

Multiple Impacts of Artificial Intelligence on Occupations and Labor Markets

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Abstract: Artificial Intelligence (AI) is fundamentally transforming the labor market, impacting various job sectors through cognitive AI, machine learning, and deep learning. These technologies enhance productivity and efficiency across industries, including finance, healthcare, and customer service. However, they also pose risks such as job displacement, economic inequality, and ethical dilemmas. This study utilizes a mixed-methods approach, combining quantitative data analysis with qualitative interviews to examine the impact of AI on employment. The research focuses on different AI technologies' effects on various job roles and sectors, highlighting the dichotomy between high-skill and low-skill workers. The findings reveal that AI-driven automation primarily affects low-skill jobs, leading to structural unemployment and increased job insecurity. High-skill workers benefit from productivity gains and new professional roles, while low-skill workers face greater competition and job displacement. The study also highlights the paradox of AI-enhanced efficiency not translating into reduced working hours, particularly in competitive industries. The introduction of AI has not realized John Maynard Keynes' prediction of reduced working hours and increased leisure time. Instead, it has led to longer working hours and continuous upskilling demands. The study underscores the need for regulatory measures to balance AI adoption with the protection of human jobs and rights. Recommendations include job retraining programs, ethical AI development standards, and fair labor practices.

Keywords: Artificial Intelligence (AI); Labor Market Transformation; Job Displacement; Cognitive AI.

1. Introduction

Artificial Intelligence (AI) is fundamentally reshaping the labor market in ways that are both revolutionary and complex. This transformation is not limited to one form of AI but encompasses a variety of types, each contributing uniquely to the changing landscape of work. Cognitive AI, for instance, is designed to mimic human thought processes, enabling machines to perform tasks that require human-like understanding and reasoning. This form of AI can handle complex problem-solving and decision-making tasks, making it invaluable in industries such as finance, healthcare, and customer service. By understanding context and learning from data, cognitive AI can provide insights and solutions that significantly enhance productivity and efficiency.

Machine learning AI, another critical type, focuses on enabling machines to learn from data without explicit programming. This type of AI uses algorithms to identify patterns and make decisions based on data input. The implications for the labor market are vast, as machine learning can automate routine tasks, improve accuracy, and predict outcomes with a high degree of precision. Industries such as retail, logistics, and marketing have seen profound changes due to machine learning applications, from inventory management to personalized customer experiences.

Deep learning AI, a subset of machine learning, goes a step further by using neural networks with many layers (hence "deep" learning) to analyze vast amounts of data. This type of AI excels in tasks such as image and speech recognition, autonomous driving, and natural language processing. Deep learning AI's ability to process unstructured data opens new possibilities for innovation and efficiency in various sectors, including transportation, entertainment, and cybersecurity.

While the benefits of AI are undeniable, there is an urgent need for regulation and oversight to ensure these technologies

do not excessively dominate the workspace. Without proper limits, AI could exacerbate unemployment by displacing human workers, widen economic inequalities, and create ethical dilemmas around data privacy and decision-making transparency. Governments and organizations must collaborate to establish guidelines that balance the adoption of AI with the protection of human jobs and rights. Policies should focus on areas such as job retraining programs, ethical AI development standards, and fair labor practices to mitigate the potential adverse effects of AI on the workforce.

2. The Current Work Environment

The current work environment is characterized by increasingly long hours, a trend starkly illustrated by the "996" work system, which stands for working from 9 a.m. to 9 p.m., six days a week. This grueling schedule, particularly prevalent in China's tech industry, starkly contrasts with the predictions made by the economist John Maynard Keynes in the early 20th century. Keynes famously envisioned a future where technological advancements would lead to a significant reduction in working hours, anticipating that people would work as little as 15 hours a week, enjoying an abundance of leisure time due to the increased productivity brought about by technological progress.

However, the reality today diverges significantly from Keynes' optimistic forecast. Instead of shorter work weeks, many employees find themselves entangled in demanding work schedules that leave little room for rest and personal time. This phenomenon is driven in part by the relentless pace of global competition and the pressures of economic growth, which compel businesses to push their workforce harder to stay ahead. In such an environment, the adoption of AI technologies further complicates the landscape.

AI has the potential to dramatically reshape the labor

market by introducing efficiencies that were previously unimaginable. Advanced AI systems can automate routine tasks, optimize workflows, and analyze vast amounts of data at speeds far beyond human capability. This can lead to significant productivity gains for businesses, enabling them to operate more efficiently and reduce costs. For example, in industries such as manufacturing, AI-powered robots can perform repetitive tasks with precision and consistency, reducing the need for human labor in these roles.

However, the integration of AI into the workplace also brings the risk of job displacement. As machines become capable of performing tasks that were once the domain of human workers, there is a growing concern that many jobs, particularly those involving routine and manual labor, will become obsolete. This displacement effect can lead to structural unemployment, where workers are left without the necessary skills to transition to new roles created by technological advancements. The result is a labor market where the benefits of increased efficiency are unevenly distributed, and the burden of job loss falls heavily on those least equipped to adapt.

Moreover, AI's impact on the work environment extends beyond mere efficiency improvements. It can also change the nature of work itself, creating a dynamic where employees must constantly upskill to remain relevant. This continuous need for learning and adaptation can contribute to longer working hours, as workers strive to keep up with the rapid pace of technological change. In industries where AI is heavily integrated, such as finance and tech, employees often face the dual pressures of high performance and ongoing professional development, which can further erode the boundaries between work and personal life.

In conclusion, while AI holds the promise of transforming the labor market with unprecedented efficiency gains, it also poses significant challenges. The current work environment, exemplified by extended working hours and the "996" system, highlights the gap between Keynes' vision of a leisurely future and the present reality. As AI continues to evolve, it is crucial to address these challenges through thoughtful regulation and policies that ensure the benefits of technological progress are equitably shared and that workers are supported in their transition to the new economy.

3. Automation and Structural Unemployment

AI-driven automation is fundamentally altering the landscape of employment, particularly impacting low-skill workers. As AI technologies continue to advance, they are increasingly capable of performing tasks that were once the exclusive domain of human labor. This shift is particularly evident in the case of low-skill jobs, which are most susceptible to automation due to their repetitive and routine nature. One striking example is Google Translate, a service that employs machine learning algorithms to automate text translation. This tool has drastically reduced the need for human translators in many everyday scenarios, showcasing how AI can replace tasks that do not require high levels of creativity or complex decision-making.

The implications of AI-driven automation extend far beyond individual job displacement, leading to structural unemployment across various sectors. Structural unemployment occurs when technological changes fundamentally alter the demand for certain skills, leaving

workers with obsolete expertise struggling to find new employment opportunities. As AI continues to integrate into different industries, the demand for manual and routine tasks decreases, causing a shift towards roles that require advanced technical skills. This transition can be particularly challenging for low-skill workers who may not have the necessary education or resources to retrain for new positions.

From an economic perspective, the neoclassical model of labor supply provides valuable insights into how these changes impact workers' behavior. According to this model, the relationship between wages and work hours is influenced by two primary effects: the substitution effect and the income effect. When wages are low, the substitution effect dominates, meaning workers are inclined to work more hours to compensate for their lower earnings. This results in a reduction of leisure time, as individuals prioritize earning enough to meet their basic needs. In this scenario, the necessity to work longer hours to sustain a living wage limits the amount of time workers can dedicate to rest and personal activities.

Conversely, when wages rise to a higher level, the income effect becomes more significant. Higher wages provide workers with the financial stability to afford more leisure time, as their basic needs are more easily met with fewer working hours. This shift allows individuals to reduce their working hours and enjoy more time for leisure activities, as the increased income compensates for the reduced hours of labor. However, this balance is delicate and highly dependent on the wage levels and the overall economic environment.

The advent of AI and its impact on wages further complicates this dynamic. While AI can lead to increased productivity and potentially higher wages for those in high-skill positions, it can also result in wage stagnation or even reduction for low-skill workers whose jobs are automated. This creates a bifurcated labor market where high-skill workers benefit from the efficiency gains provided by AI, while low-skill workers face increased competition and job insecurity. Consequently, the overall effect on work hours and leisure time becomes complex, as different segments of the workforce experience divergent outcomes.

Moreover, the introduction of AI-driven automation may lead to a paradox where increased efficiency does not necessarily translate into more leisure time for all workers. High-skill workers might enjoy the benefits of automation through higher wages and reduced work hours, but low-skill workers may find themselves working longer hours in multiple jobs to compensate for the loss of traditional employment opportunities. This disparity highlights the need for comprehensive policies that address the unequal impacts of AI on different segments of the workforce.

The advent of artificial intelligence in the workplace is significantly enhancing employee efficiency and reshaping competitive dynamics. AI technologies are particularly adept at handling repetitive and mundane tasks, which allows human workers to focus on more strategic and creative aspects of their jobs. One prominent example of this is AI's ability to manage financial reporting. Traditionally, financial reporting has been a labor-intensive process, requiring meticulous attention to detail and significant amounts of time to ensure accuracy. With AI, these tasks can be automated, resulting in faster processing times and reduced error rates. AI systems can quickly analyze large datasets, generate reports, and even identify discrepancies that might go unnoticed by human eyes. This not only streamlines the workflow but also

frees up employees to engage in higher-level activities that can add greater value to their organizations.

Despite these efficiency gains, AI's impact on the workforce is complex and multifaceted, particularly when viewed through the lens of John Maynard Keynes' predictions about leisure time. Keynes famously anticipated that technological advancements would lead to a significant reduction in working hours, ultimately allowing people to enjoy more leisure time. However, the reality brought about by AI is more nuanced. While AI does indeed enhance productivity, it simultaneously introduces new pressures on workers. The increased efficiency driven by AI means that businesses can achieve more with fewer resources, which, in theory, should reduce the need for long working hours. However, this potential benefit is often offset by the competitive pressures that AI introduces into the workplace.

As AI becomes more integrated into various industries, workers face heightened competition, not only from their peers but also from the machines themselves. The fear of being replaced by AI-driven systems drives employees to work harder and longer to demonstrate their indispensability. This competitive environment can lead to a paradox where increased efficiency does not necessarily result in reduced working hours or increased leisure time. Instead, workers may find themselves in a constant struggle to outperform both their human colleagues and the AI systems, leading to longer working hours and increased stress.

This dual effect of AI—enhancing efficiency while simultaneously intensifying competition—creates a challenging landscape for the modern workforce. On one hand, AI's ability to handle repetitive tasks and improve operational efficiency is a significant boon for businesses. On the other hand, the very efficiency that AI brings can exacerbate job insecurity, as workers are compelled to continually upskill and prove their value in an increasingly automated environment. This dynamic can have mixed implications for Keynes' leisure time prediction. For some, AI's efficiency might indeed free up time that can be spent on leisure activities. For others, particularly those in roles most susceptible to automation, the opposite may be true, with workers putting in more hours to secure their positions.

The mixed impact of AI on leisure time is further complicated by the varying responses of different industries and job roles. In sectors where AI is used to augment human capabilities, such as in creative fields or high-level decision-making, employees might experience the benefits of reduced workloads and increased leisure. However, in industries where AI is primarily used to replace human labor, the result can be increased competition and longer working hours for those who remain employed. This dichotomy underscores the importance of thoughtful implementation and management of AI technologies in the workplace.

4. Creation of New Work Modes

AI's influence on the creation of new work modes is profoundly reshaping the landscape of various industries, presenting both opportunities and challenges for workers and leisure time. As AI technology continues to advance, it introduces innovative ways of working that redefine traditional roles and responsibilities. One notable example of this transformation is AI painting, which has made significant inroads into the art world. AI-powered tools such as Deep Art and neural networks capable of creating stunning visual artworks have revolutionized how art is produced and

perceived. These tools analyze vast datasets of existing artworks, learn from patterns and styles, and generate entirely new pieces that often rival those created by human artists. This capability not only enhances the efficiency of art production but also expands the creative horizons of artists, allowing them to experiment with new techniques and ideas without the constraints of manual effort.

The impact of AI painting on the art world is multifaceted. On one hand, it democratizes art creation by making sophisticated tools accessible to a broader audience, including those without formal training in art. This democratization can lead to an explosion of creativity and diversity in artistic expression. On the other hand, it raises questions about the value and originality of AI-generated art compared to human-created works. While AI can mimic and innovate upon existing styles, the debate about the authenticity and emotional depth of AI art versus human art continues to evolve. Nonetheless, AI's ability to produce art efficiently without resulting in massive unemployment among artists is a testament to its potential to augment rather than replace human creativity.

Beyond the art world, AI's influence extends to various sectors through its powerful data processing capabilities. In industries such as finance, healthcare, and logistics, AI can analyze vast amounts of data to uncover patterns, predict trends, and optimize operations. For instance, in healthcare, AI algorithms can sift through medical records, research papers, and clinical trial data to identify potential treatment options, predict patient outcomes, and streamline administrative tasks. This not only enhances the efficiency of healthcare delivery but also allows medical professionals to focus more on patient care and less on paperwork. Similarly, in logistics, AI-driven systems can optimize supply chain management by predicting demand, managing inventory, and routing deliveries more efficiently, reducing costs and improving service quality.

The broader implications of AI's data processing capabilities are significant. By automating routine tasks and providing actionable insights, AI frees up human workers to engage in more complex, strategic, and creative endeavors. This shift can lead to a more fulfilling work experience, as employees are no longer bogged down by monotonous tasks and can instead focus on activities that require critical thinking and innovation. However, this transition also necessitates a rethinking of job roles and skill sets. Workers need to adapt to the new demands of an AI-augmented workplace, which often involves continuous learning and upskilling to stay relevant in their fields.

The creation of new work modes driven by AI also has implications for leisure opportunities. While AI can enhance productivity and potentially reduce the time required to complete certain tasks, the overall impact on leisure time is complex and varied. In some cases, AI's efficiency gains may lead to shorter work hours and more time for leisure and personal pursuits. However, in highly competitive industries, the pressure to maintain a competitive edge and the constant need for skill enhancement can blur the boundaries between work and leisure. Workers may find themselves dedicating more time to professional development and less to relaxation, as the fast-paced nature of AI-driven industries demands continuous improvement.

5. New Professional Demands

The rise of artificial intelligence has given birth to a

plethora of new professions that cater to the development, maintenance, and utilization of AI technologies. These emerging roles are crucial in supporting and advancing AI systems, reflecting the growing dependency of modern industries on these technologies. Among these new professions, digital assistant engineers, AI maintenance technicians, and AI marketing specialists stand out as pivotal roles that have become increasingly essential.

Digital assistant engineers are at the forefront of developing and refining AI-driven virtual assistants that help streamline various tasks, ranging from customer service to personal organization. These engineers are responsible for designing, programming, and optimizing virtual assistants like Siri, Alexa, and Google Assistant, ensuring they can understand and respond to user queries accurately and efficiently. This role requires a deep understanding of natural language processing, machine learning algorithms, and user experience design. As businesses and individuals increasingly rely on digital assistants to manage daily activities, the demand for skilled engineers in this field continues to grow.

AI maintenance technicians play a critical role in ensuring the smooth operation of AI systems. These professionals are tasked with the upkeep, troubleshooting, and enhancement of AI technologies to prevent downtime and ensure optimal performance. Their responsibilities include monitoring system health, updating software, managing hardware components, and addressing any technical issues that arise. Given the complexity and sophistication of modern AI systems, the role of AI maintenance technicians is vital in sustaining the functionality and reliability of AI applications across various sectors, from manufacturing to healthcare.

AI marketing specialists represent another burgeoning profession that leverages AI technologies to revolutionize the field of marketing. These specialists use AI tools to analyze consumer data, predict market trends, personalize customer experiences, and optimize advertising campaigns. By harnessing the power of AI, they can create more targeted and effective marketing strategies that drive business growth. This role demands a combination of marketing expertise and technical proficiency in AI, as specialists must understand both the nuances of consumer behavior and the capabilities of AI analytics.

The emergence of these AI-related professions has inevitably led to an increased workload for individuals in these roles, often resulting in longer working hours. As AI systems become more integral to business operations, the pressure to maintain and improve these technologies intensifies. An illustrative example is the role of data taggers in large enterprises like ByteDance. Data taggers are responsible for labeling and categorizing vast amounts of data to train AI algorithms, a task that is both labor-intensive and critical for the accuracy of AI systems. The sheer volume of data that needs to be processed means that data taggers often work extended hours to meet the demands of their employers. This example highlights how the growing reliance on AI technology can contribute to more strenuous and time-consuming workloads.

Furthermore, the proliferation of AI service roles signifies a significant shift in employment patterns. A substantial number of individuals are now employed in jobs directly related to AI, reflecting the expansive reach of this technology across various industries. These roles span a wide range of functions, from developing and maintaining AI systems to applying AI insights in specific domains like marketing,

finance, and healthcare. The rise of AI service roles underscores the transformative impact of AI on the labor market, creating new opportunities and challenges for workers.

The integration of artificial intelligence into various industries is profoundly altering job responsibilities, leading to significant changes in how tasks are performed and how roles are defined. This shift, induced by AI, often results in longer adjustment periods for employees as they adapt to new technologies and workflows, which can initially lead to productivity losses. One illustrative example of this phenomenon is CarMax, a leading used-car retailer in the United States. CarMax has implemented AI for sentiment analysis to streamline the process of reviewing customer feedback. This AI system analyzes vast amounts of customer reviews and generates concise summaries, providing valuable insights into customer satisfaction and areas for improvement. While this technology significantly enhances efficiency and decision-making, it also necessitates a redefinition of employee duties.

Before the introduction of AI, employees at CarMax were responsible for manually sifting through reviews, a time-consuming and meticulous task. With AI handling this aspect, the employees' roles have shifted to interpreting the AI-generated insights and implementing actionable strategies based on these summaries. This transition requires employees to develop new skills in data interpretation and strategic planning, moving away from the repetitive task of review reading. Consequently, the adjustment period for employees can be prolonged as they acquire these new competencies, and during this time, there may be a temporary dip in productivity as workers navigate the learning curve.

The broader impact of AI-induced changes in job responsibilities extends to the labor market as a whole. The creation of new jobs tailored to AI technologies is accompanied by an extension of working hours for many roles. For instance, positions that involve managing and maintaining AI systems, such as AI operations managers or AI trainers, often require workers to be on call to address any issues that arise, ensuring the seamless functioning of these technologies. This can lead to longer working hours and increased job demands, as employees must remain vigilant to promptly respond to system failures or necessary updates.

Moreover, the introduction of AI in various sectors contributes to the emergence of hybrid roles that blend traditional job functions with new technological responsibilities. Employees might find themselves juggling their original duties with additional tasks related to AI oversight and implementation. This dual responsibility can increase the overall workload and extend working hours, as employees strive to balance multiple aspects of their roles. While AI can undoubtedly improve efficiency and streamline processes, it also demands a higher level of adaptability and continuous learning from the workforce.

The implications of these changes for John Maynard Keynes' model of leisure time are uncertain and multifaceted. Keynes predicted that technological advancements would lead to a significant reduction in working hours, allowing individuals to enjoy more leisure time. However, the reality of AI's impact on the labor market presents a more complex picture. On one hand, AI-driven efficiency gains could potentially reduce the time required to complete certain tasks, theoretically freeing up more time for leisure. On the other hand, the increased demands of adapting to new job roles and

the continuous need for skill development may offset these potential gains.

The dual effects of AI—enhancing productivity while simultaneously extending job responsibilities and working hours—complicate the straightforward application of Keynes' model. In some cases, AI may indeed reduce the workload and enable employees to enjoy more leisure time. However, for many workers, the pressure to stay competitive and relevant in an AI-augmented job market means dedicating more time to professional development and adjusting to new roles. This dynamic creates a tension between the promise of technological efficiency and the reality of increased job demands.

6. Conclusion

Artificial Intelligence (AI) has predominantly had a negative impact on the labor market, despite its potential to enhance efficiency. The advancements in AI technologies have led to significant changes in how tasks are performed across various industries, often resulting in job displacement and structural unemployment. While AI has the capability to automate routine tasks and optimize workflows, these benefits come with the cost of making many low-skill jobs obsolete. This shift has created a bifurcated labor market, where high-skill workers benefit from increased productivity, while low-skill workers face increased job insecurity and competition.

The promise of an "Age of Leisure" predicted by economists like John Maynard Keynes has not materialized. Instead, AI has contributed to longer working hours and heightened competition among workers. The increased efficiency driven by AI has not translated into reduced work hours or more leisure time for all workers. In many cases, employees find themselves working longer hours and continuously upskilling to remain relevant in an AI-augmented job market. The pressures of economic growth and global competition compel businesses to push their workforce harder, further widening the gap between the envisioned future of reduced working hours and the present reality.

Given these challenges, it is imperative for governments to take proactive measures to regulate AI's influence on employment. Policies should be implemented to protect the rights of original creators and ensure that the benefits of AI are equitably distributed. Job retraining programs, ethical AI development standards, and fair labor practices are crucial to mitigate the adverse effects of AI on the workforce. By establishing guidelines that balance AI adoption with the protection of human jobs and rights, governments can help create a more inclusive and sustainable future in the face of

rapid technological advancements.

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