

Artificial Intelligence and the U.S. Economy

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Abstract

Dating back to 1950, after Alan Turing began making computer software models of the human brain, artificial intelligence (AI) has continued to develop and improve. From Siri to self-driving cars, AI has rapidly changed the United States' economy. Sectors such as manufacturing, professional services, wholesale/retail, and financial services have all adopted some form of AI. Artificial intelligence can be referred to as "thinking machines". These machines are programmed to act, think, and look like humans. Scientific predictions state AI intelligent machines are the future of the U.S. economy.

Artificial Intelligence and the U.S. Economy

Science fiction portrays artificial intelligence as robots with human characteristics (Anyoha, 2017). However, there are numerous types of artificial intelligence that are prevalent in modern society. One type of AI is virtual assistants, like Amazon's assistant Alexa. Other types of AI are self-driving cars (Tesla), online customer support, smart home devices, Pandora, and Netflix.

Studies have shown that AI has had a major impact on U.S. businesses. It has increased overall productivity in manufacturing environments such as Proctor & Gamble (These factories, 2016). It has also resulted in an increase in employment opportunities in the technology field. In contrast, jobs such as administrative support and personal assistants will likely become obsolete. According to technologists, "AI will have a profound impact on the society and the way we do business" (Desjardins, 2017). This paper will elaborate on AI and the way it is impacting the U.S. economy.

Artificial Intelligence

Artificial intelligence can be defined as computers that think and act like humans. Humans learn and understand by doing, or being active. "The human mind is better equipped to gather information about the world by operating within it" (How humans learn best). Artificial intelligence is

designed to learn in the same manner. AI machines can perform functions such as facial and speech recognition, decision making, and manipulation objects.

A prime example of AI is Sophia. According to Stone, Sophia was created and programmed by computer scientists at Hanson Robotics. She has a sense of humor and can express feelings. “This is due to her AI, which has been developed to allow her to hold eye contact, recognize faces and understand human speech” (Stone, 2017). Sophia is so lifelike that she was granted citizenship in Saudi Arabia. Early AI computers and machines were not as advanced as those like Sophia are today.

Evolution of Artificial Intelligence

British Scientist Alan Turing is considered to be the father of artificial intelligence. In the 1920’s Turing predicted that computers would one day act and think like humans. During this time, Turing helped lead the Allies to victory in World War II. Turing broke codes on the Nazi military machine and deciphered the German tunny codes. Turing’s advances allowed the allies to receive and understand messages between Hitler and his generals (World War II, 2015).

The Turing Machine

Turing mainly focused on the concept of “thinking computers”. He was interested in whether computers were capable of carrying out tasks. Barker-Plummer believes that question, “is one of the foundational questions in the philosophy of computer science” (2012). If a computer can be programmed to follow specific instructions to complete a task, then the task is computable In 1936, Turing created a machine similar to a calculator. The device could carry out and complete multiple tasks by changing its software.

The Turing Test

Turing is also famous for creating a test called the Turing Test in 1950. The test consisted of a computer and a human hidden from an interviewer. During the test, the interviewer asked both subjects a number of random questions. If the interviewer could not distinguish between the answers of the computer and the human, then “the computer would be considered to be thinking” (Sharkey, 2012).

Over time, computer capability has changed. Modern day computers are surpassing the speed and processing time of human brains. Estimates are that, “the memory and speed of computers doubles every year, had finally caught up and in many cases, surpassed our needs” (Anyoha, 2017).

Anyoha also states that the lack of storage capacity on computers years ago is no longer a problem today.

AI Effects on the U.S. Economy

Artificial intelligence has affected the U.S economy and businesses in many ways. AI has taken over repetitive tasks, increased overall productivity, increased employment in the technology field, and increased unemployment in other fields. There are four major sectors that have benefited most from the adoption of artificial intelligence: manufacturing, professional services, wholesale/retail, and financial services.

Manufacturing and AI

Most tasks in the early years of manufacturing, were done by humans. According to *Business Insider*, “Now, the industry is in the first stages of its next automation breakthrough—using artificial intelligence, or AI, to make production decisions in real time.” (These factories, 2016). Artificial intelligence assists workers at Kia Motors Manufacturing plants such as the one in West Point, Georgia. Robots are used to complete tasks that are repetitive or could be harmful to employees. These tasks include drilling, welding, and lifting. Robots have allowed manufacturers to be more efficient and save money by reducing inventory and waste. According to Hall, “Hyundai Motors reduced delivery time by 20% and increased inventory turns from 3 to 3.4. Reynolds Aluminum reduced forecasting errors by 2% that resulted in a reduction of 1 million pounds in inventory...SCI Systems reduced on-hand inventory by 15% resulting in \$180 million in annual savings” (2002).

Professional Services and AI

The Department of Energy (DOE) and the Department of Veteran Affairs (VA) are using AI to better predict medical complications and improve treatment of veterans. They have combined the VA’s healthcare data and the DOE’s high-performance computing, artificial intelligence and data analytics. According to Rick Perry, “better healthcare via using supercomputing to inform when and how to treat our veterans to improve outcomes and reduce cost” (Perry, 2017). According to *Time Magazine*, “the idea behind artificial intelligence in medicine is not so much to replace the doctor... but to enhance the doctor’s medical expertise” (Park, 2017). AI programs use medical knowledge at new levels (Park, 2017).

Retail and AI

Sephora, a popular cosmetic business, has adopted AI in the form of virtual assistants. The AI assistant, Virtual Artist, allows customers to try products through a cell phone application. Customers are able to experience different shades of lipsticks and foundations. Also, customers can test eye lashes, eyeshadow, concealers, and mascara. According to Rayome, “Virtual Artist includes more than 20,000 products sold at Sephora... Since launching on the app, Sephora Virtual Artist has seen 200 million shades tried on, and over 8.5 million visits to the feature” (2018).

The Future of Artificial Intelligence

Desjardins reports that by 2030 AI will add \$15.7 trillion to global GDP. Consumer demand will make up \$6.6 trillion, and labor productivity will make up \$9.1 trillion (Desjardins, 2017). According to Arbess, “The Bank of England estimates that 48% of human workers will eventually be replaced by robotics and software automation, and ArkInvest predicts that 76 million U.S. jobs will disappear in the next two decades” (2016).

Employment agencies and career search websites use AI. When job searchers login to career search websites and upload their resumes, AI software provides recommended job openings. The AI software also alerts employers of those who match their job criteria. Strauss reports that Raj Mukherjee of indeed.com believes “job seekers will likely see a reduction in their research time while looking for work... A career-focused AI should also tell job seekers whether they are being paid fairly at their current job, with a high degree of accuracy, compared to others in their line of work” (2018).

Conclusion

Artificial Intelligence describes computers that perceive, understand, reason, and act like humans. The primary purpose of AI is to create intelligent machines. These computers show intelligence by thinking, making decisions, solving problems, and by learning. Many industries have benefited from advances in artificial intelligence. Robots have increased, and continue to increase, productivity in manufacturing environments. Virtual assistants are giving makeup recommendations. Medical AI helps doctors diagnose military veterans’ medical conditions. Predictions are that AI will add millions of dollars to the U.S. economy by improving efficiency, reducing delivery time, and reducing forecasting errors.

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