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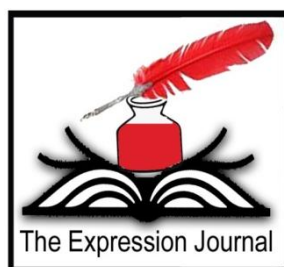
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## **A SOCIO-ECONOMIC ANALYSIS OF ARTIFICIAL INTELLIGENCE IN INDIA**

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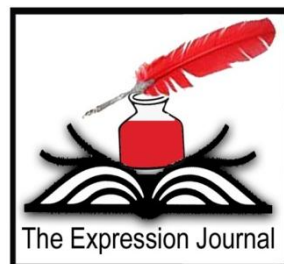
### **Abstract**

It is a well-known fact that artificial intelligence (AI) is pervasive in both our society and economy, as well as impacting the environment in a variety of ways. Two major economic powers, the United States and Asia, are presently preparing to take advantage of the intensifying global competition in order to capture the benefits that it has to offer. AI is viewed in a number of ways by many individuals. This can be achieved by increasing productivity and the economy as a whole. By analyzing a large amount of data, it is possible to significantly improve the effectiveness of the process and the decision-making processes. The development of brand new goods and services, markets, and industries may also result in the creation of brand new markets and industries, thereby increasing consumer demand and resulting in the creation of new revenue streams. Other people worry that it may result in the growth of large corporations--institutions of wealth and knowledge that would be detrimental to the economy as a whole--which could eventually result in the collapse of the economy. Depending on the impact of the latest changes on the labour market, it is possible that there will be an increasing gap between the developed and developing nations, as well as an increased need for highly trained individuals, while at the same time, others may be displaced. Furthermore, experts are concerned that increasing inequality may result in a smaller tax base as a result of a decrease in incomes. There was a need for this study in order to see how artificial intelligence is used in the modern business world as well as what the general public thinks about its application in the modern business world.

### **Keywords**

Artificial Intelligence, Digital Transformation, Industrial Revolution, Social Economic Environment.

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### **1. Introduction:**

A wide range of issues that are essential to public policy and welfare are being addressed by national governments and global governance organisations around the world. With its versatility and predictive capabilities, AI can provide answers to a variety of societal problems. By carefully integrating AI into its processes, governments may better serve the underprivileged and deliver services. According to a task-based analysis, AI can accelerate governance tasks by 20%, freeing up to 96.7 million hours and helping governments save \$3.3 billion in the process.

The field of public utilities offers other real-world examples of AI's potential. For instance, Melbourne Water, a public sector organisation in Australia that manages water distribution throughout the city of Melbourne, uses machine learning techniques to control the varying rates at which its water pumps work in order to maximise system efficiency. Through Deep Learning-based applications like facial recognition systems, which are being used by law enforcement agencies to effectively track missing children<sup>28</sup>, India's AI is exhibiting its potential to improve law enforcement capacities. In order to safeguard internal security and regulate crime, Delhi Police collaborated with ISRO to build an analytical system called Crime Mapping Analytics and Predictive Systems (CAMPS). Other states like Jharkhand and Karnataka<sup>29</sup> are implementing such programmes. For its predictive policing solutions, which have already been piloted and accepted by states like Rajasthan, Punjab, and Uttarakhand, Dubai Police has inked an MoU with the Indian company Staqu. Despite the fact that many of these programmes are still in the pilot or experimental stages, India's defence services utilise AI for intelligence, surveillance, and other purposes.

A report on the United Nations' actions on AI<sup>30</sup> was released by the International Telecommunications Union (ITU), and it details the strategies used by several UN agencies to carry out the Sustainable Development Goals (SDGs). For instance, the International Labour Organisation (ILO) launched a study to track the prevalence of child labour in Kyrgyzstan using Big Data-based AI algorithms. The United Nations Children's Fund (UNICEF) is utilising deep learning techniques to boost empathy for victims of natural catastrophes and AI to generate

insights on the progress of an epidemic<sup>31</sup>. Numerous AI applications with a developmental focus can be found in India. According to a recent media article, the education sector was the focus of 11% of India's AI start ups. These include of Embibe, Toppr, Edu Gorilla, etc. Securing the lives of the disabled, providing for their needs, improving child nutrition, etc., are other crucial application areas. IIT Kharagpur has created a system that detects bogus news and notifies users of emergencies.

Natural language processing, neural networks, and computer vision are all used by the smartphone software GnoSys, which was created for the deaf and mute, to convert gestures and sign language into voice. For the estimated 18 million hearing-impaired persons in India, the software is predicted to alter their lives.

It is said that in the twenty-first century, AI has become crucial to government. In the Big Data era, AI technologies like sensors and machine learning can offer immediate insight into the effectiveness of governmental rules and oversight gaps. The Indian government has openly acknowledged the contribution of AI to the implementation of appropriate rules and good governance in India.

## 2. Main Thrust

### Artificial Intelligence as a General-Purpose Technology

Advances in AI are clearly among humanity's pivotal inventions. Andrew Ng (2015) stated emphatically<sup>42</sup>, "Just as electricity transformed almost everything a hundred years ago, today I actually have a hard time thinking of an industry that I don't think AI will transform in the next several years." This statement is also important for it (unwittingly) draws attention to a common conceptual framework: AI, like electricity, is a GPT. Simplistically, GPTs are technologies that impact economic growth by fundamentally transforming both household living as well as ways in which firms conduct business. The three critical features characterizing GPTs are (i) pervasiveness, (ii) technical improvements and (iii) their role in enabling other innovations. One can think of electricity, or more recently, the (See Figure 1) Conceptualising AI as a GPT implies, that AI led innovations will be reflected not only as direct contribution in any given sector, but also inspire complementary innovations and spillover benefits in other sectors of the economy.

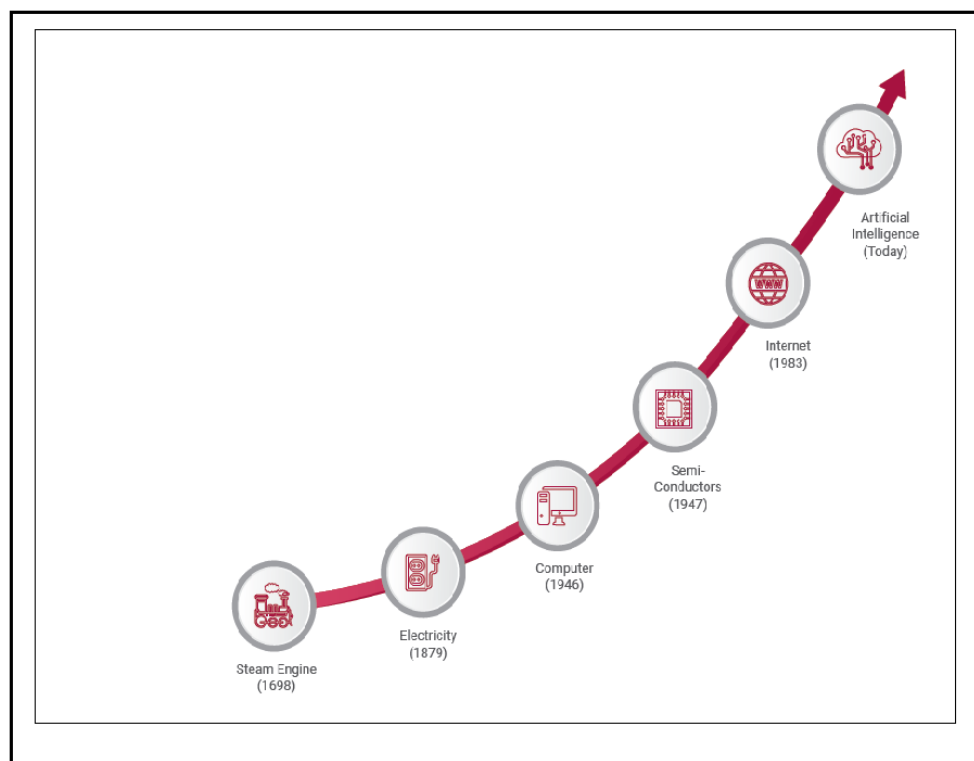
While there are no formal empirical tests that can detect General Purpose Technologies, it is possible to describe the extent to which AI matches up to three key features of GPTs. Pervasiveness: The pervasiveness of AI across various 'application sectors' is documented in the World Intellectual Property Organization's (WIPO) recent Technology Trends 2019: Artificial Intelligence Report<sup>47</sup>. AI applications also include social and behavioural sciences, military, agriculture, energy management, education, document management, publishing, etc. Deloitte recently published a report stating that while AI is getting better it is also becoming more pervasive<sup>48</sup>. From 79 million in 2018, the annual shipment of devices embedded with AI is likely to increase up to 1.2 billion in 2023. Technological improvements: The field of AI continues to undergo significant transformations, with not just improvements in its performance and applicability<sup>49</sup>- from the 'Turing Test' to Big Data driven Machine Learning techniques, but also rising and falling trends in various techniques. For instance, from 1997 to 2017, while research on heuristic search and optimization, cognitive modelling, knowledge representation has declined, research on game theory, Machine Learning and natural language processing has witnessed a consistent rise<sup>50</sup>. Using data on patent filings, WIPO finds that telecommunications, transportation, life and medical sciences, personal devices, computing and Human-Computer Interactions (HCI) are the top application fields. Enabling Innovations:

The diffusion of AI has enabled a wide range of activities that were hitherto unimagined. UN activities on AI report the use of Machine Learning techniques for environmental protection in Mongolia, disaster preparedness in Maldives, and the development of cloud-based geospatial solutions for enhanced management of natural resources. The proliferation of predictive algorithms and natural language processing has transformed business processes in the financial services sector. This includes fraud detection, processing insurance claims and customer interactions. AI's predictive capabilities are reducing costs and altering organisational structures. Networked turbines, intelligent power distribution and automated manufacturing are now realities made possible with the diffusion of AI technologies. General Purpose Technologies have, in the past, unlocked the growth potential and played a significant role in explaining the wealth of nations<sup>51</sup>. Artificial Intelligence, as argued, demonstrates certain fundamental characteristics of General-Purpose Technologies, and thus to an extent validate the future promise of AI-driven economic growth. The comparison with critical features of GPTs in general, is an imperfect yardstick to test whether AI is a GPT or not and it is up to history to validate such claims, but such comparisons indicate that at the least, AI has the makings of a General-Purpose Technology. However, the transition towards an AI-based economic system is not a natural occurrence. Unlocking the potential of AI requires an understanding of the short-run possibilities and long-run dynamics of such growth, and equally importantly, the opportunities and challenges in the process of diffusing AI across societies in a manner that is welfare-enhancing.

In order to illustrate the growth impacts of AI in this report, we adopt the understanding of AI as a GPT. Doing so allows us to link AI with an existing understanding of GPTs and derive an understanding of its economic implications, while appreciating novel economic and regulatory challenges posed by AI.

Fig1: An historical overview of GPT instantiations

## Research





## Methodology

Selecting the appropriate ways for gathering different types of data is crucial since it might influence what kind of information is required. Research methods are the procedures, plans, and techniques used to gather data for analysis and explanation in order to get a better understanding of a situation. The three fundamental categories of research methodologies are quantitative, qualitative, and mixed methods. This study's primary goals are to evaluate the function that practical wisdom will play in the economy of the future and gauge how important artificial intelligence is to it. The quantitative research method is applied in this study. The outcome consists of numerical information that can be measured or broken down into statistical categories. It promotes the investigation of routines or connections as well as resemblances. Finding the numbers is made easier by using this investigational strategy.

The two primary designs utilised in quantitative research are experimental design and non-experimental design. The test design tracks the settings under which the experiment is carried out and distinguishes between a promised object in a controlled and uncontrolled environment. The quantitative research method makes use of tests, surveys, or questionnaires with an objective framework to gather statistical data. These data collection methods can produce data that can be quickly turned to numbers. One of the most popular ways to gather data is through open-ended questions, surveys, and in-person interviews. A qualitative technique is preferred when answering research questions that call for the interpretation of events and textual material. Mixed techniques are employed when the research questions call for both textual and numerical data.

A quality approach is preferred since the goal of this study is to determine how artificial intelligence is used in the current economic system and whether or not public speculation about AI is positive or negative. Because there isn't much research on this and it's just been established, research. The research topics of this study create the need for a sample of selected people for AI knowledge.

## Data Collection

The online survey's goal was to find out how intelligent technology affects the economy today and what people think of it. Closed-ended questions are used in the survey's first section to gather demographic information and learn more about the participants' backgrounds. To gather as much information as possible about participants' experiences and opinions, most surveys include open-ended questions. When open-ended questions are posed, participants may respond with their own original thoughts. Due to the COVID-19 epidemic's existing regulations, a pertinent questionnaire was used for this survey rather of a face-to-face interview. Closed survey questions seek to ascertain respondents' age, gender, place of residence, and level of higher education.

Regardless of whether the study needs variability, accurate research should be used to gather demographic data. In addition, stakeholders must disclose if they are employed, their industry of work, and the position they hold. In the following stage of the study, participants are asked about their understanding of practical skills used in their workplaces and how they feel about it in open-ended questions.

It was crucial to have an audience that had been pretested in a certain field for the survey to be as effective as possible. Respondents are urged to be as specific as possible about their work history, perspectives on, and expertise with the practical approaches employed in addressing these questions. The first sentence of the survey's main section asks participants about their familiarity with and expertise about espionage intelligence systems. This inquiry assists in

determining whether or not AI technology is utilized broadly. The component also establishes the quantity of AI applications employed in participant recruiting. Deches the technology's current economic level of efficiency. The participants' attitudes towards AI technology are examined in the second section of the main survey phase. It asks for feedback on potential hazards as well as suggestions for how artificial intelligence might boost production and efficiency in particular industries. In order to prevent over responsive replies, participants were urged to disclose as much information as they could at the outset of the study. To aid participants in understanding the study, a brief explanation is given in the beginning. An online poll was created in English to prevent inconsistent responses and ideas while being translated .

## Sample Data

The practice of choosing a group of people who can offer relevant information is known as targeted sampling. A sample of persons with a particular amount of practical cleverness is needed for research issues. Participants in this study were required to have completed secondary or higher education, be currently employed by the organization, and have little to no knowledge of artificial intelligence technology in order to collect huge amounts of data. Once a sample of the population has been selected, there are numerous ways to handle the respondents. Those who had contact information, which included roughly 20 participants, were the first to get a bulk email. Second, reminders to participants to complete a thorough survey have been disseminated on social media sites like Facebook, Instagram, and WhatsApp. Participants who have previously been hired by and worked for businesses using AI technology fall into a different group. These individuals often work from 9 a.m. to 5 p.m., and they are constantly searching for fresh and distinctive innovations. The judgment method/purpose of the sample provides for a full sample of the population as opposed to employing statistical indicators.

## Experimental Assessment

Twenty individuals completed the extended qualitative survey. Based on the data collected, Figure 2 depicts that 50% of the participants are male and 50% are female. None of the participants picked "Prefer not to say." The total number of male and female respondents to the entire survey is shown in Figure 2. No respondents, as shown by their age distribution in Figure 3, selected the option "Prefer not to say." 15% of respondents are between the ages of 18 and 25; 25% are between the ages of 26 and 35; 40% are between the ages of 36 and 50; and 20% are over the age of 51. Additionally, Figure 3 demonstrates that the vast majority of participants are adults between the ages of 36 and 50.

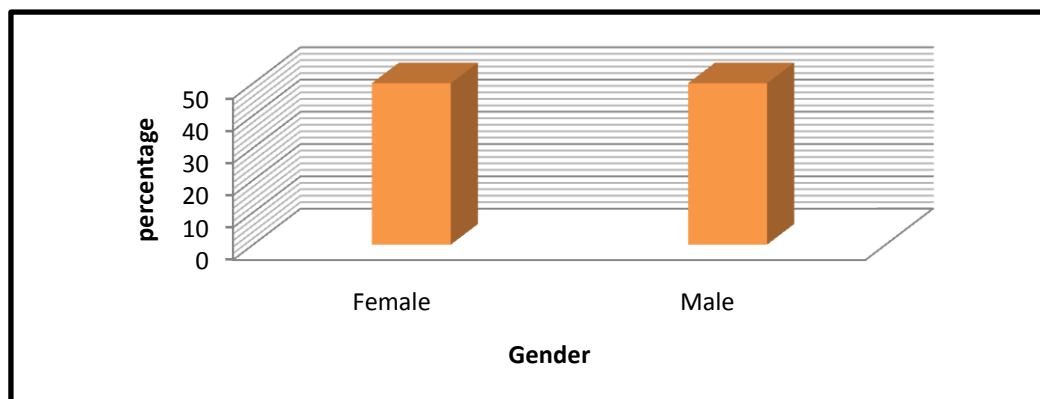


Figure 2: Gender distribution of participants

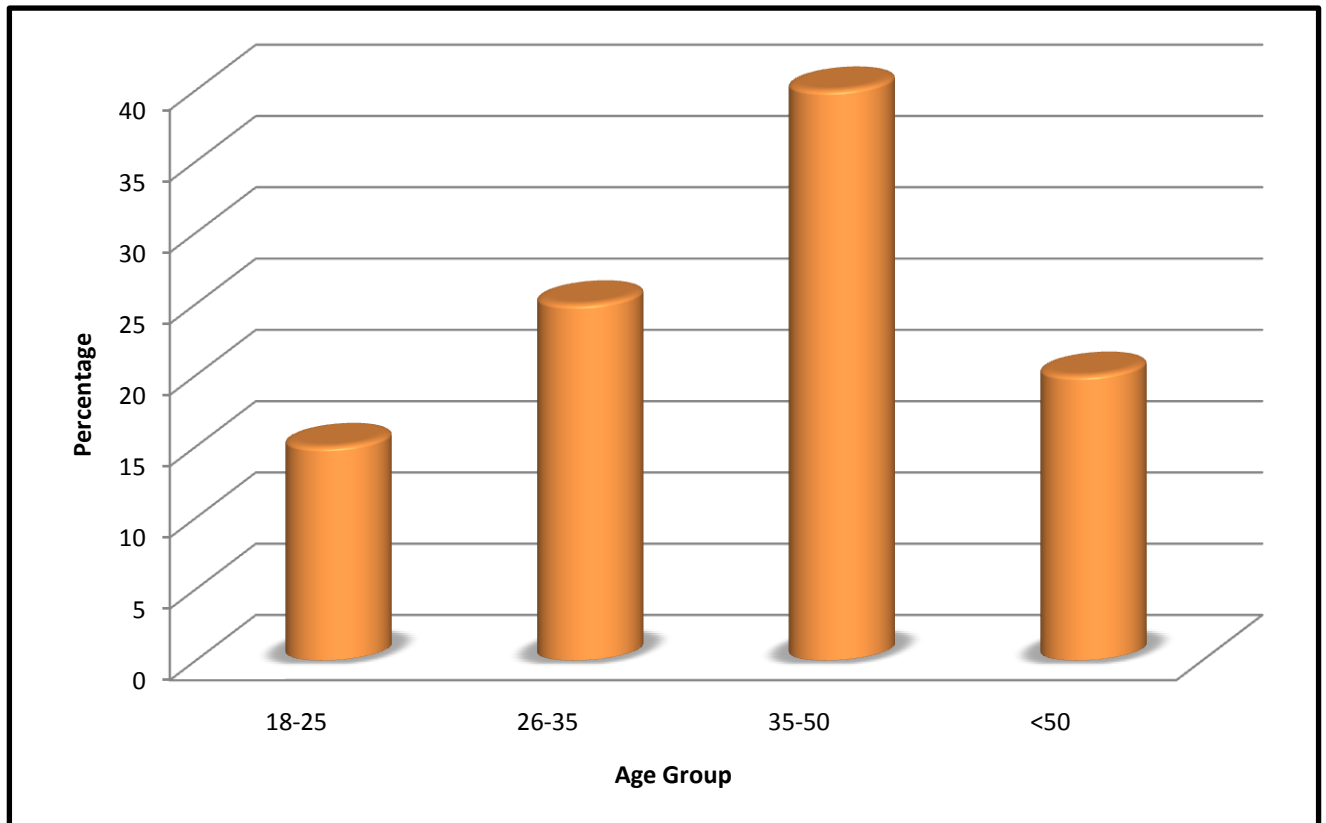


Figure 3: Age distribution of participants

The demographics of the participants' current residence served as another survey criterion. The current resident location was important to mention due to the variable recognition of AI integrated gadgets in different places. The person's level of familiarity with artificial intelligence was another need. This would be a crucial aspect of getting valuable data because survey participants from nations with restricted access to high-speed computers and smart phones would be unable to participate. People who were familiar with AI applications were hence more inclined to persist in the survey and help it to completion. 58% of the population of India is found in the south. Chennai makes up 13%, North India makes up 23%, and villages make up 6%.

A minimum secondary education completion was one of the requirements for participation in the qualitative survey. Figure 4 shows that 2% participants have earned a doctorate and that more than half (58%) of the respondents have earned a bachelor's degree. 30% of the participants have completed high school and 10% have earned a master's degree.



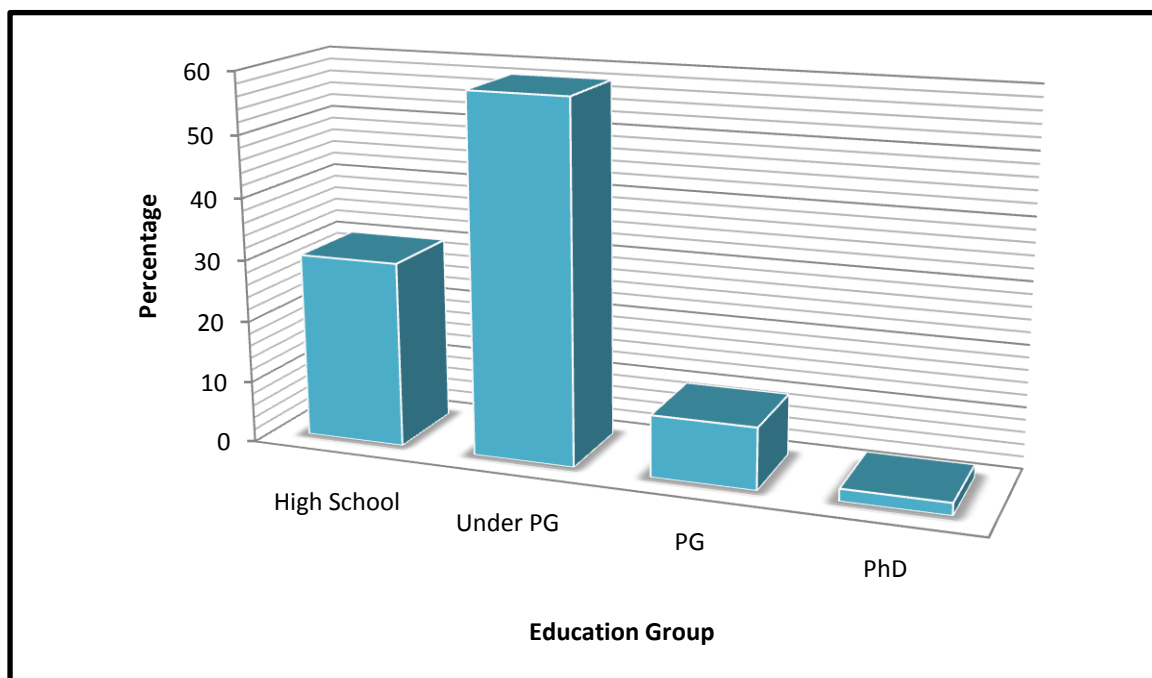


Figure 4.

Educational achievement of participants

## Data Analysis

The primary data collected was identified and arranged using a qualitative content analysis. In content analysis, messages and themes are sought after. It was essential to carefully review the participant's written responses since qualitative research focuses on the interpretation and identification of data received. The survey's approach and content analysis were appropriate for this inquiry. The qualitative content analysis approach creates themes from transmitted or in-text data.

## The Level of Artificial Intelligence's Influence

Finding out how influential AI is in the current economy was one of the open-ended survey topics. While evaluating the gathered primary data, many of the participants used technology that included artificial intelligence. The participants' interactions with chatbots and Alexa or other AI voice assistants were comparable. The 17 respondents' levels of expertise on applications of artificial intelligence did not significantly differ.

Many of the respondents said they are more cooperative with AI technologies. In contrast to individuals who work in non-innovative fields, those who deal with new technology have a comprehensive understanding and frequently have first-hand experience with artificial intelligence applications.

Additionally, there were patterns showing that respondents who used AI more regularly at work also used AI-enabled goods more frequently at home. The message was loud and clear, and the responders heard it. Another recurring pattern was also identified when the question "How might emerging AI grow efficiency in certain industries?" was posed. The most popular approaches to this problem were manufacturing process acceleration and e-commerce with high data processing analytics. These responses were chosen because they best represented how most respondents understood efficiency—that is, how efficient AI robotic machines work

to produce outcomes more quickly. Numerous respondents claimed that their organisation uses chatbots, demand forecasting, and other artificial intelligence programmes for customer support.

## Perception of Artificial Intelligence Technology

Table 1. Survey questions

Question	
1	How could AI become increasingly visible in our existing socio-economic systems?
2	What are some ways that emerging AI might increase efficiency in certain industries?
3	Can you comment on the negative opinions about AI?
4	What does artificial intelligence look like on a basic level?
5	Do you have experience working directly with artificial intelligence applications?
6	Could you tell me more about AI's ability to make the work environment more usable?
7	What about the advancement of artificial intelligence technologies would disrupt the labor market?
8	Is artificial intelligence going to eliminate obsolete jobs?
9	Can its expansion improve the efficiency of our socio- economy?
10	How does deep fake technology work?

To better contribute to the study's topic and analyse the research questions, the survey in Table 1 is intended to ascertain participants' attitudes on AI applications and technology. Participants gained distinctive insights on cutting-edge technology after seeing and experiencing how artificial intelligence is affecting the entire economy. What are potential problems with AI becoming more obvious in our current economy? What was one of the open-ended survey questions. All of the respondents' comments were similar. Many individuals think that as artificial intelligence technologies improve, the demand for human capital will decline and the labour market will be disrupted.

The bulk of respondents' opinions on AI are extremely negative. The two most common themes that came up in the comments were job loss and job replacement. One person expressed concern that developments in artificial intelligence would improve deep fake technologies and make them seem more authentic, changing digital media and making it harder to differentiate real content from false. Some employment replacements, according to another participant, have already begun. Upon studying the qualitative survey's content, a few of the respondents expressed a more positive opinion of AI's potential to boost economic efficiency. In the future, artificial intelligence would "eliminate obsolete jobs while also creating new opportunities," according to one of the respondents. This statement acknowledges that there is no agreement on whether AI will increase or decrease employment in the future, as shown in the study's material above. There will undoubtedly be new jobs established that require a variety of knowledge and training, but this was not a huge concern. Overall, the responses showed a split between positive (80%) and negative (20%) opinions towards the use of AI. Only a small portion of the participants recognised the potential for the expansion of artificial intelligence technology to increase the effectiveness of our economy, despite the fact that this technology is still in its early stages of development.

## 4. Conclusion

One significant finding is the extensive use of AI in the current economic system. The study also found that people who were worried about artificial intelligence potentially replacing occupations were less engaged with AI at work, and that advanced technology applied in organisations with initiative training had reduced fear of replacement. The data gathered from the qualitative survey, which covered subjects including using AI in the modern economy and evaluating AI implementations, has strengthened the literature analysis. The literature research and survey show that participants experienced and saw the reinforcement of AI functions in some organisational processes. Given the quick development of AI, the findings on participants' worries about replacement were also anticipated. The study verified what had already been hypothesised: people were concerned about the impending changes. New hires will require a variety of skill sets and training to be able to adapt to AI-enabled applications as technology continues to change the employment market. People have already observed and used AI in a wide range of industries; it is only a matter of time before AI's capabilities increase.

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