high schools to increase the basic coding knowledge of all students.
  - While junior talent is available, senior talent is rarer; thus, the government could encourage a ‘brain attraction’ scheme specifically directed at AI and AA senior experts, both of Italian and international origin.

- Ensure all citizens are able to deal with AI implications, building a common understanding of its potential end uses.
  - Companies must immediately launch reskilling programs for their employees, focusing
on digital capabilities, data understanding, and interaction with digital tools. Reskilling programs can be organized with public-private partnerships between companies and universities/research centers (e.g., Microsoft has launched a number of re-skilling/upskilling initiatives along with partners, CRUI and Universities, training so far 190k talents within the program Ambizione Italia, while Cisco has launched a reskilling program for professionals and SMEs in collaboration with the University of Naples Federico II).

° Education – particularly “Istituti Tecnici” – is an asset that could be leveraged by the government to form a technical workforce able to deal with AI (e.g., Industry 4.0 production lines). In addition, the public sector could help citizens become accustomed to AI by applying it in its customer-facing processes.

• Build a class of managers prepared to oversee the day-to-day transformation of AI by combining significant technical understanding with the ability to drive and motivate people with diverse backgrounds, skills, and competence.

° Companies must indeed invest in upgrading the specific skills and capabilities of their management. Training should be aimed at building not only technical skills, but also an understanding of ongoing cultural transformations and the need to manage diverse profiles. While external hiring can sometimes accelerate the pace of innovation, we believe most companies will be able to find high-potential managers within their ranks if they are willing to train them. An alternative could be to hire interim/temporary managers, even from abroad, to support the launch of the digital transformation.

6.3 DIRECT INVESTMENT

The correct allocation of public research funds, already limited in Italy, is of utmost importance to create scale and enable immediate industrial application:

• The government could create an agency, in close collaboration with the agency aimed at supporting the AI vision, for the coordination of AI research to direct funds appropriately. Without aiming at full centralization, this solution would avoid duplication and maximize fund efficiency.

The government could also offer support with economic incentive schemes for companies investing in AI, potentially extending the Industry 4.0 incentives.

The collaboration between public and private sectors is crucial for the support of AI development in the country. The next report will analyze the outlined initiatives in more detail, describing how the collaboration could be carried out effectively.

These preliminary guidelines have been drawn from our analysis and interviews with private companies carried on from January to July 2019. Having had the opportunity to read the first draft of Italian National AI strategy developed by MISE and made public in August 2019, we have noticed substantial alignment on suggestions and guidelines. We hope that our report and suggestions will be of further support to accelerate Italian growth in this important challenge.
7.1 KEY SUCCESS FACTORS

7.1 A Overview of AI implementation cases in Italy – other dimensions

Capital adequacy
AI projects need to be financed adequately according to their purpose and scope. If a company starts an AI project and then stops financing it or finances it only partially, the chances of success diminish accordingly. Therefore, it is critical to arrange adequate investment in advance and have a contingency plan in place as well. One-fifth of the AI projects in our sample did not allocate enough of a budget for the planned scope of their AI. Only 42 percent of companies in our sample have allocated a specific budget for internal and external marketing campaigns. Much of AI’s potential can be extracted only if there is support from external and internal stakeholders. To ensure this support, adequate resources must be earmarked. If they are not, the AI project is likely to only achieve very limited success.

Project governance
Project governance is based on the ability to introduce measurable KPIs; to make executive decisions as fast and flexible as possible; to transform the traditional operating model and internal processes; to modernize internal IT systems for collecting, preparing and managing heterogeneous data easily and rapidly and sharing data compliantly and efficiently; and to plan a wide internal and external communication and marketing campaign aimed at raising awareness.

Our analysis shows that project governance can be further improved if companies dedicate more effort to modernizing their IT structures to enable more transparent and compliant data sharing, something that is very necessary in the AI era; spread the word about the importance of AI projects; and put more effort into process review as part of their AI transformation program.

Talent readiness
On average, our analysis shows that leadership still lacks the extensive understanding and knowledge of what AI is, what its role can be, and how real benefits can be extracted from it and applied to business. In almost half of all cases, there is no re-skilling program planned for the company’s workforce, and very often Italian companies do not plan to introduce any specific AI roles within their organizations, which prevents them from achieving the greater benefits of AI implementation.

Ecosystem role
In our analysis, the ecosystem (in terms of partnerships and network) appears one of the weakest chain elements contributing to the success of AI projects. Almost one-third of the companies in our sample do not leverage an ecosystem for their implementation of AI at all, and only 12 percent have established partnerships with multiple stakeholders such as system integrators or software providers, start-ups, and academic institutions. This indicates a huge underutilization by Italian companies. If they could set up more links with partners, share knowledge, innovation and expertise, they could improve other dimensions and reduce budget requirements. Thus far, however, the ecosystem remains a factor that could bring much more synergy into the overall success of AI projects, if it were to be appropriately utilized.
7.1 B Factors’ description

Talent Readiness

- **Leadership skills:** This factor provides a comprehensive measure of the project lead’s perceived competence as regards AI, including the awareness of AI and its role for the company and the understanding of AI technicalities. We envisioned three possible levels of competence from a complete lack of skill, to an average knowledge of AI without a deep understanding of its technicality, to full awareness.

- **Re-skilling:** Regardless of whether the company is employing its own internal resources or an external pool of experts, this factor highlights if the company provided suitable training – or planned on doing so – to those internal resources that were to use the new AI tools introduced by the specific project

- **Talent pool and five key roles for AI projects:** This factor describes whether the company is relying on or has relied primarily on an internal or external talent pool for the AI project’s set up and implementation. Moreover, we investigated which of the five following pivotal roles were employed by the organization in question:
  - AI Engineer
  - Data Scientist
  - Domain Expert
  - Data Evangelist
  - AI Designer

Capital Adequacy

- **Investment allocated budget:** This factor describes whether the investment allocated for the AI project was perceived as adequate for the implementation of the project overall. Moreover, it also helps determine the type of expenditure made; to check whether the project was treated as a capital expenditure i.e., as a major investment for future consumption or an operational expenditure, i.e., a short-term cost for daily business operations.

- **Marketing budget:** Our notion of capital adequacy is also determined by whether the organization thinks to make provision for a budget for the marketing and communication campaign about AI initiatives (e.g. chatbot, automation, etc.).

Strategic vision

Whether the company is implementing AI projects as one-shot solutions to current issues or as part of a longer-term plan for guiding the business towards full digitalization, this determines the degree of success it will achieve in terms of reaping the benefits of the projects. In particular, if the latter case occurs, there will need to be put in place a more serious re-think of all aspects of the business, from technologies in use to employee culture, and the fact that the AI project needs to be part of a more comprehensive strategic vision, seeing as it is a strategic priority for the organization.
Project governance

- **Measurement of success**: This factor describes how closely the company was monitoring the project implementation by adopting some quantitative or qualitative KPIs to track its success. Again, we considered three levels of possible measurements, with the most efficient measurement in place being some type of quantitative KPI and the average level of success measurement being represented by some type of qualitative KPI. A regular check of the project’s success by means of a thorough and rigorous tool for measurement may signal a deeper commitment to the project and facilitate the adoption of AI solutions as part of a more comprehensive and long-term strategic vision.

- **Agile methodology (decision-making process)**: The factor describes whether the company adopts an Agile Software development method, as opposed to other, more traditional and structured development models. Agile methodology implies an objectives-focused approach with a greater emphasis on early and frequent delivery by teams which are often small, self-organized and performing several different tasks. The adoption of an Agile methodology allows for more flexibility in the decision making process due to the smaller number of stakeholders involved in the approval procedure, and hence for more rapidity in committing to the implementation of a project – both in terms of financial resources and human capabilities. This approach also enhances teamwork, unstructured forms of collaboration among teammates and teams and more decisional independence. On the other hand, the adoption of a more traditional approach to software development may signal a vertical, top-down organizational structure based on strictly defined roles and responsibilities, so that the decision-making process obeys the hierarchical chain of authority. Formal rules of procedures may imply rigidity (and consequently delays) in the implementation of projects, especially in terms of those which are developed cross-sectionally to departments and offices.

- **Process review**: The presence of this factor indicates that the operating model and the business process underlying the AI project’s implementation are regularly reviewed and adjusted. Such process reviews may either be an integral part of the project envisioned from the very start of it, or take place despite not being provided for, or not considered at all.

- **Data collection and sharing**: The factor refers to the company’s IT structure and its adequacy in terms of collecting, managing and sharing data in a fast and efficient way as well as in full compliance with the rules in place.

- **Internal/External marketing campaign**: This factor captures the company’s willingness to raise awareness about the AI project both internally and externally through a marketing campaign.

Project maturity

The scale used mentioned in the introduction was adjusted and simplified so as to include 3 stages in which a company may position itself with reference to AI-based projects:

- **No or low level of AI maturity**: The company is either viewing AI as irrelevant for its business or is just aware of its potentialities, or is tentatively planning to use it;

- **Medium level of AI maturity**: The company is currently experimenting with AI, perhaps launching pilot projects;

- **High level of AI maturity**: AI solutions are being adopted on a regular basis and/or incorporated as standard practice in the company’s internal organization and processes and in its operations.
Ecosystem role
The factor describes whether the company was able to partner with a number of stakeholders and ecosystem players to accelerate the AI project’s implementation.

Cybersecurity and data privacy
- **Compliance**: This three-level factor measures the degree of adoption of strong cybersecurity and data privacy measures by the company, from no measures at all, to some measures to a complete set of rules. The presence of a more or less complex structure for cyber threat prevention is a proxy of the technology’s pervasiveness as far as company operations and processes are concerned and could be broadly related to the level of knowledge of AI and awareness of its role as well as implications for the company’s business.
- **Cloud provider certification**: The last factor provides a deeper and more specific measure of how seriously the company is dealing with the cybersecurity-related implications of engaging in a technological transformation and does so by checking whether the company has already obtained or is in the process of obtaining a certificate for cloud provider or whether it has not even considered it.

7.1 C Factors’ distribution
7.2 A Governmental initiatives by country

**France**

The French National Government has announced its national AI strategy ‘AI for humanity (French Strategy for artificial intelligence)’ in March 2018, with several objectives including:

- Guaranteeing EUR 1.5 billion in public funding dedicated to artificial intelligence by 2022;
- Setting up a national AI program, coordinated by the National Institute for Research in Computer Science and Control;
- Developing a data policy: Data are essential for the development of new practices and applications, supporting the creation of private and public data based exchange platforms;
- Promoting Agile and Enabling Research: It is necessary to attract academics and to create attractive working environments;
- Assessing the effect of AI on the Future of Work and the Labor Market, and Experiment Adequate Policy Responses: It is necessary to evaluate the effect of the development of AI, automation and robotics on job destruction and creation;
- Developing an AI project for a more ecological economy;
- Setting Up an AI Ethics Committee

**US**

In 2016, the US developed the ‘National Artificial Intelligence Research & Development Strategic Plan’ whose objectives are to prioritize research towards and development of US AI capabilities and to ensure that the next great AI inventions are made in the US.
To achieve this goal, this AI R&D Strategic Plan has identified 7 priorities:

1. Make long-term investments in AI research, prioritizing next generation technologies.
2. Develop effective methods for human-AI collaboration to limit the replacement of human labor and optimize human-computer interactions.
3. Understand and address the ethical, legal, and societal implications of AI.
4. Ensure the safety and security of AI systems.
5. Develop shared public datasets and environments for AI training and testing to enhance AI performance.
6. Measure and evaluate AI technologies through standards and benchmarks to be developed.
7. Better understand the national AI R&D workforce needs to help ensure that enough AI experts are available to address the strategic R&D areas outlined in this plan.

Nowadays the US is the leading country in AI development, with an increasing number of start-ups focused on AI.

China
The AI effort in China is being directed by the government, that has prioritized AI in all its key plans and initiatives for the following years, such as its 13th Five-Year Plan (which runs from 2016 to 2020), its “Internet Plus” initiative (aimed to equip traditional businesses to join the digital economy) and its AI plans.

AI plans have been in line with a three-step strategy introduced in 2017 in an effort led by the State Council. As revealed in ‘China AI development report’ published in July 2018 by the Tsinghua University, the updated three-step strategy involves:

• By 2020: China wants to ensure that AI will become an important driver of economic growth, leading enterprises to possess a myriad of technological breakthroughs including intelligent big data as well as hybrid enhanced intelligence, helping the core AI industry value to reach EUR 19.7 billion.

• By 2025: The goal is to extend AI to many application areas including smart manufacturing, healthcare, cities, agriculture as well as national defense, with a core AI industry value of EUR 52.5 billion.

• By 2030: China aims to become a world-leading center in AI. The focus is to become the global center of technologies and AI economy, supported by deep and integrated IP application systems, aiming to bring the core AI industry value to EUR 131.3 billion.

In addition to governmental initiatives, several Chinese tech companies have joined a ‘national team’ to develop AI in areas such as autonomous vehicles, smart cities, and medical imaging.

UK
The UK Government sees AI as a global opportunity for advancement and has decided to focus its efforts specifically on machine and deep learning. Since 2017, it has decided to put its efforts...
towards its AI review, launching its initiative for the Sector deal in 2018.

The objectives of the 'Industrial Strategy - Artificial Intelligence Sector Deal' are:

- Build strong partnerships between business, academia and government;
- Recognize the increased convergence of technologies and focus on areas where the UK can compete globally;
- Create an economy that boosts productivity and earning power throughout the UK.

The UK AI strategy has five blocks that make up its foundation:

- Ideas: The government aims to make the UK the world's most innovative economy, and commits to collaborate with the private sector to boost research and development spending to 3% over the longer term;
- People: The Industrial Strategy has people at its core focusing on creating good jobs and equipping citizens to deal with next generation technology. It defines a strategy for the government, universities and industry to collaborate to improve the supply of technical skills and to attract the best talents to the UK.
- Infrastructure: As part of the Industrial Strategy, the government is investing over £1bn for a major upgrade to the UK’s infrastructure, in terms of digital network, like 5G, or public open datasets.
- Business Environment: the goal to make the UK the best place to start and grow a business will be achieved continuing the financing work of the British Business Bank, and specifically promoting AI through new Councils and attraction of AI entrepreneurs.
- Places: Ensure the adoption of AI by businesses across the UK, not only in London and in the other active clusters such as Edinburgh and Cambridge.

Germany

Germany announced the Federal Government’s Artificial Intelligence Strategy in November 2018. The Artificial Intelligence Strategy was drawn up based on the cornerstones agreed on by the Cabinet on 18 July 2018.

The German government is planning to invest a total of EUR 3 billion in implementing the Artificial Intelligence Strategy over a period of several years until 2025.

The main goals of this strategy are:

- Germany and Europe are to become leaders in the development and application of AI technologies.
- AI Research: Drastic increase in research expenditures, overall better work conditions to compete for the best AI talent, and benchmarks to measure AI research progress.
- AI competence development: Broadly distributed AI knowledge in society, core AI modules should integrated into engineering and natural science programs as well as taught at schools of applied sciences.
- Data availability: Development of data pools and more advanced methods of anonymizing

or synthesizing data.

- Computing power/infrastructure: Access of German AI research and applications to most powerful processing hardware.
- Ensuring responsible development and use of AI.
- Within the framework of a broad dialogue within society and active political steering, AI is to be firmly anchored in society in ethical, legal, cultural and institutional terms.

These goals will be achieved by forming a network of research clusters in collaboration with France.

**Finland**

Finland announced Finland’s Age of Artificial Intelligence in May 2017. The report highlights eight key actions to turn “Finland into a leading country in the application of artificial intelligence”.

The Finnish Government set the objective of making Finland one of the top countries in the world in AI application and appointed a working group, led by Pekka Ala-Pietilä, Chairman of the AI Finland program to make it a reality. More specifically, the Ministry of Economic Affairs and Employment in Finland released the ‘Artificial Intelligence program’.

Its key objectives are:

- Enhancing the competitiveness of companies with the utilization of artificial intelligence encouraging the formation of innovation ecosystems.
- Effective utilization of data in all sectors through a new legislative framework.
- Speeding up and simplifying the adoption of artificial intelligence with an AI accelerator, where companies get access to AI expertise and resources.
- Ensuring top level expertise and attracting top experts by setting up an international hub, Center of Excellence for AI and applied basic research, to establish collaboration between industry and research.
- Developing the world’s best public services, e.g. Aurora, the AI-based 24/7 citizen’s assistant.
- Establishing new cooperation models between public and private sectors.

**Norway**

For Norway, artificial intelligence represents a fundamental tool that can have great potential and huge impact on future societal developments.

In February 2019, the Norwegian Government announced the introduction of a national strategy for artificial intelligence, to be finalized during the course of 2019\(^4\). The strategy will be developed around four main pillars:

- Building up expertise and a competitive position through education, research and innovation;
- Helping Norway to adopt artificial intelligence by focusing on digital co-competence and

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other related fields such as adaptation to changes in the working life;
• Focusing on technologies that can favor the development of broadband 5G and high-performance computing;
• Ensuring ethical guidelines and data protection.

Denmark
The Danish government announced a novel Danish National Strategy for AI in March 2019\textsuperscript{15}.
The strategy aims at ensuring that Denmark will have a human-centric and common ethical foundation for AI.
The most important AI objectives within the AI strategy are:
• Implementation of ethical principles and initiatives for the development and use of AI, including increased legal transparency.
• Establishment of a free joint Danish language resource.
• Easier access to a broader selection of public data.
• Implementation of signature projects in the Danish public sector to test AI solutions.
• A strengthening of efforts to secure investments to Danish companies

Russia
The Russian government wants to focus on meeting a 2019 deadline to create a national strategy aligning government, military, academic, and private resources\textsuperscript{16}.
The Russian Government defined several tech-related deadlines:
• The President ordered the government on February 27 to formulate a national artificial intelligence strategy by June 25
• Since July 2019 the draft strategy has been under revision of the government
• July 1: Find ways to stimulate investment in broader areas of technology, including the Internet of Things, robotics, and processing of large data arrays by small and medium-sized businesses;
• Sept. 1: Connect all Russian schools to high-speed internet service;
• Dec. 31: Open five new scientific and educational centers, and open another 10 by the end of 2021.

OECD AI initiatives
The OECD initiative aims at promoting artificial intelligence by fostering innovation and trustworthiness by respecting human rights and democratic values\textsuperscript{17}.
The OECD’s five principles for AI were adopted in May 2019 and are summarized as follows:

\textsuperscript{15} https://investindk.com/insights/the-danish-government-presents-national-ai-strategy
\textsuperscript{17} https://www.oecd.org/going-digital/ai/principles/
• AI should benefit people and the planet by driving inclusive growth, sustainable development and well-being.

• AI systems should be designed such that they respect the rule of law, human rights, democratic values and diversity, and include appropriate safeguards – for example, enabling human intervention where necessary – to ensure a fair and just society.

• There should be transparency and responsible disclosure around AI systems to ensure that people understand AI-based outcomes and can challenge them.

• AI systems must function in a robust, secure and safe way throughout their life cycles and potential risks should be continually assessed and managed.

• Organizations and individuals developing, deploying or operating AI systems should be held accountable for their proper functioning in line with the above principles.
REFERENCES


