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One Day National Conference on
**Robotics & the Future of Work:
Possibility, Feasibility and Economic Reality**

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This is to certify that Dr./Mr./Ms. K. SURESH BABU,
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INTELLIGENCE ON ECONOMY

the **One Day National Conference on "Robotics & the Future of Work: Possibility, Feasibility and Economic Reality"** organized by the Department of Economics (SF), PSG College of Arts & Science, Coimbatore on **11.03.2025**.

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Robotics & The Future of Work: Possibility, Feasibility, and Economic Reality explores how robotics, artificial intelligence, and automation are transforming modern workspaces, industries, and economies. The book examines emerging trends in the gig economy, industrial production, education, agriculture, and retail sectors, shedding light on both opportunities and disruptions caused by technology. It addresses vital concerns like employment displacement, skill development, and policy responses while considering global shifts and India's path toward sustainable and inclusive growth.

This edited volume offers a comprehensive and multidisciplinary perspective from experts, academics, and practitioners on the economic, social, and technological dimensions of automation. Chapters delve into human-robot collaboration, digital innovation, sustainable automation, AI in governance, and challenges in legal and labor frameworks. The book balances optimism with realism, offering insights for navigating an automated future. It serves as a valuable resource for policymakers, researchers, entrepreneurs, and students seeking to understand and shape the future of work.



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Possibility, Feasibility, and Economic Reality

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An Impact of Artificial Intelligence on Economy

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Abstract

Rapid advancements in artificial intelligence (AI) will have a dramatic impact on the global economy. This paper provides a systematic review of the economic impact of AI, focusing on the promotion of AI on productivity and economic growth; the impact of AI on labor employment; and the question of whether AI will increase income inequality. On this basis, a summary of how to implement public policies to reduce the potential negative impacts of AI on the employment structure and income inequality is provided. Finally, a summary and prospective research directions are provided.

Keywords: Artificial Intelligence; Economic Growth; Employment; Inequality of Income

Introduction

The influence of technical advancement on the economy has long been one of economists' primary concerns. Every major technology advancement throughout history has been accompanied by a tremendous rise in productivity. Recently, with the advancement of artificial intelligence (AI), the academic community has taken a renewed interest in the influence of AI on the economy. Since the 1940s and 1950s, AI research has increased, and the 1956 Dartmouth Conference, hosted by Dr. John McCarthy and others, is regarded as the beginning of the area of AI. The term "AI" was explicitly introduced for the first time during the meeting. Dr. McCarthy defined AI as "the science and engineering of making intelligent machines" in 1955. Recent advancements in big data, technology, and algorithms have ushered in a new apex of development for AI. AI is expected to develop faster in the future, which will lead to big scientific and technological breakthroughs and have a bigger and deeper effect on the economy and human society. Studies on AI's implications for the economy, income inequality, employment, and other themes continue to grow as AI continues to affect every aspect of the present and future economies and societies. In addition, the effect of AI or deep learning technology development on the spread of economic ideas and other

essential themes was examined. Studying how AI affects the economy can help us understand the pros and cons of its growth. This will let us make good public policies to deal with any possible threats.

The Impact of AI on Productivity and Economic Growth

AI is a significant advance in science and technology, and it is widely believed that AI will boost productivity and economic growth. Brynjolfsson and McAfee predicted that the second machine revolution based on AI and the digital revolution, which will achieve extraordinary technical advancement (2). A 2016 report by Accenture consulting firm viewed AI as a new factor of production, noting that AI will promote economic growth in at least three ways: first, AI can automate complex physical tasks, a phenomenon known as “intelligent automation; second, AI can supplement existing labor and assets, enhancing worker capabilities and capital efficiency; and third, AI can promote innovation and spread across industries. In recent years, much theoretical and empirical research has focused on the role of AI in fostering economic expansion. Under the assumption that inputs of production elements such as capital and labor stay fixed, productivity affects the pace of economic growth. In the literature, it is a measure of both technical advancement and economic efficiency. Typical indicators.

Is AI on Its Way to the Singularity?

AI may be distinct from other technical developments in economic history. Deep learning has brought about a fundamental shift in computing since the first technological revolution. In the past, computer programs recorded human knowledge sequentially, changing input into output based on human assumptions. Using massive datasets, however, deep learning can comprehend this mapping process on its own. This technology has enabled robots to make enormous strides in perception and cognition, both of which are required for the majority of human occupations. Given the fast growth of AI, some academics have begun to question whether the singularity will occur. In the 1960s, Good developed the singularity theory, which states that self-improving AI might soon transcend human cognition, resulting in an explosion of intellect that brings limitless knowledge in a finite amount of time. According to Kurzweil, the technological singularity may occur around 2045, if progress continues at the current rate. Economists, on the other hand, are concerned about the occurrence of the economic singularity – that is, the crossing of a threshold by the rapid development of AI, after which economic growth would increase at an unprecedented rate.

Different academics have divergent opinions on whether and when the singularity will occur. According to conventional knowledge, exponential

expansion is unsustainable since it demands finite resources. However, if the expansion is primarily represented in the realms of knowledge, culture, or pure value, economic growth does not necessarily have a ceiling. Consequently, some fear that the evolution of AI may approach a singularity in the future. Aghion et al. considered how the development of AI could drive the growth explosion and pointed out the path of rapid growth or singularity that the automation brought by AI could bring, but also proposed some bottlenecks that would limit the emergence of singularity, such as limitations on the level of automation, and limitations on finding new ideas. Nordhaus incorporated the singularity theory into the economic development model, concentrating on important input factors such as salaries, productivity growth, pricing, intellectual property goods, and R & D, among others, and offered seven tests to determine if we are now in a singularity. Considering the singularity, such as the increase in the share of intellectual property goods in the capital stock, these tests eventually indicate that the singularity is still a long way off. Upchurch and Moore feel it is still uncertain if the singularity will occur, and they identify other criteria that restrict the singularity's occurrence. First, from a technological standpoint, it is extremely difficult to construct sentient, human-like robots. Second, the societal fear of unemployment may impede wider acceptance of technology. In addition, manufacturing in the real economy is the required gear and software are not infinitely available, and there will be limitations on scientific advancement at a certain time. The preceding research examined whether AI would progress towards singularity, but no consensus has been reached. Exploring the prospect of the singularity remains a future research direction.

The Impact of AI on Workforce Employment

The growth of AI will lead to a progressive decrease in the price of automation, resulting in the replacement of human labor with machines. In reality, technical improvements leading to the replacement of human labor by robots are not a new issue. Since the onset of industrialization in the late 18th century, numerous economists have conducted constant and in-depth studies on this topic, examining whether technological advancement promotes or diminishes employment. According to available research, technological advancement may have both a negative inhibiting effect and a positive creating effect on employment. On the one hand, technological advancement enhances labor productivity and substitutes a portion of labor, consequently diminishing job chances. For example, Schumpeter proposed that while technological innovation and productivity improvements will cause a temporary increase in demand for the main factors used to produce new products, the saving effect of process innovation will result in a decline in labor

demand and an increase in unemployment. In contrast, technical growth also generates employment opportunities through capitalization effects. Accordingly, the cost of employment prospects brought about by capitalization has already been incurred, and the faster technical advancement, the lower the effective discount rate of future earnings and the greater the present value of profits. In order to maximize earnings, businesses will extend their manufacturing scale and provide additional employment opportunities. The scholarly community cannot agree on which of the two afore mentioned consequences is more significant. Automation and technological advancement have not displaced more workers over the past two centuries, and while unemployment has changed cyclically, there is little evidence to suggest a long-term increase in unemployment due to technological advancement.

AI is comparable to earlier technology revolutions in that it liberates human labor and considerably increases productivity. In addition, AI has several new functions. The primary distinction between AI and earlier technology revolutions is its pace, scope, and depth. The advancement of machine learning has made it possible to computerize manufacturing processes by transforming previously non-routine tasks into routine ones. Brains are beginning to be replaced by machines. It is not simply a machine that augments human capabilities, and not just complements human labor but also has the potential to replace human labor in an entirely new way, which will impact numerous vocations that have not been impacted by technology previously. The development of AI has permitted the replacement of labor at an unprecedented rate and scale. Current research on the influence of AI on the labor market focuses mostly on three aspects: the risk of job automation; the impact of AI on employment as a whole; and the impact of AI on the employment structure.

The Risk of Job Automation

As the price of computers continues to decline, computers continue to replace ordinary activities, and a growing number of jobs are automated. Currently, AI development is advancing, and automated occupations are no longer restricted to regular activities; more jobs may be automated. Numerous researchers have examined the dangers of job automation in various nations and industries.

AI and Work-Life Balance

Most available theoretical models predict that computers or automation will primarily influence the job market via two channels: Computers may augment human labor and increase the efficiency of some types of work performed by the work force. In addition to this assumption, using task-based

models, they found that automation will reduce the number of jobs in traditional jobs, but the creation of new jobs will lead to more jobs.

The aforementioned theoretical literature on the influence of AI on employment uses economic models to qualitatively explain the mechanism and effect of AI on labor employment, whereas empirical research quantitatively analyzes the effect of AI on labor employment using historical data. Existing empirical research on how AI affects jobs mostly looks at how AI affects certain fields, like industrial robotics or computing capital.

IFR data is utilized in the majority of research from the standpoint of industrial robots. The IFR offers information on the usage of industrial robots in 50 countries from 1993 to 2014, representing about 90% of the market for industrial robots. Using IFR panel data from 17 countries between 1993 and 2007, Graetz found no significant influence of industrial robots on overall employment (20). Using the IFR and EU KLEMS (European Union Capital, Labor, Energy, Materials, and Services) datasets, Acemoglu & Restrepo analyzed the impact of increased robot use on the local U.S. labor market between 1990 and 2007 and found that the use of robots will indeed reduce employment, and adding one robot per thousand people will reduce the employment-population ratio by about 0.18% to 0.34% (18). However, Dauth et al. conducted a study using IFR data in Germany from 1994 to 2014 and discovered that the use of robots did not result in overall job losses but rather altered the composition of German employment, i.e., while robot use decreased manufacturing employment, it increased employment in the service sector.

The Impact of AI on the Employment Structure of the Workforce

Although the influence of AI on employment as a whole is unknown, it is undeniable that the impact of AI on employees in various industries or with different abilities varies. Numerous academics have stressed the necessity for vigilance over the job polarization caused by AI and automation. Employment polarization, the displacement of intermediate-skilled employees by AI or computerization, is the most severe problem, although employment has expanded in both high-skilled industries and low-skilled service industries. There is substantial evidence that employment polarization has formed in the labor markets of several nations. Autor et al. performed study and provided explanations for the causes of employment polarization. They identify two main groups of tasks that are challenging to automate. One is abstract work, typically in professional, technical, or administrative roles, requiring problem-solving, intuition, creativity, and persuasion. The other is manual labor, which often requires environmental adaptation, visual or verbal awareness, and interpersonal skills. Polarization of employment happens because these two

sorts of professions are often dispersed at different extremes of the skill spectrum.

The Impact of AI on Income Inequality

In addition to encouraging economic development and generating greater wealth, a significant number of economists have raised the alarm about the potential increase in income inequality brought about by AI and automation. For instance, Autor noted that if technology renders a segment of the labor force superfluous, then distribution, rather than scarcity, would be our primary economic challenge (24). There are several ways in which AI influences economic inequality. Berg and colleagues found that the current growth in inequality is mostly due to two factors: as robotics become less expensive, production per son will increase, and as a result, the capital share of total income will rise. Moreover, productivity Wages for skilled work and skilled labor will progressively increase, while wages for low-skilled labor will decline and the pay disparity will deepen. Multiple factors, including the degree of complementarity between skilled individuals and robots, will determine the magnitude of inequality. Numerous studies examine the process and effect of AI or automation on income inequality from two perspectives: the reduction of the labor income share, the increase in the capital income share, and the expansion of labor pay disparity.

The Impact of AI on Capital and Labor Income Shares

In reality, the capital distribution is more unequal than the labor distribution. The majority of capital is frequently held by a small number of individuals. The growth of AI and automation will raise the proportion of capital components in the production process and capital returns, leading to an increase in income inequality.

The Impact of AI on Income Inequality across Labor Markets

While AI has an influence on the employment of low-and medium-skilled workers, it will also have a detrimental impact on their relative pay share. Incorporated automation capital as a factor of production into the endogenous economic growth model, assumed that low-skilled workers are more likely to be automated than high-skilled workers, and analyzed the impact of automation on the wages of low-skilled and high-skilled workers. Automation decreases the actual earnings of low-skilled laborers, thus raising the skill premium and income inequality. Acemoglu and Autor discovered that the positions and earnings of the middle class are steadily declining, and that pay polarization is followed by job polarization. Suggested that as the usage of industrial robots increases, intermediate-skilled workers will experience

significant income losses. Nevertheless, these losses will not result from job loss or replacement, but rather from a fall in existing employment earnings.

Relevant Suggestions for Public Policy to Lessen the Impact of AI on the Job Market

AI will increase both productivity and economic growth. However, some academics are concerned that AI may cause unemployment among low- and middle-skilled employees and raise economic inequality. For political considerations, the adoption and development of AI technology may be hindered or even prevented if a means of creating shared wealth cannot be identified. Therefore, the role of public policy in mitigating the potential negative effects of AI on the job market and preserving the general social welfare has been a topic of debate among several academics. In the past, the changes brought about by the technological revolution allowed humans sufficient time to adapt and achieve a balance between labor supply and demand. However, the changes brought about by AI are significantly more rapid and extensive than those brought about by the technological revolution. Because of this, it is even more important for the government to come up with the right policies to deal with the effects of AI on the job market.

Implement a Universal Basic Income Policy

Implementing a “Universal Basic Income” (UBI) policy is an effective response to the surge of automation induced by AI and robotics. The concept of a universal basic income, in which all citizens receive regular, unconditional payments from the government, is not novel. Friedman introduced the concept of “negative income tax” in his 1962 book, “Capitalism and Freedom” (46), which proposes that the government replace the present welfare system with a negative income tax and punish households with incomes beyond a specific threshold. Since then, this plan has evolved into a policy for a universal basic income. A key advantage of the universal basic income policy compared to other welfare systems is that it provides all citizens with a fixed amount of unconditional transfer payments, which may be used for any purpose. Automation will provide immense wealth and value for society as a whole, but a universal basic income policy can ensure that everyone achieves a suitable quality of life, even if they are not employed. The amount of UBI is usually set in a moderate way, and it could be set at or below the poverty level.

Tax on Robots

Massive investments are required to improve low- and middle-skilled workforce training as well as to establish a universal basic income program. Since the majority of the U.S. government’s revenue comes from employees

under the existing tax system, the growth of automation technologies would drastically cut tax revenue, making it harder to achieve the above two policies. They claim that there should be “neutrality” between the taxes of robots and human labor, that automation should be taxed similarly to human labor, and that there should be no automation deductions. The falling cost of machine capital allows machine capital to increasingly replace labor in manufacturing, which is the primary route via which automation or AI influences employment and earnings. By charging robots, the introduction of automation will be slowed, allowing employees time to shift to alternative vocations. This part of the income can also be used to help employees and raise money for a universal basic income.

Conclusions

First, the studies addresses the influence route of AI on economic development by the use of neoclassical growth models or task-based models, or through empirical study to verify the effect of AI on economic growth, although it remains uncertain whether AI will go toward singularity. Scholars have pointed out that AI will produce some new jobs while causing labor substitution, but they have not reached an agreement as to whether the impact is dominant; it may depend on market conditions. In addition, the majority of the available literature asserts that the decrease in automation costs would raise short-term income inequality, mostly through the two channels of a drop in the labor income share and a rise in the wage gap between various labor groups. On this premise, various sources argue that it is crucial to establish appropriate public policies to handle the possibility of AI-caused job loss. Experts have suggested policies like improving the education and training of the work force, putting in place a universal basic income policy, and taxing robots as a way to deal with the possible bad effects of AI on an employment and economic inequality. The economic effect of AI is an essential subject. We must recognize that AI technology is still in its early stages of development and spread, and that there is a significant deal of uncertainty regarding its influence on future economic growth, employment scale and structure, and income inequality. It is anticipated that in the future, more scholars will strengthen research on the impact of AI on the economy, discuss how to formulate optimal policies to mitigate the enormous impact caused by technological changes, and ensure that society as a whole enjoys the benefits brought by AI, so as to assist individuals in effectively coping with the impact of AI.

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