

The economic vision of artificial intelligence's (AI) efficiency

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Abstract. *The advancement of technology and implicitly the faster development of artificial intelligence are becoming more important in our lives and today's economy day by day. The effects of this wonderful achievement already having an effect on various industries and affects our world in many different ways. This goal of this article is to show the vision of how artificial intelligence (AI) impacts the world economy and its industries. Its purpose is to present the artificial intelligence fundamentals, the impact of it and how the industries adapt to this technological revolution based on artificial intelligence.*

Keywords: artificial intelligence, automation, economic growth, technology, industries, impact.

JEL Classification: E20, G40, O40.

Introduction

Artificial intelligence (AI) represents the capacity of an artificial mechanism to solve and provide solutions for simple or complex problems using its own intelligence. The term Artificial intelligence (AI) was first shaped in 1956 by a branch of computer science. (Miller, 2011)

The true goal of computer intelligence, as suggested by mathematician Alan Turing, will be achieved when the answer from a human cannot be distinguished from that received from a computer. (Turing, 1950)

This is not entirely the case, because today, almost 70 years later, artificial intelligence is used in several industries and domains including telecom, medicine, banking, military, and robotics. The technology involved in these applications use complex mechanisms to see, hear, and react to sensory stimuli. (Pareek, 2014)

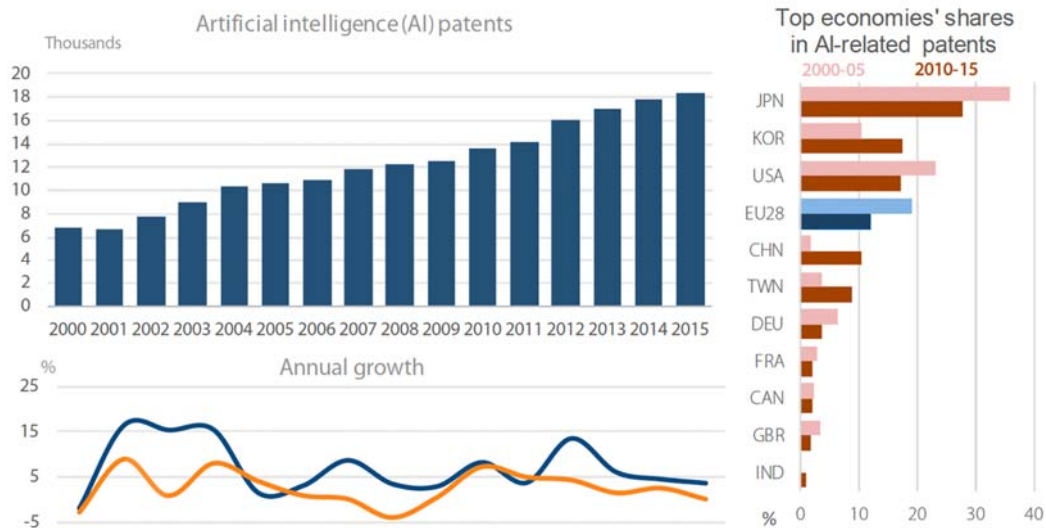
Also, the developers of an artificial intelligence mechanisms focus to include in their AI technology, human-like cognitive processes such as: the capacity to think, understand, memorize, see patterns, adapt to change and learn from previous experience. Another direction being tackled by AI developers is the enhancement of a system that can provide adaptable and flexible solutions based on its own analyses and decisions. (Singh and Haju, 2022)

Besides that, artificial intelligence found its purpose in today's society as smart assistants, such as Siri provided by Apple or Google Assistant for Android users, accomplishing and automate for them small tasks. Furthermore, AI is now used in social media by Facebook and other companies to filter and offer content to its user based on previous behavior patterns.

Considering the rapid rise of AI-based technology, the question has arisen as how it will influence and affect industries, consumers and in the end, the economy. The interest of employees has been raised regarding how AI-based technology can help them in day-to-day job tasks and what it means for their income.

On the other hand, companies are looking forward to finding ways to use this powerful technology for capitalization, increasing efficiency, and reducing costs. The potential for AI-based technologies to change and contribute to major global challenges has been highlighted by the OECD and the European Commission.

At the same time, with the rapid development of AI-based technology, computational power and the connectivity have increased rapidly. This has generated momentum for AI, and as can be seen from Figure 1, the AI patents have been on the rise globally. The average annual growth rate grew by 6% from 2010 to 2015, which is significantly higher than other annual growth rates.

Figure 1. Artificial intelligence patents

Source: OECD, Science, Technology and Industry Scoreboard, 2017.

As shown in Figure 1, Japan, South Korea and the United States were the top three countries where AI patents have developed rapidly. On the other hand, South Korea, China, and Chinese Taipei also experienced an interesting increase in AI patent technologies. EU Member States are ranked fourth with 12% of the total AI patents.

A report conducted by World Intellectual Property Organization (WIPO) in 2019 regarding AI technologies, presents the increase of scientific papers on this subject since the start of this century. Also, the number of patent application increased to 2013-2016, which can be concluded as the change between theoretical field to a more practical application of AI-based technologies in services and commercial industries. (WIPO Technology Trends, 2019)

The machine learning (ML) patents represent the largest number of patents granted regarding AI as WIPO report presents. This represents the main application field of AI. At the same time, deep learning (DL) and neural networks (ANNs) represent the fast-growing fields of AI. Accordingly, to the OECD the progress of the current AI-based technology can be explained by the development of DL using ANNs. (WIPO Technology Trends, 2019)

Given the intense world competition in AI, the European Commission advises that a coordinated framework it's a necessity for the advance of European efforts regarding AI-based technology. According to the European Commission, AI is one of the most strategic technologies that the 21st century faced.

Industries that benefit from AI contributions

The development of AI-based technologies is constantly expanding. There are many industries that have just started the process of embracing AI. The effect of that is felt by end users in a variety of ways in their daily lives. Here are some of the industries that benefit from AI technology:

1. Healthcare

Healthcare is one of the most important areas in the larger landscape of big data due to its crucial role in a productive, healthy society. Artificial intelligence in healthcare data can have a significant impact on the difference between life and death. Doctors, nurses and other health workers are able to benefit from artificial intelligence in their regular work. AI in health care can improve patient outcomes through improved preventive care and quality of life, as well as more accurate diagnostics and treatment. AI can assist in anticipating and tracking the spread of contagious illnesses by analyzing data from the government, healthcare, and other sources. Therefore, AI can become an essential tool in the fight against diseases and pandemics in the field of global public health.

2. Automotive

Despite not being widely available yet nor legally regulated, fully self-driving cars are still in the works with multiple companies, and some self-driving features are already in cars today. Self-driving cars have already been developed by companies like Waymo, Tesla, and Aurora, and artificial intelligence is the key factor that made this possible. Artificial intelligence has also played a major role in developing electric and hybrid vehicles. Using AI engineers and designers accomplished to optimize their designs for maximum efficiency and performance. (Gülen, 2022)

3. Medicine research

Epidemiologists have always endeavored to comprehend the spread of diseases to anticipate and hopefully prevent them. It's easier with artificial intelligence. Artificial intelligence can help make faster progress on data analysis and prediction modelling than humans could do on their own, which is a clear example of this.

4. Communication and multimedia

Everyone who uses email knows about spam filters. Email inboxes are equipped with filters that send spam emails to a separate folder, so they don't clutter users inbox with useless messages and potentially malicious emails. Spam filters also exist for phone calls, to filter out scammers and other spam phone calls. Artificial intelligence feeds these spam filters by using previous knowledge of what spam or phone calls look like from a data point of view, and by filtering those that correspond.

Companies like Google use for their search engines AI for filtering and better suggestions to the end user. Search engine algorithms are among the most robust algorithms available.

For instance, Google is using more than 200 data points to figure out where each result ranks on each results page. Their algorithm processes a significant amount of data with every query due to the billions of pages in their database.

The impact of AI on companies, industries, and economies

Analysis Group, a company created by Facebook, came with a conclusion after conducting an analysis in 2016 that suggests that AI will influence and will have direct and indirect effects on jobs, productivity, and GDP.

Companies and industries that will invest into developing of AI technologies will have a positive impact because of rising incomes and employment, which may also create entirely new economic activities. The indirect benefits will come for companies that will utilize AI to optimize their method of work and decision-making. That will boost their productivity, raise their knowledge and access to information. Overall, they expect modest gains (US\$1.49-2.95 trillion) over the next decade. (Rao et al., 2023)

In a study realized in 2017, McKinsey contends that the rise of massively scaled organizations may be facilitated by AI and automation on the one hand and on the other hand, it will permit small players and even individuals to take on project that is now mostly accessible to bigger companies. The merger of small and large companies could be a direct result of this. (Manyika et al., 2017)

The gap between advanced and lagging countries may widen due to the variations in current AI adoption levels across the world. It is likely that AI front-runners, who are mostly based in countries with a strong economy, will improve their lead over their counterparts in developing countries.

Moreover, developed countries with high wages are more likely to experience this potential effect, as they are able to favourize a stronger incentive to substitute labour with AI than in lower-wage economies. In addition, AI has the potential to reduce the cost of bringing back production from poorer countries for some manufacturers.

The impact of AI on the economy

It is widely believed by most studies that AI will have a significant economic impact. Accenture's research encompasses 12 developed economies. Together, they generate more than 0.5% of the world's economic output. Artificial Intelligence could double economic growth rates in 2035 according to Accenture. AI will drive this growth in three important ways. It will lead to a strong increase in labour productivity provided by innovative technologies which will enable more efficient ways of working and a better time management. According to the report, AI is a new workforce that can solve problems

and self-learn quickly and cost-effectively. This new type is called 'intelligent automation'. The dissemination of innovation will have a positive impact on the economy, as it will affect different sectors and create new sources of income.

The McKinsey Global Institute expects that around 70% of companies would adopt at least one type of AI technology by 2030, while less than half of large companies would deploy the full range. McKinsey estimates that AI may deliver an additional economic output of around US\$13 trillion by 2030, increasing global GDP by about 1.2% annually. This will mainly come from substitution of labour by automation and increased innovation in products and services. On the other hand, AI is likely to create a shock in labour markets and associated costs needed to manage labour-market transitions; this shock would be incurred as an effect of negative externalities such as loss of domestic consumption due to unemployment. (Bughin et al., 2018)

A study carried out by PricewaterhouseCoopers (PwC) predicts that global GDP could rise by 14 percent by 2030 due to the acceleration of development and adoption of AI. The report predicts a new revolution in digital growth based on data generated from the Internet of Things (IoT). The quantity of data generated by the current 'Internet of People' is likely to be much more important. It will boost standardization and consequently automation, as well as enhancing the personalization of products and services. PwC concluded that AI would have an impact on two branches in the global economy. Capital-intensive industries like manufacturing and transport will soon see the impact of AI, which will automate routine tasks and increase productivity.

This could mean a broader use of machinery such as robots and self-driving cars. Productivity will also be enhanced by companies that complement and support their existing workforce with artificial intelligence technologies. Investing in software, systems, and machines that are based on assisted, autonomous, and augmented intelligence will be necessary according to PwC research. (Gillham et al., 2018)

Labour markets and employment

The impact of AI on labour markets is a topic of considerable debate. While AI has the potential to automate routine and repetitive tasks, it also creates new opportunities for human workers. Empirical evidence suggests that AI is more likely to transform job roles than eliminate them entirely (Bessen, 2019). This transformation often involves a shift from routine, manual tasks to more creative, complex, and value-added activities.

In the banking industry, for example, AI-powered algorithms may automate data analysis and fundamental decision-making, freeing up financial analysts to concentrate on strategic planning and customer connections. In healthcare, AI may help with diagnoses and data analysis, allowing doctors to devote more time to patient care and challenging situations.

However, there are still issues with worker adaptation. Workers whose employment are becoming automated may need to learn new skills in order to compete in the labour market. Reskilling and upskilling projects are critical to preparing the workforce for the changing needs of the AI-driven economy (Arntz et al., 2016).

Competition and market structure

Artificial intelligence-driven technologies have transformed competitive dynamics across sectors. AI encourages competitiveness by decreasing the barriers to entry for start-ups and small enterprises. Cloud-based AI services, for example, enable companies to have access to strong AI tools without making major upfront infrastructure expenditures (Manyika et al., 2016). This levelling of the playing field promotes entrepreneurship.

Furthermore, AI has the capacity to upend established market arrangements. AI-powered recommendation systems on e-commerce platforms may provide users with highly personalised product recommendations. This not only enhances the consumer experience but also puts existing retail business models to the test (Porter et al., 2017).

Furthermore, through data analytics, AI helps firms to better understand customer behaviour. As a result, marketing activities are more focused, client retention is enhanced, and market share is raised. AI can give a vital edge in highly competitive industries by identifying new trends and client preferences (Manyika et al., 2016).

Market access and consumer behaviour

Another important component of AI's microeconomic influence is its impact on market access and consumer behaviour. AI technology have provided new ways for organisations to reach out to and connect with their customers.

E-commerce platforms driven by AI recommendation algorithms give consumers with highly personalised product choices based on their previous behaviour and interests. This not only enhances the shopping experience but also raises conversion rates and client loyalty (Porter et al., 2017).

Furthermore, AI-powered chatbots and virtual assistants are becoming increasingly common in customer care. These technologies can give help 24 hours a day, respond to client enquiries, and even process transactions. They increase client involvement while decreasing operational costs for enterprises (Manyika et al., 2016).

The emergence of online marketplaces, where firms of all sizes may reach a worldwide customer base, demonstrates AI's influence on market access.

This has democratised market access, enabling small and medium-sized firms (SMEs) to compete globally (Chui et al., 2016).

Conclusions

A series of conclusions, mostly theoretical, emerged from the study of 'The economic vision of artificial intelligence's (AI) efficiency' in this article. First of all, the ways of working as we know it now will be greatly impacted by the development of AI-based technologies.

The new standards will require companies and their employees to adjust to the increased productivity and efficiency. Second, the global economy will be affected by the continuing evolution of industries that rely more and more on technology.

The economic perspective of AI's efficiency is dynamic and multifaceted. The academic research mentioned earlier indicates that AI's impact can range from improving productivity and driving innovation to causing challenges in job displacement, ethics, and regulation. AI will play a greater role in shaping economies worldwide as it continues to evolve. To fully harness the potential of AI and mitigate its challenges, collaboration between academia, industry, and policy makers is crucial. The integration of AI technologies in a responsible and strategic manner will have a significant impact on the future of economies.

The economic vision of AI's efficiency extends beyond immediate gains. AI has the potential to generate sustainable economic growth over the long term. The use of AI technologies, such as autonomous vehicles and energy-efficient systems, can lead to environmental sustainability and economic development.

This study emphasises the importance of collaboration among governments, industries, academia, and society at large in harnessing AI's possibilities while reducing its difficulties.

Human intellect combined with AI capabilities holds the key to unlocking a future of wealth, efficiency, and sustainable growth for civilizations around the world. As AI evolves, it is critical to be watchful, ethical, and proactive in building a future in which AI serves as a driving force for economic success and human well-being.

Artificial Intelligence (AI) has emerged as a revolutionary force in technological growth, with substantial ramifications for the global economy. The extraordinary ability of AI to improve efficiency, simplify processes, and optimise decision-making has resulted in a sweeping reinvention of sectors and economies throughout the world.

The ability of AI to automate regular and repetitive jobs frees up human employees to focus on higher-value, creative, and complicated endeavours underscores its influence on productivity.

While fears about job displacement remain, data shows that AI is more likely to modify employment functions rather than completely abolish them. In an AI-augmented future, reskilling and upskilling efforts are critical to ensuring a flexible and adaptive workforce.

The economic vision of AI goes beyond short-term profits. AI technologies are critical for solving complicated global concerns. AI-powered healthcare solutions, for example, improve patient outcomes while lowering expenses. AI also helps the environment by enabling energy-efficient devices, intelligent transportation, and climate modelling.

In addition, automation of small human tasks by using AI-based technology will have a direct and indirect effect into companies. It will help companies streamline production, reduce costs, and gain more information on their working field, while reducing human error and increasing productivity.

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