Artificial Intelligence in Entrepreneurship. Trends and Opportunities Towards Competitiveness

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Abstract
This article provides an in-depth analysis of the concept and impact of artificial intelligence (AI) across various fields, highlighting different perspectives and associated challenges. First, we discuss the essential aspects of artificial intelligence, including defining AI in terms of human and rational behavior and thinking, as well as behavior and thinking that resemble human or rational characteristics. Furthermore, the article underscores the importance of future research to understand the relationship between AI and economic growth and its implications for other emerging fields. Additionally, this article considers the role of training and human resource development in the digital age, emphasizing the necessity, particularly for small and medium-sized enterprises (SMEs), to adapt to the digital world of work and the changes AI brings. To achieve the proposed objectives, 610 documents were analyzed using Scopus as an academic database and specific tools for bibliometric analysis, including the VOSviewer application. This paper not only provides a deep understanding of the concept and significance of AI but also proposes a critical and interdisciplinary approach to examine the economic, social, and ethical implications of AI introduction and use.

Keywords
Entrepreneurship; Advanced Technologies; Competitiveness; Artificial Intelligence; Innovation.

Introducere

Artificial intelligence (AI) has become ubiquitous in various industries; however, the concept remains a controversial topic in public understanding. To clarify the research presented in this article, we theoretically define the concept of artificial intelligence in two essential dimensions: humanity and rationality, focusing on thinking and behavior. There are four ways to define AI: First, through human-like behavior. The Turing Test, for example, demonstrates that if an interrogator cannot distinguish between responses from a human or a computer, the test is considered passed. Second, through human thinking, expressed by programming a system to think similarly to a human. If the program's behavior aligns with the corresponding human behavior, we assume that the program's mechanisms exist in humans. Third, through rational thinking, based on the "laws of thought." Any solvable problem described in logical symbols can be addressed using an AI program. The fourth method is rational behavior, based on the rational agent approach, where computer agents are expected to act autonomously, perceive the environment, persist over time, adapt to changes, and formulate and achieve objectives.

In the history of AI development, methods focused on rational agents have gained ground. A recent trend indicates that probability theory and machine learning can enable intelligent agents to make decisions under conditions of uncertainty. Therefore, this article defines artificial intelligence as the science and technology that simulates

human intelligent activities through computer programs and algorithms. This involves creating intelligent systems to solve a wide range of problems, including perception, understanding, learning, reasoning, and decision-making.

The reader may ask: how will AI influence the distribution of wealth and resources globally? This is a complex question that the authors believe involves economics, politics, and ethics, representing a field that has not yet been explored in depth but holds an answer in its impact on global inequalities. Moreover, unequal access to technology and the skills required to use AI could promote socio-economic inequalities and divide society between those who have access to AI and those who are left behind. There are debates about the short-term impact of AI. However, discussions about long-term scenarios (What would post-AI societies look like? Or what is the impact of AI on human evolution in the long term?) are rarer and often speculative.

As a result, future research is essential better to understand the relationship between AI and economic growth, particularly to identify measures that can indicate the level of AI adoption in each country.

How will AI intersect with other emerging technologies? Or, what is the impact of AI on biotechnology or nanotechnology? These are questions posed for relatively new areas of research. Studies suggest a critical approach is needed to evaluate the societal ramifications of AI development and implementation at an international level (Mohnen and Hall, 2013). Our study explores the impact of integrating artificial intelligence technologies on global economic transformation and wealth redistribution, focusing on the high-tech and financial services sectors. Additionally, we investigate regional disparities in AI adoption through a bibliometric analysis of publications, measuring the evolution and impact of research in various regions to identify trends and variations in the specialized literature.

By focusing on managerial perceptions, the research contributes to the existing literature by providing a deep understanding of the dynamics of changes in work competencies and organizational strategies for adapting to AI. The results can guide SMEs in developing human resource policies that respond more effectively to the challenges brought by the digital era 4.0, as well as in designing educational and training programs tailored to the emerging needs of the workforce. In this regard, the study addresses researchers' calls for a better understanding of the impact of AI on employee competencies and training in the digital era 4.0 (Hernandez-de-Menendez et al., 2020; Li, 2022; Maisiri & Van Dyk, 2021; Malik et al).

Literature review

From the perspective of theoretical contributions relevant to the specialized literature, we reiterate the idea that Industry 4.0 marks an era of innovation and digital transformation, significantly impacting economic development through the adoption of emerging technologies such as IoT, Big Data, and blockchain. These technologies enable the creation of smart factories capable of optimizing production and contributing to the realization of a competitive global economy.

Adaptation to Industry 4.0 redefines how businesses operate and stimulates the need for advanced digital maturity to integrate new technologies into business strategies efficiently. Moreover, on the global stage, AI is becoming a defining criterion for economic competitiveness, positioning countries that strategically invest in this direction for success in the digital economy by automating activities and work processes that were traditionally reliant on human intervention. Additionally, AI can offer a level of personalization that humans cannot provide.

As a contribution to the existing knowledge in the business literature, we can conclude that most managers recognize the integration of AI into organizational activities as an essential strategic move aimed at innovation and productivity improvement, highlighting AI's role in increasing efficiency and personalizing user experiences. At the same time, they acknowledge existing challenges, particularly related to the initial costs that hinder the rapid adoption of AI, and reveal a spectrum of opinions regarding AI's impact on employee competencies.

Additionally, there is an emphasis on analytical skills for interpreting data generated by AI, identifying patterns and trends, and the ability to address specific issues related to the use of AI in operations, particularly in the field of marketing.

Investments in technological education, the development of meta-competencies, and the creation of robust digital ecosystems are essential for successfully confronting the complexity of the modern economy and exploiting the opportunities presented by AI. This collaborative effort between the business and educational sectors stimulates economic growth and contributes to developing an agile workforce capable of adapting to future challenges.

Studies analyzing the impact of AI show that almost all areas of entrepreneurship have been addressed to some extent. Economic studies discuss AI's potential to contribute to global economic activity and the challenges its adoption poses at the corporate level. The "Artificial Intelligence Index Report 2021" (Zhang et al., 2021) estimates that AI could add approximately 13 trillion dollars to global economic activity by 2030, representing a 16% increase in global GDP compared to current levels. This would correspond to an additional annual GDP growth of 1.20%. At the same time, Gao & Feng (2023) identify a significant issue related to AI adoption, which can lead to increased industrial concentration, favoring large companies capable of investing massively in AI to the detriment of smaller enterprises.

From a macroeconomic perspective, Cockburn et al. (2017) analyze how AI can impact three areas of interest: productivity growth, the labor market, and industrial concentration. There is a possibility that AI may not have a significant impact on productivity growth or may shift workers from more productive positions to less productive and less dynamic jobs (Morandini et al., 2023). Additionally, national regulations may impose strict restrictions that slow down the development and dissemination of AI (Tobin, 2023). The optimistic scenario assumes that AI will substantially increase productivity by applying it to a significant portion of tasks performed by most employees, adding complementary tasks and allowing them to spend more time on creative and inventive activities (Bughin, 2020).

As a result of these advancements, there is still a lack of concrete empirical evidence showing that AI is a driver of economic growth. This issue is mainly due to the lack of data (Zhao et al., 2022). Moreover, the phenomenon involves the comprehensive integration of the industrial sector through advanced communication and information technologies (ICT), including digitalization and network connectivity, as well as extensive collaboration across the entire value chain—from design and research to production, management, logistics, and distribution. This value chain encompasses business partners and clients, facilitating cooperation among all involved parties.

For example, in the manufacturing industry, AI systems have led to improved quality control and efficiency of assembly lines. Research on using GitHub Copilot, an AI-based programming assistant, showed a significant reduction in the time required to complete programming tasks. In this experiment, the group using Copilot experienced a 55.80% decrease in the average task completion time compared to the control group, indicating a substantial increase in employee productivity (Peng et al., 2023). Another study, conducted in collaboration with Boston Consulting Group, found that the use of generative AI could improve the performance of highly skilled workers by up to 40% compared to those who do not use AI. However, it was also observed that using AI beyond its appropriate limits could lead to significant declines in work performance (Somers, 2023).

Ismail's (2017) analysis shows that "global GDP could increase by up to 14% by 2030 due to AI implementation. Moreover, $6.6 trillion is projected to come from increased labor productivity, while $9.1 trillion will come from second-round effects at the consumption level." This report highlights the growth in employee productivity through the automation of business processes and the development of the workforce with the support of AI. The impact of AI on labor productivity could be decisive, and companies that do not adapt and adopt AI may become uncompetitive." This statement emphasizes the importance of adapting to and adopting AI technology to maintain competitiveness in the modern business environment.

In this context, Zirar et al. (2023) discuss the collaboration between humans and machines in the AI era. The authors explore how AI can extend human capabilities and demonstrate how companies can strategically benefit from the connection between human talent and machine efficiency. They address concepts such as "process fusion" – where humans and machines work together to perform tasks more efficiently – and the "missing domain" – which refers to new areas of economic activity opened by AI innovations. Considering these emerging technologies, the authors offer practical strategies for transforming workplaces and organizations.

Research methodology

Scientometrics is a form of knowledge that aims to measure scientific research activity. Bibliometrics is a branch of scientometrics that focuses primarily on the quantitative study of scientific publications for statistical purposes (Gauthier, 1998). Bibliometrics is a research method that involves creating an inventory of editorial activities at the national or institutional level and is used for the comparative analysis of the productivity of academic fields.

These data can be used to evaluate the performance of research centers as a supplement to standard evaluation procedures. Furthermore, bibliographic data can provide reference points for scientific and technical concerns, as longitudinal studies of academic interest can help identify research fields that are developing or declining. Scientometric indicators also prove to be important in the analysis of scientific research (Volovici and Repanovici, 2015). The study was conducted using information obtained from querying databases available on the Scopus platform, which contains information on scientific journals, papers, books, and more. Through all its scientific resources, the Scopus platform provides users with databases that can form the basis for quantitative analyses of research progress in various fields.

To carry out the quantitative analysis of scientific interest regarding the connection between artificial intelligence and economic fields, the software product VOSviewer (version 1.16.20), developed by Nees Jan van Eck and Ludo Waltman at the Centre for Science and Technology Studies at Leiden University, was used. It is used especially in

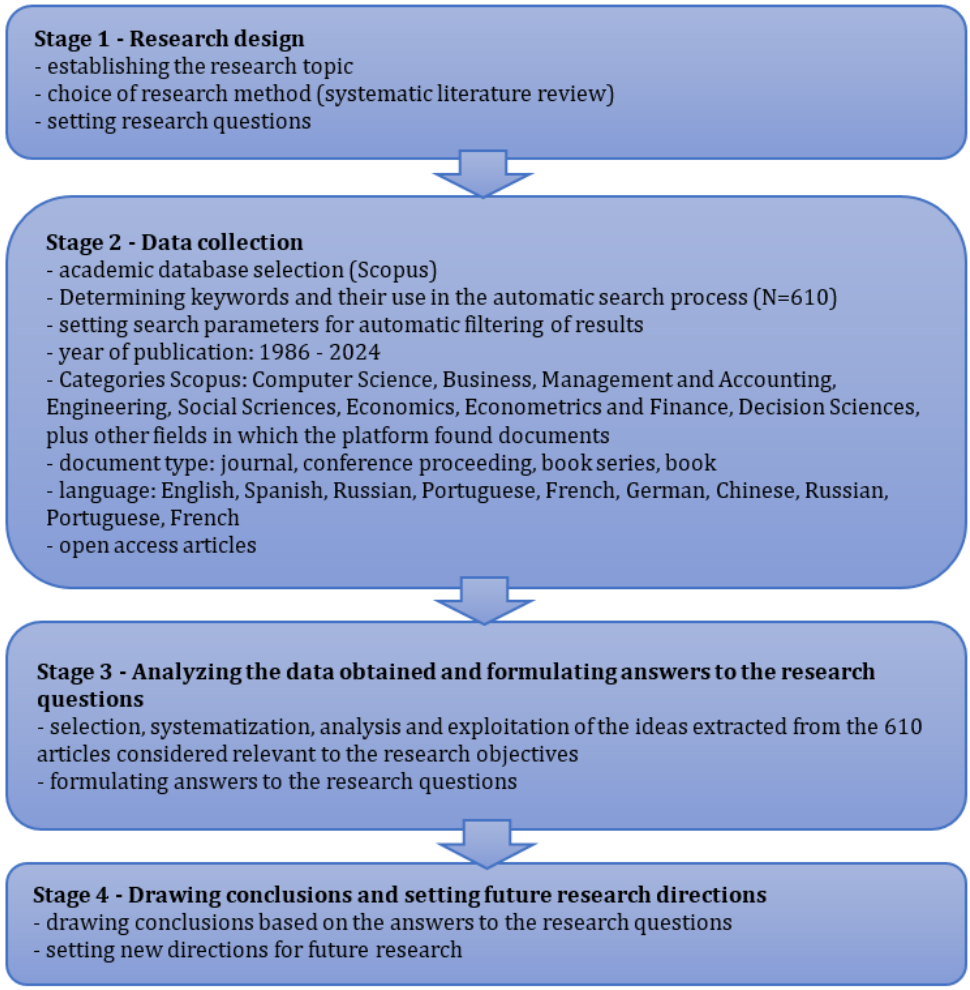

Figure 1. Research Methodology. Source: Adapted by the author from (Brabete, 2023)

science and research to analyze the relationships between scientific papers, keywords, authors, and other entities in the scientific literature. It is an analysis tool that helps us perform large data analyses. VOSviewer can create maps that graphically represent the links between the words that appear most frequently in the documents filtered on the Scopus platform.

To understand the impact and penetration of artificial intelligence (AI) in entrepreneurship, this study analyzed 610 documents selected from the Scopus database. We applied bibliometric methods using the VOSviewer software to map major trends and significant geographical contributions in the field of AI, emphasizing the role of market leaders such as China, the USA, and India.

In the indicator analysis, we explored AI adoption in various industries, highlighting how high-tech sectors and financial services integrate this technology to improve operational efficiency and drive innovation. This analysis allowed us to identify how AI is applied in practice and its impact on industrial transformation and sectoral innovation.

Results and discussion

The integration of AI in SMEs redefines how businesses conduct their activities and how employee skills are valued and developed. In this dynamic, a qualitative approach provides an in-depth perspective on the impact of AI on competencies across different industries, bringing to the forefront authoritative voices—managers—who lead AI implementation and manage the transition of employee skills.

The impact analysis of AI technologies anticipates a significant manifestation of their effects over a 5-10-year time horizon. The initiation of AI integration into company infrastructures inevitably involves substantial initial financial allocations; however, the justification of this initial investment becomes evident as large-scale adoption is accelerated by competitive factors and the maturation of technological competencies associated with AI usage. AI is projected to be a major catalyst for increasing productivity in enterprises. Economic entities and nations need to adopt a long-term vision in their AI strategies, as its substantial benefits will become tangible and evident only after a period of adjustment and continuous learning.

The set interval for the query targeted the period from 1986 to 2024, considering that the distribution of the 610 articles in the final sample is as follows: Computer Science - 269, Business, Management, and Accounting - 245, Engineering - 159, Social Sciences - 125, Economics, Econometrics, and Finance - 122, Decision Sciences - 81, plus other fields where the platform found documents. Additionally, the automatic filtering considered the type of documents queried, selecting the following types: journal, conference proceeding, book series, and book.

Of the 610 articles that make up the final sample, 310, or 50.81%, are represented by journals, while 169, or 27.7%, are conferences. To emphasize the relevance of the final database, we also used VOSviewer, an informatics tool developed by van Eck and Waltman (2010), which allowed us to create suggestive bibliometric maps. To make the bibliometric maps with the help of VOSviewer, it was necessary to export the database

from Scopus in CSV format. Through this software, we were able to perform an analysis of the relevance of the number of publications by country in the Scopus query process, as shown in Figure 2.

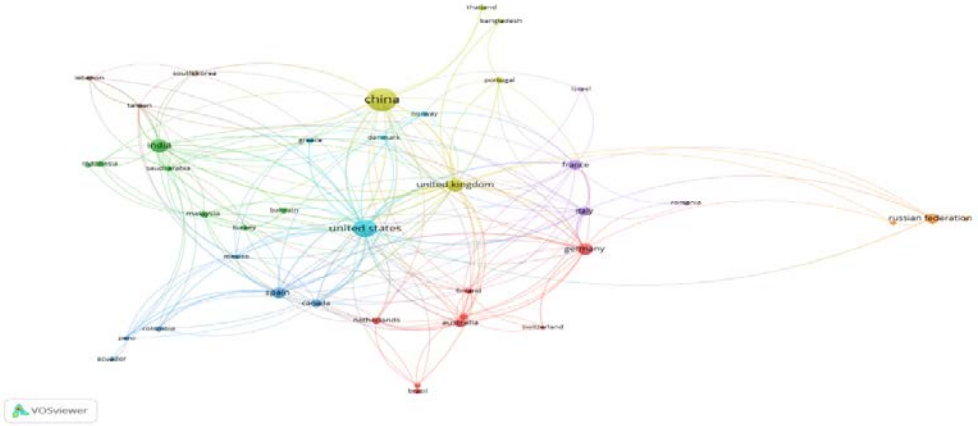

Figure 2. Graphical Representation of the Number of Publications by Country on the Scopus Platform

The bibliometric analysis also indicates that China contributes the largest share of published documents, demonstrating that these advanced technologies are being discussed in Asia. The next countries that contribute significantly to this research area are the United States and India, followed by Germany, the United Kingdom, and Russia, which have a relatively equal number of published documents.

There is a noticeable increased in interest in this research field in countries that lead the global economy and in Western European countries. This suggests that the concern is global and that the world's economies have acknowledged the current and future effects that artificial intelligence will have on the economy.

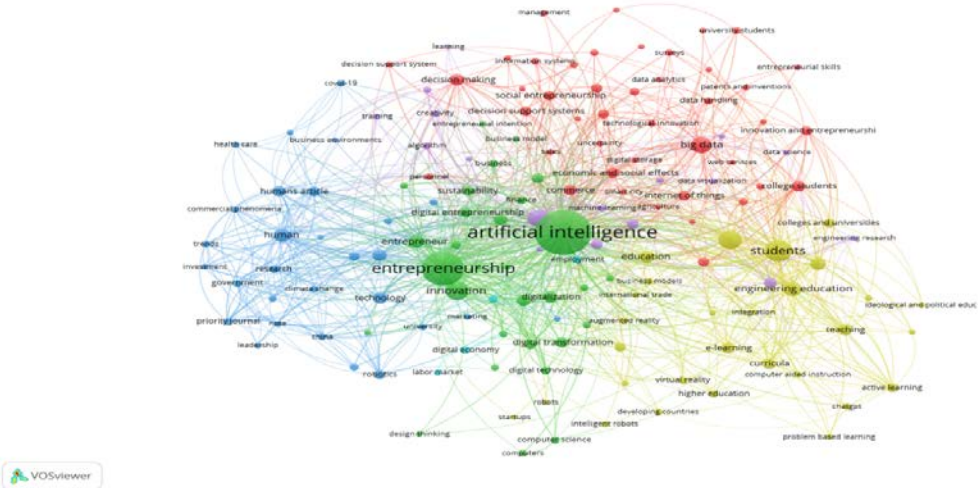

Figure 3. Graphical Representation of Keywords Found in the Scopus Database

The map generated by VOSviewer highlights the frequency of keyword usage by authors. From this analysis, it can be observed that the most frequently used keywords include those employed in our querying process. Furthermore, it is noticeable that three of the keywords we used—"artificial intelligence," "entrepreneurship," and "innovation"—are among the most used by the authors of the articles included in the final sample, emphasizing the relevance of the keywords used in our query process.

The analysis of AI integration trends in the business environment in 2022, as shown in Figure 4, indicates a prevalence of these technologies' adoption among companies located in advanced countries within the Asia-Pacific region.

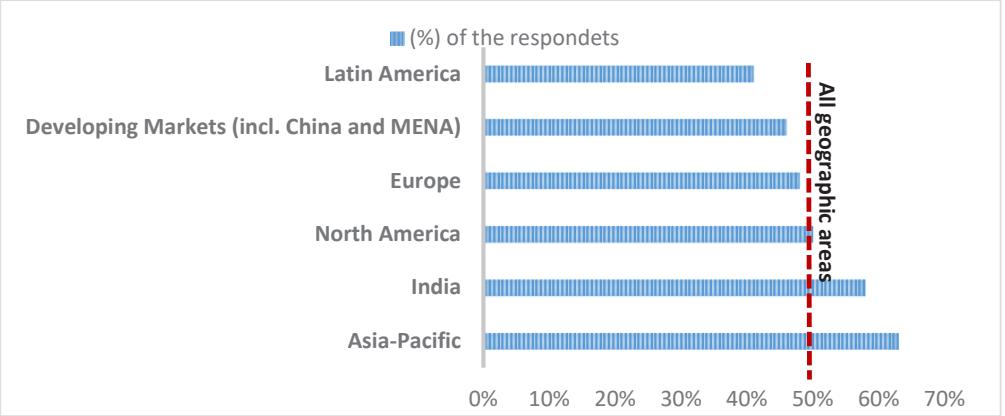

Figure 4. Adoption of AI by Organizations Globally (2022)
Source: Adapted from Chui et al. (2020)

This suggests an accelerated market maturation and a high capacity for innovation in this geographical area. Companies in India and North America rank immediately after, indicating a substantial spread of AI in these regions as well. Comparing this data with that from 2019, we observe that AI adoption was more evenly distributed across regions. However, in 2022, companies in Latin America and other developing nations noted an emerging discrepancy in the adoption of AI technology, which showed a significantly reduced tendency to implement AI in their business processes. This gap can be attributed, among other factors, to unequal access to advanced technologies, differences in research and development investments, and potentially divergent government policies. In the study on AI technology adoption in 2022, as shown in Figure 6, the collected data suggests a higher prevalence of AI integration in the high-tech and telecommunications sectors. This trend aligns with observations from the previous year, 2019. This consistency indicates ongoing technological progress and strategic adoption of AI in these industries, which are typically pioneers in implementing technological innovations.

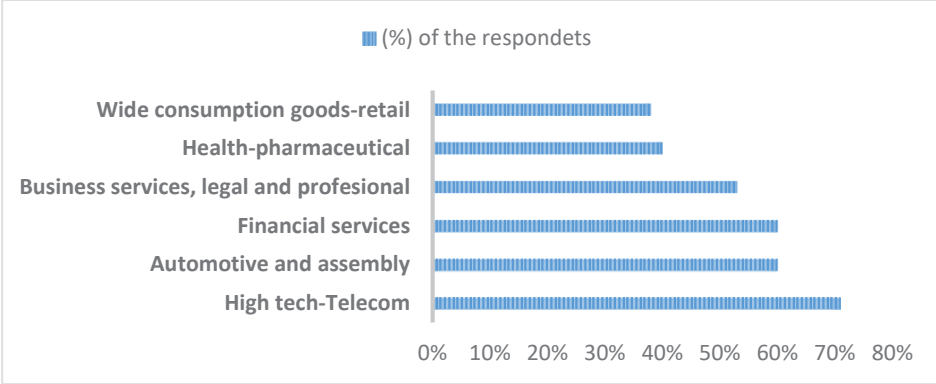

Figure 5. Industry adoption of AI
Source: Adapted from (Ellingrud et al., 2023)

In a secondary yet consistent order, the financial services sector, followed by the automotive and assembly sectors, also demonstrate a significant rate of AI adoption. These fields show a willingness to embrace automation and optimization through AI, reflecting cross-sectoral growth and a diversification of AI applications across different branches of the economy.

Table 1. AI Adoption by Industry and Department

	Human resources	Manufacturing	Marketing and sales	Products and/or services development	Risk	Service Operations	Strategy and corporative finance	Supply chain management
All industries	8%	12%	15%	21%	10%	21%	7%	9%
Automotive and assembly	13%	29%	10%	21%	2%	16%	8%	18%
Legal and professional services	13%	9%	16%	21%	13%	20%	10%	9%
Wide consumption goods-retail	1%	19%	20%	14%	3%	10%	2%	10%
Financial services	5%	5%	21%	15%	32%	34%	7%	2%
Health-pharmaceutical	3%	12%	16%	15%	4%	11%	2%	6%
High tech-Telecom	14%	11%	26%	37%	14%	39%	9%	12%

Source: Adapted from (Manyika et al., 2017)

According to the data extracted from Table 1, we observe a specific sectoral trend regarding the integration of AI technologies. The automotive and assembly industries stand out for their intensive use of AI in optimizing production processes. Similarly, the financial services sector shows a pronounced tendency to implement AI in risk management functions. In contrast, AI adoption is predominantly linked to product and service development activities in the high-tech and telecommunications fields.

Across various industrial sectors, there is a general inclination to use AI in service operations, such as field assistance and customer support, as well as in back-office activities. Additionally, reports indicate an increased presence of AI in product and service development, marketing, and sales activities, highlighting the broad applicability of artificial intelligence as a cross-functional vector for innovation and efficiency growth within companies' operations.

Roundy (2022) compares Stitch Fix, which uses algorithms to personalize the shopping experience, with Lingxi, which aims to solve public welfare organizations' problems through design, technology, and data, illustrating the diversity of AI applications in the entrepreneurial environment.

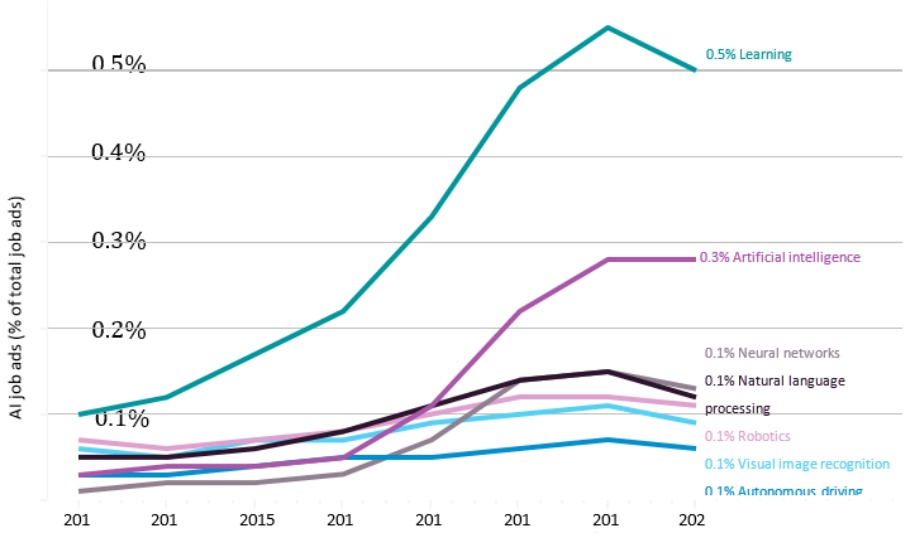

Figure 6. AI Job Postings (% of All Job Postings) in the United States by Skill Cluster, 2013-2020. Source: Burning Glass (2020). AI 2020 Index Report

A closer look at the demand for AI labor in the United States between 2013 and 2020, as shown in Figure 8, breaks down the demand year by year according to skill clusters. Each skill cluster consists of a list of AI-related competencies. The neural network skill cluster includes abilities such as deep learning and convolutional neural networks.

Between 2013 and 2020, AI-related job postings in machine learning and artificial intelligence saw the fastest du growth in AI job postings in the United States, rising from 0.1% of all job postings to 0.5% and from 0.03% to 0.3%, respectively. As previously mentioned, 2020 shows a decrease in the share of AI-related job postings across all skill groups.

LinkedIn members report their skills on their LinkedIn profiles. Currently, over 35,000 distinct standardized skills are identified by LinkedIn. These have been coded and classified by LinkedIn taxonomies into 249 skill clusters, which are the skill groups represented in the dataset. The top skills that make up the AI skill cluster include machine learning, natural language processing, data structures, artificial intelligence, computer vision, image processing, deep learning, TensorFlow, Pandas (software), and OpenCV, among others.

Burning Glass uses its skills taxonomy of over 17,000 abilities to measure employer demand for AI skills. The list of AI skills from Burning Glass data is presented below, along with associated skill clusters. While some skills are specifically considered part of the AI cluster, for this report, all the skills listed below were considered AI skills. A job posting was considered an AI job if it required one or more of these skills.

Artificial Intelligence - Expert systems, IBM Watson, IPSoft Amelia, Ithink, virtual agents, autonomous systems, Lidar, OpenCV, path planning, remote sensing.

Natural Language Processing (NLP) - ANTLR, Automatic Speech Recognition (ASR), Chatbot, Computational Linguistics, Distinguo, Latent Dirichlet Allocation, Latent Semantic Analysis, Lexalytics, Lexical Acquisition, Lexical Semantics, Machine Translation (MT), Modular Audio Recognition Framework (MARF), MoSes, Natural Language Processing, Natural Language Toolkit (NLTK), Nearest Neighbor Algorithm, OpenNLP, Sentiment Analysis / Opinion Mining, Speech Recognition, Text Mining, Text to Speech (TTS), Tokenization, Word2Vec.

Neural Networks - Caffe Deep Learning Framework, Convolutional Neural Network (CNN), Deep Learning, Deeplearning4j, Keras, Long Short-Term Memory (LSTM), MXNet, Neural Networks, PyBrain, Recurrent Neural Network (RNN), TensorFlow.

Machine Learning - AdaBoost algorithm, Boosting (Machine Learning), Chi-Square Automatic Interaction Detection (CHAID), Classification Algorithms, **Clustering Algorithms, Decision Trees, Dimensionality Reduction, Google Cloud Machine Learning Platform, Gradient Boosting, H2O (software), Libsvm, Machine Learning, Madlib, Mahout, Microsoft Cognitive Toolkit, MLPACK (C++ library), Mlpy, Random Forests, Recommender Systems, Scikit-learn, Semi-Supervised Learning, Supervised Learning (Machine Learning), Support Vector Machines (SVM), Semantic Subtractive Clustering Method (SDSCM), Torch (Machine Learning), Unsupervised Learning, Vowpal, Xgboost.**

Robotics - Blue Prism, Electromechanical Systems, Motion Planning, Motoman Robot Programming, Robot Framework, Robotic Systems, Robot Operating System (ROS), Robot Programming, Servomotors/Motors, Simultaneous Localization and Mapping (SLAM).

Image Recognition - Computer Vision, Image Processing, Image Recognition, Automated Vision, Object Recognition.

In 2020, the economic sectors that emphasized the information domain (2.8%), professional, scientific, and technological services (2.5%), as well as agriculture, forestry, fishing, and hunting (2.1%), recorded the most significant shares in AI-related job offers among all job categories available in the United States. Although the first two categories mentioned have consistently maintained a high demand for AI specialists, the agricultural, forestry, fishing, and hunting sectors showed the most notable growth—by almost one percent—in the proportion of AI-specific job offers from 2019 to 2020.

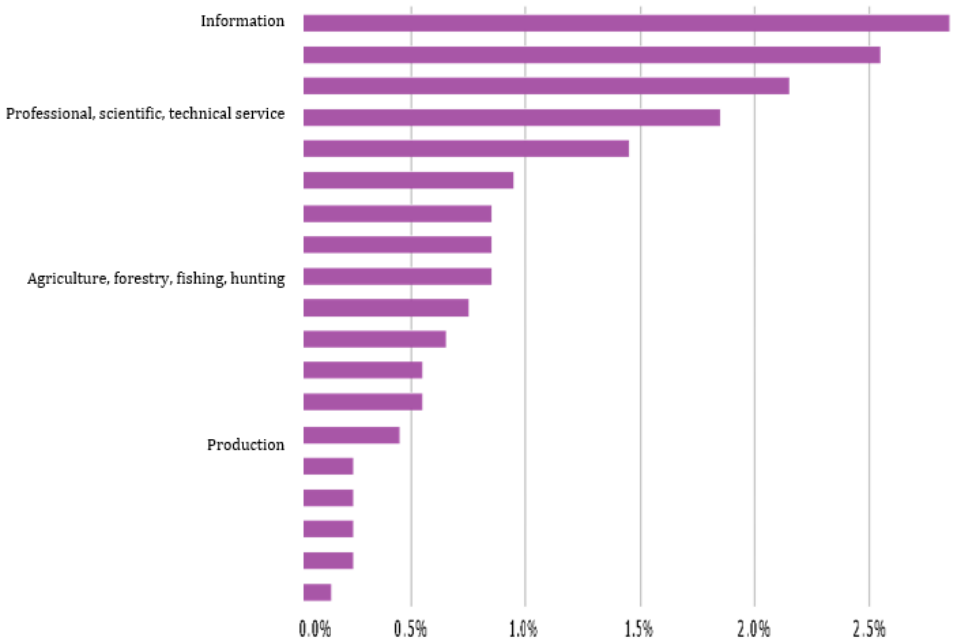

Figure 7. AI Job Postings (% of All Job Postings) in the U.S., by Industry, 2020
Source: Burning Glass, 2020

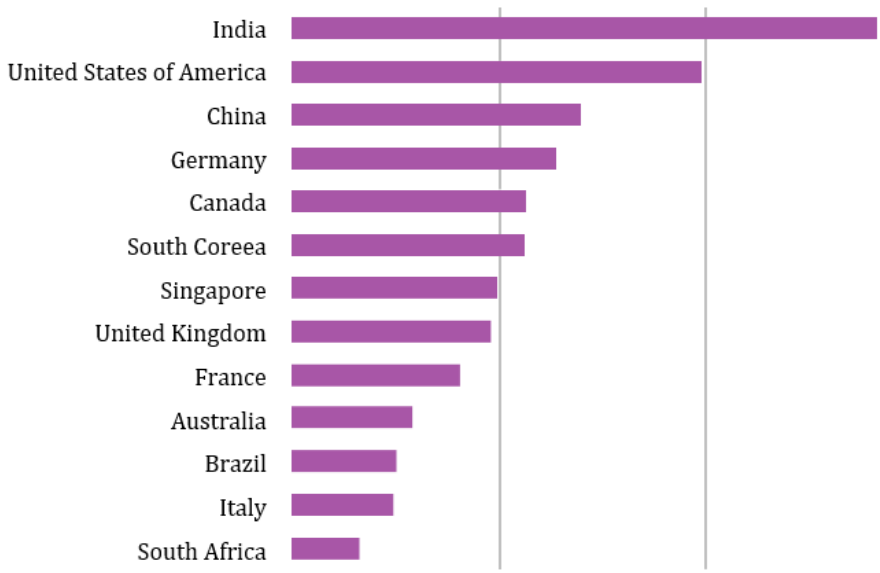

Figure 8. Relative Rate of AI Skills Penetration. Source: LinkedIn, (2020)

The AI skills penetration indicator reflects the average proportion of these skills within the top 50 relevant abilities for each occupation analyzed. In the analysis conducted for various countries, the consolidated data for the 2015-2020 period show that India has the highest relative AI skills penetration coefficient, reaching a

level 2.83 times greater than the global average. This is followed by the United States, with a coefficient 1.99 times above the global average; China, with 1.40 times the global average; Germany, with 1.27 times; and Canada, with a level 1.13 times above the global average.

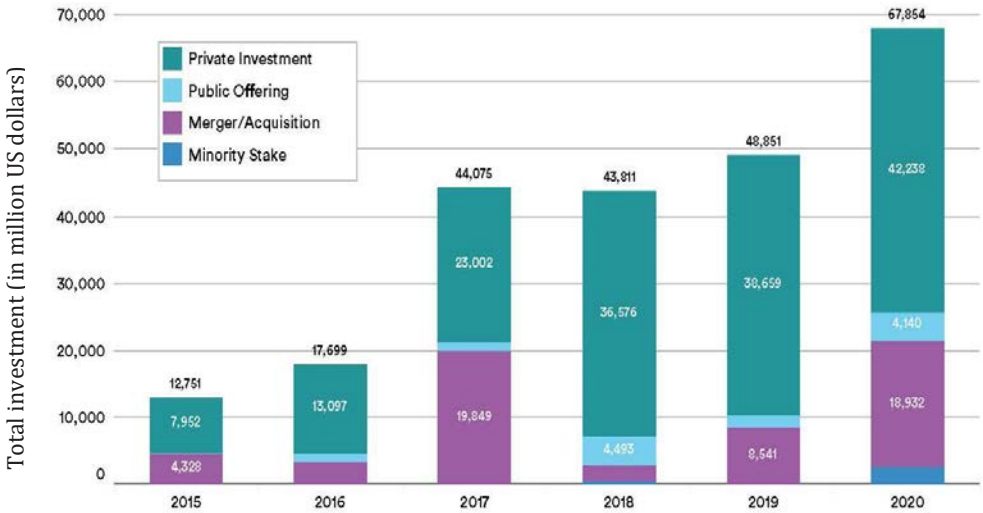

Figure 9. Global Corporate Investments in AI by Investment Activity, 2015-2020
Source: CapIQ, Crunchbase și NetBase Quid, 2020 (Massri et.al, 2023)

Global investments in artificial intelligence (AI), including private capital contributions, initial public offerings, mergers and acquisitions, and minority investments, experienced a 40% expansion in 2020 compared to the previous year, reaching a peak of 67.9 billion U.S. dollars. In the context of the COVID-19 pandemic, it was observed that smaller firms were disproportionately affected. As a result, the trend toward market consolidation, along with the intensification of merger and acquisition activities during 2020, significantly stimulated the total volume of corporate investments in the AI sector. Valuations resulting from mergers and acquisitions constituted the dominant segment of total AI investments in 2020, recording an increase of 121.7% compared to 2019. During this period, several large-scale transactions in the AI sphere were finalized, notably the acquisition of Mellanox Technologies by NVIDIA and the takeover of Altran Technologies by Capgemini.

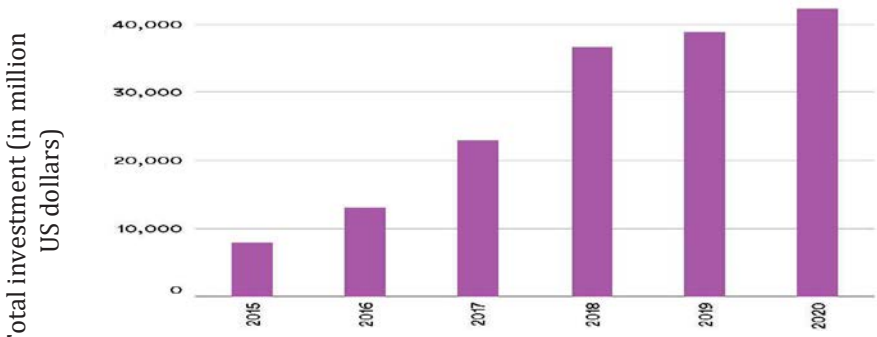

Figure 10. Private Investments in Funded AI Companies, 2015-2020
Source: CapIQ, Crunchbase și NetBase Quid (2020)

More private investments in AI are being channeled toward fewer startups. Despite the pandemic, 2020 recorded a 9.3% increase in the value of private investments in AI compared to 2019—a higher percentage than the 5.7% growth in 2019. However, the number of funded companies declined for the third consecutive year. Although there was a record level of over 40 billion USD in private investments in 2020, this represents only a 9.3% increase compared to 2019—significantly lower than the highest growth of 59.0% observed between 2017 and 2018.

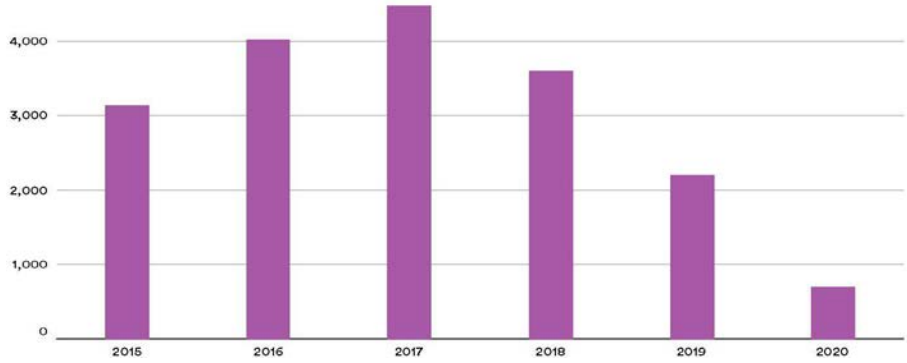

Figure 11. Number of Newly Funded Artificial Intelligence Companies Worldwide, 2015-2020
Source: CapIQ, Crunchbase și NetBase Quid (2020). AI 2021 index report

The graphical analysis indicates a downward trend in the volume of artificial intelligence startups that received funding, reflecting a sharp decline from the peak recorded in 2017.

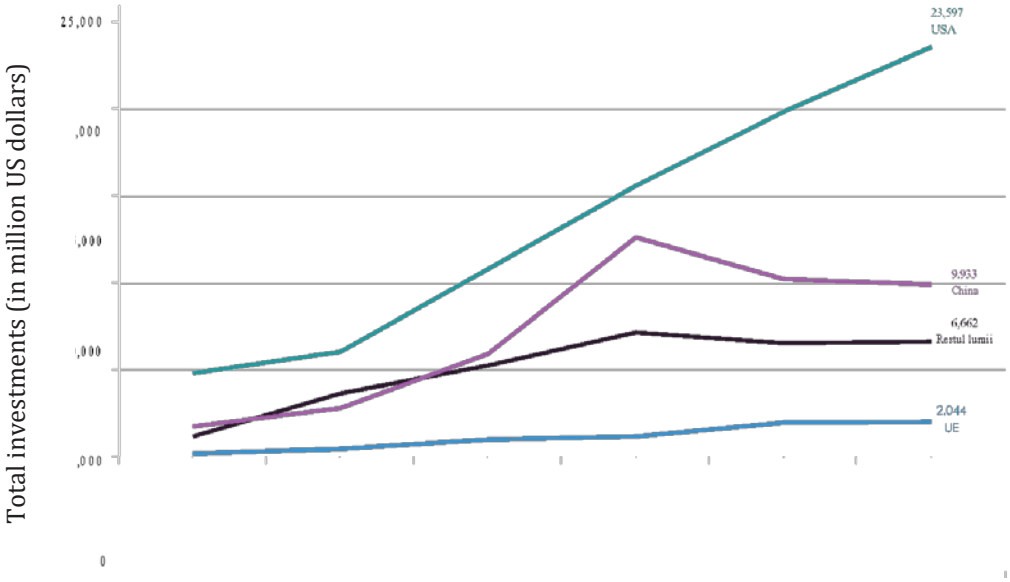

Figure 11. Private Investments in AI by Geographic Region, 2015-20
Source: CAPIQ, Crunchbase și NetBase Quid, (2020). AI 2021 index report

A detailed analysis of the competitive dynamics between the leaders in the AI technological race—the United States, China, and the European Union—confirms the continued supremacy of the United States in private investments in the artificial

intelligence sector. Although China initially showed extraordinarily high volumes of private AI investments, we observe that in 2020 its investments fell to less than half of the level recorded by the United States. However, it is noteworthy that Chinese state investments in AI are considerable, with substantial financial allocations from both the central government and local authorities, dedicating significant resources to research and development in this field.

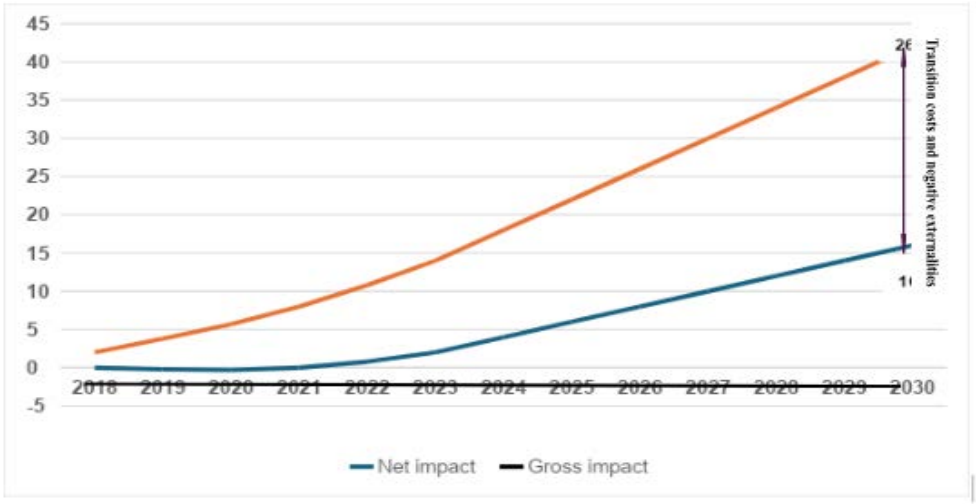

Figure 12. Transition Costs and Negative Externalities
Source: Author's Elaboration

The analysis indicates that with the implementation of AI, transition costs may involve significant investments in major changes, such as technological upgrades or restructuring, affecting short-term profitability. Externalities can influence the firm's reputation and relationships with the community and the environment, potentially including positive or negative effects not reflected in its costs or revenues.

Conclusions

Artificial intelligence (AI) is identified as a key catalyst in global economic transformation, potentially adding up to 13 trillion dollars to the world economy by 2030. AI's impact is profound among small and medium-sized enterprises (SMEs), redefining how they operate and influencing skill development and employee performance evaluation. Although implementing AI requires substantial initial investments, the economic justification becomes clear in the long term as technologies mature and widespread adoption accelerates.

Geographically, AI adoption is predominant in the Asia-Pacific, India, and North America. At the same time, Latin America and other developing nations face challenges related to unequal access to technology and differences in research and development investments. China's significant contribution to AI literature underscores the growing interest in this technology in regions leading global innovation and in Western Europe.
Sectorally, AI particularly influences high-tech and telecommunications industries, optimizing processes and streamlining operations. In financial services, AI is extensively

used for risk management, demonstrating its importance as a cross-functional tool for enhancing innovation and operational efficiency.

The bibliometric analysis of 610 documents from Scopus highlighted the geographical leaders in AI research, with a rapid increase in publications in China, the United States, and India. This significantly impacts global innovation and technological development, with the high-tech and telecommunications industries at the forefront of AI technology adoption. This analysis provided a solid foundation for understanding the current dynamics and growth potential across different regions and industries, emphasizing AI's important role in driving industrial and technological transformation.

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