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Impact of AI and automation on jobs

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Abstract

The global workforce is changing as a result of the rapid advancements in automation and artificial intelligence (AI), which present both benefits and difficulties. This study explores the various ways that technology and artificial intelligence (AI) are changing the job market, generating new job categories, and replacing certain old ones. Automation and artificial intelligence (AI) are driving innovation, productivity, and efficiency across a wide range of sectors, including manufacturing, healthcare, finance, and retail. However, these advantages come at the expense of a large labor displacement, especially for repetitive and regular jobs. This chapter examines the combined effects of automation and artificial intelligence, emphasizing the industries most impacted by these changes in technology. For example, the usage of robots and AI-driven systems in manufacturing has increased, which has resulted in the displacement of assembly line workers but also increased the need for highly qualified technicians and AI specialists. AI-driven catboats and automated customer care platforms are transforming client interactions in the service sector, eliminating the need for human intervention while necessitating new skills in AI management. The socioeconomic effects of these developments are also discussed in the research, with special attention to the growing skills gap and the necessity of reskilling and upskilling the labor force. This chapter offers a detailed perspective on the influence of AI and automation on jobs through an in-depth analysis of the literature and case studies, providing insights into strategies for developing an inclusive and resilient workforce in the age of AI.

Keywords: Artificial Intelligence, AI, Automation, Impact of AI, Job market.

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Introduction

Engagement with machines is far from a novel phenomenon in our contemporary era. Each professional role now demands a certain level of expertise with technological instruments. The discourse on the influence of technology on human labor is a subject of vigorous debate. Over the years, technology has seamlessly integrated into the fabric of every office and manufacturing site. Human generations and technological advancements have evolved in concert, hand in hand. Workplaces are continually adapting to a new paradigm where machines and humans coexist in harmonious synergy. The perennial debate centers on whether technology acts as an enhancer of human effort, augmenting productivity, or as a disruptive force, supplanting the need for human talent.

During the COVID-19 pandemic, the world witnessed a profound transformation in the workplace. Technology emerged as a savior, enabling countless businesses to operate seamlessly from remote locations. This crisis unequivocally demonstrated that without embracing technological integration, many enterprises would struggle to survive in today's dynamic market landscape. From conducting monthly meetings to showcasing product ideas to investors, the continuity of business operations was ensured by the robust technological infrastructure in place. There are numerous questions regarding automation and its impact on the workforce. Will we see an era where humans are overshadowed by machines in industries? What does the future of employment look like with the rise of machines? What role will automation play in industries, and where do humans fit into this system? Modern production in most industries requires the simultaneous completion of various tasks. Some of these tasks are so complex and demanding that they are beyond human capability, thus necessitating the use of machines.

Consequently, many tasks are now performed either by machines alone or through a combination of human and machine effort. The real question is whether machines will eventually take over these tasks entirely. In modern industries, manufacturing often necessitates the concurrent execution of multiple tasks. Certain tasks are so intricate and challenging that they surpass human capabilities, necessitating the aid of machines. Consequently, the majority of these tasks are performed either solely by machines or through a synergistic partnership between humans and machines.

(Badet, 2021) While much debate and research have focused on the potential for machines to replace many jobs in the industry, it's also anticipated that automation will lead to the creation of new job opportunities. Automation and AI are transforming the workplace by streamlining routine tasks, which is leading to the creation of new job titles and roles. For instance, companies are now hiring AI ethicists to address the ethical implications of AI implementations, automation specialists to optimize robotic processes, and data curators to manage and interpret vast amounts of information generated by AI systems. This shift also means traditional roles are evolving; for example, a marketing analyst's job now often includes managing AI tools for predictive analytics. Consequently, the demand for upskilling in AI-related technologies is rising, as employees need to adapt to these emerging roles and workflows.

The Rise of Artificial Intelligence

With the increasing storage capacity of computers and the advent of technologies like big data, today's computers can perform far more than just mathematical calculations or word processing. Modern computers are renowned for their rapid processing power, sophisticated machine learning algorithms, and advanced robotics capabilities. Artificial intelligence (AI) and automation are at the forefront of technological innovation, transforming industry landscapes and reshaping the modern workforce. These technologies are critical for increasing efficiency, improving decision-making, and generating unprecedented innovation. This section explores the evolution and definition of Artificial Intelligence (AI).

Alan Turing's 1952 article "Computing Machinery and Intelligence" introduced the concept of AI. Turing developed a method for determining a machine's intelligence, which examined the machine's ability to think. It's called the "Turing Test". Arthur Samuel produced the first checker-playing program capable of competing with human players. From 1966 to 1972, the first mobile robot project, "Shakey", which integrated various AI fields with navigation and computer vision, was undertaken and can now be viewed at the Computer History Museum.

In 1968, Terry Winograd at Stanford University developed SHRDLU, an early natural language computer program. In 1970, Waseda University developed the anthropomorphic robot WABOT-1, featuring moveable limbs and conversational abilities.

Despite the subsequent period known as the "AI winter" in the 70s and 80s, significant advancements continued with the SCARA assembly line aid in 1979 and the experience-learning robot RB5X in 1984. The term "virtual reality" was coined in 1985, leading to the first VR gloves and glasses, followed by "augmented reality" by Tom Caudell. In the 1990s, AI advanced significantly, shifting from physical robots to digital programs. Deep Blue defeated chess grandmaster Garry Kasparov, and NASA deployed Sojourner, its first autonomous robotic system.

In 2011, Apple's Siri marked a breakthrough in automation, introducing an era of AI-driven assistants. Today, automation software is essential rather than optional, with Business Process Automation (BPA) and Robotic Process Automation (RPA) becoming increasingly advanced and efficient. These technologies enhance employee productivity, leading to significant resource savings. AI now pervades our daily lives through social media, email, gaming apps, and beyond. AI assistants are now commonplace on our phones, in transportation, homes, and workplaces, reflecting rapid technological advancement. Examples include Siri, Alexa, video game characters, Microsoft's Tay, ChatGPT, and Meta AI, showcasing AI's broad range of applications today. (AI bees, 2023)

What is AI?

The term Artificial Intelligence was first coined by John McCarthy in 1955. (AI) is the branch of computer science dedicated to creating systems capable of performing tasks that typically require human intelligence such as learning, reasoning, self-correction, problem-solving, and perception. AI systems can acquire information and rules for using it, use logic to reach conclusions, fine-tune algorithms to correct errors, solve complex problems, and interpret sensory information to interact with their environment.

According to Alan M. Turing, the machine passes the famous Turing Test is declared as a criterion for determining whether a machine can exhibit intelligent behavior indistinguishable from that of a human. In this study, Turing discussed the possibility of machine thinking and addressed objections and implications surrounding this idea. He delved into various aspects of intelligence, including learning, language understanding, and machine creativity, laying foundational ideas that continue to shape the field of AI research and philosophical debates about the nature of intelligence and consciousness. (Turing, 1950).

AI can be categorized based on its capabilities into different types. Narrow AI, or Weak AI, is designed and trained for a specific task, like speech recognition, image classification, or playing chess. These systems excel in their designated area but cannot perform tasks outside their training. General AI, or Strong AI, possesses generalized cognitive abilities, meaning it can perform any intellectual task that a human can do, adapting to new situations and learning from experience. Super intelligent AI refers to a hypothetical future AI that surpasses human intelligence across all fields, capable of solving problems and making decisions far beyond human abilities, though this remains theoretical and is the subject of ongoing research and debate.

Various techniques underpin AI, making it versatile and powerful. Machine Learning (ML) involves algorithms that allow computers to learn from data and make predictions or decisions based on that data. Deep Learning, a subset of ML, uses neural networks with many layers to analyze various factors of data, enabling tasks like image and speech recognition to be performed with high accuracy. Natural Language Processing (NLP) encompasses techniques that enable computers to understand and process human language, allowing for applications like language translation, sentiment analysis, and conversational agents.

Robotics applies AI to robots, enabling them to perform tasks in the physical world, such as manufacturing, surgery, or autonomous driving. AI's applications are widespread and impactful across various fields. In healthcare, AI assists in diagnosing diseases, personalizing treatment plans, and managing patient care. In finance, AI enhances fraud detection, algorithmic trading, and customer service. The automotive industry leverages AI for autonomous driving, predictive maintenance, and enhancing safety features.

In customer service, AI powers chatbots, virtual assistants, and personalized recommendations, improving user experience and operational efficiency. AI's versatility and potential for innovation continue to drive advancements across industries, transforming how we live and work.

Research Methodology

This chapter mainly focused on using descriptive research design, by using the secondary data related to AI and its impact on the job, changing scenarios of job such as upskills, and job role changing due to AI. Scholarly articles from databases such as PubMed, JSTOR, and PsycINFO will provide insights from empirical studies, literature reviews, and theoretical frameworks. And published data of various types.

Objectives

- To study AI and its impact on various sector
- To Study AI role and its impact on Job
- To analyze the impact of AI on Skill requirement
- To study the evolution of AI in Organization

Literature Review

Olaniyi et al. (2024) mentioned in this study that the integration of AI and automation in various sectors presents both challenges and opportunities for the global workforce. This study, surveying 482 professionals in IT, healthcare, and finance, examines the impact of AI and automation on employment patterns, skills, and remote work. Using PLS-SEM analysis, it finds AI and automation significantly affect employment, creating new jobs and boosting productivity in tech-savvy sectors.

However, concerns about a widening skills gap and inadequate employment policies persist, with 69% of respondents stressing the need for urgent training and education, and about half criticizing current policies. They recommended proactive strategies, including targeted reskilling programs, adaptive employment policies, and robust remote work infrastructures to maximize digital transformation benefits and mitigate negative effects.

Paudel, R. (2024) examined the impact of automation and AI on leadership and the workforce, offering strategies for leaders to navigate the transition to a tech-focused workplace. It aimed to provide insights into how AI and automation affected leadership and the workforce, alongside practical suggestions for managing this transformation. The research highlighted the benefits of AI and automation, such as improved efficiency and decision-making, while also addressing concerns about job displacement and ethical issues. The goal was to equip organizations and leaders with the resources needed to prepare for a technology-driven future and ensure success.

Jumaev, G. (2024) explored the impact of AI on the job market and provided strategies for individuals, organizations, and policymakers to adapt. Further, the researcher examined industries and occupations most susceptible to AI disruption, highlighted emerging roles that combine AI expertise with domain knowledge, and emphasized human-AI collaboration models. The study addressed ethical considerations like bias and transparency and discussed the effects of AI on job satisfaction and well-being. Further, it offered strategies for thriving in the AI era, such as continuous learning and upskilling. The global implications of AI on the workforce and the role of entrepreneurship in creating new jobs were analyzed. The article aimed to provide a comprehensive understanding of AI's impact on the job market and actionable insights for navigating the future of work.

Oluwaseyi et al. (2024) analyzed the impact of AI on job displacement and income inequality. Through a comprehensive literature review, it examined how AI-driven automation displaced routine tasks, altering labor demand and skill requirements. The study highlighted that AI benefited high-skilled workers more, worsening the wage gap between skilled and unskilled workers. It explored the socio-economic ramifications of job displacement and income inequality, focusing on challenges like structural unemployment and labor market polarization, particularly affecting vulnerable populations. The paper emphasized the need for proactive policies, including investments in education, skills training, labor market adaptability, and social welfare reforms to mitigate the adverse effects of AI. It underscored the importance of ethical AI deployment to foster equitable economic growth. The study provided insights for policymakers, businesses, and stakeholders to harness AI's benefits while addressing its socio-economic challenges and promoting inclusive prosperity.

Zarifhonarvar (2024) investigated the influence of ChatGPT on labor market dynamics, aiming to understand the changes induced by generative AI technologies. It used existing literature and a supply and demand model to assess the effects of ChatGPT.

A text mining approach analyzed the International Standard Occupation Classification to identify occupations most susceptible to disruption by ChatGPT. The study found that 32.8% of occupations could be fully impacted by ChatGPT, 36.5% might experience a partial impact, and 30.7% were likely to remain unaffected. While it offered insights into the potential influence of ChatGPT on the labor market, it noted that these findings were potential implications rather than realized effects. Further research was needed to track actual changes in employment patterns where these AI services were widely adopted. The paper contributed to the field by categorizing the level of impact on different occupations, providing a nuanced perspective on the implications of ChatGPT and similar generative AI services on the labor market.

Tyson et al. (2022) commented that AI would displace humans from existing tasks while increasing demand for new tasks in both manufacturing and services. Their study examined how AI-enabled platforms could exacerbate labor issues, such as job polarization, stagnant wages for middle- and low-skill workers, and growing inequality. The authors were skeptical that AI would create enough good jobs or widely share its productivity benefits, forecasting increased inequality instead. They argued that mitigating AI's adverse effects would require intelligent policy design. Further, noted that labor shortages and upward wage pressure could arise due to slowing growth in working-age populations and anticipated skills shortages in sectors like healthcare and software engineering, potentially accelerating the adoption of AI-driven automation.

Nazareno et al. (2021) examined how automation might impact worker well-being through five channels: freedom, sense of meaning, cognitive load, external monitoring, and insecurity. Using a measure of automation risk across 402 occupations, it assessed impacts on job satisfaction, stress, health, and insecurity based on data from the General Social Survey. The findings showed that while automation risk was associated with less stress, it also correlated with worse health and minimal or negative effects on job satisfaction, especially for those facing high levels of automation risk. The study recommended that firms, policymakers, and researchers consider the mixed well-being impacts of automation and AI, rather than viewing technological complementarity as uniformly beneficial.

Badet, J. (2021) analyzed the benefits of automation for employment, highlighting that automation not only displaces existing jobs but also creates new, more complex tasks requiring higher skills. The study used data on automation and jobs, showing that automation leads to the development of "smart jobs" while replacing repetitive tasks with machines. Further, it emphasized that new jobs generated by automation would require advanced skills, making education crucial for future workers. It found that job loss from automation varied by country, with faster automation leading to higher job risk in countries with rapid technological adoption. The study suggested that workers and students need to focus on acquiring skills relevant to new technologies to adapt to future job markets.

Barbieri et al. (2019) analyzed the impact of automation on employment, noting that while automation aimed to reduce costs and labor, compensation mechanisms might have mitigated its negative effects. The study concluded that automation generally benefited high-skilled and non-routinized jobs while threatening routinized low- and middle-skilled positions.

Vermeulen et al. (2018) examined the projected effects of automation on employment over the next decade by integrating an evolutionary economic model with labor economic theory. It assessed how labor displacement in automated sectors might be offset by job creation in new, labor-intensive industries. Using datasets with expert projections on occupations impacted by automation, including robotics and AI, the study found that job losses in automation-centric sectors are likely to be balanced by job growth in related and supportive sectors. Further, they concluded that automation will lead to typical structural changes in the labor market rather than causing an "end of work." The study proposed policy recommendations to improve the efficiency of these structural transitions.

Technological Revolutions and Employment Shifts

The advent of AI and automation in India marks a significant technological shift, with profound implications for various sectors, including IT, manufacturing, agriculture, and services. Historically, India has experienced similar transformations, such as the Green Revolution (Pingali, 2012) and the IT Revolution (Arora & Athreye, 2002), which reshaped its economic landscape and job market. Currently, the integration of AI and automation is transforming industries by automating routine tasks, enhancing productivity, and introducing new job roles in areas like AI development, data science, and cybersecurity (NASSCOM, 2020).

However, this shift also poses challenges, including the displacement of low-skilled jobs and the necessity for extensive reskilling and upskilling initiatives (World Economic Forum, 2020). The primary challenge lies in mitigating job displacement and addressing the skill gap in AI and related fields. As automation replaces low-skill, repetitive tasks, there is a pressing need for educational reforms and vocational training programs to equip the workforce with the necessary skills for emerging job roles (McKinsey Global Institute, 2017).

Moreover, the economic disparity could widen if the benefits of AI and automation are not equitably distributed. Thus, policymakers must focus on creating inclusive growth strategies that ensure the gains from technological advancements are shared across different socio-economic groups (Kanitkar, 2020). To navigate these challenges, strategic policy interventions are imperative. Integrating AI and automation-related subjects into educational curricula, supporting research and development, and fostering government-private sector collaborations for reskilling programs are essential steps (Government of India, 2018).

Additionally, developing a regulatory framework to address the ethical and societal implications of AI will be crucial (Binns, 2018). By proactively addressing these issues, India can harness the potential of AI and automation to drive economic growth, create new job opportunities, and improve the overall quality of life, ensuring a balanced and inclusive technological progression.

Current Impact of AI on Job

Artificially intelligent although artificial intelligence (AI) offers the potential for greater productivity and creativity, it also necessitates ongoing skill development, ethical considerations, and adjustment to new working practices. AI is already having a wide range of effects on business, including automation, manufacturing and job relocation, role transformation, and significant adjustments to the skills and training requirements. Focus on ways to limit negative effects so that you are receiving more profit.

While AI offers prospects for improved productivity and innovation, it also raises issues relating to economic mobility, income inequality, and ethical considerations. Job responsibilities and duties have evolved as a consequence of artificial intelligence (AI) being integrated into the workplace. Through the integration of contemporary research, the highlighting of significant concerns, and the integration of conclusions from many studies, this literature review offers an in-depth analysis of the influence of AI on business. The effects of AI on business today are diverse and include automation, manufacturing and job relocation, role transformation, and significant adjustments to the skills and training requirements.

While artificial intelligence (AI) offers the potential for greater productivity and innovation, it also raises issues with income inequality, economic mobility, and ethical concerns. When making more money, concentrate on strategies to lessen adverse effects. AI is improving risk management, fraud detection, and customer service, according to a 2024 PwC report. Working with AI technologies to comprehend complicated data and make strategic decisions is becoming more and more necessary for financial professionals (PwC, 2024).

Automating Repetitive Activities

AI systems are capable of managing substantial data entry volumes, which minimizes the requirement for human involvement. Errors are decreased and process speed is increased by automation. AI chatbots and virtual assistants may handle inquiries from customers, offer assistance, and solve issues, freeing up human agents to work on more difficult jobs.

Increased Decision-Making

AI systems are capable of analyzing vast volumes of data to offer insights and aid in decision-making. This talent is useful in industries like finance, business, and healthcare where making judgments based on data is essential. Predictive analytics: AI can foresee patterns and results, enabling businesses to take preventative measures. AI, for instance, can enhance inventory management and forecast demand in the retail industry.

Work Rotations

AI provides medical professionals with assistance by evaluating imaging data, forecasting patient results, and suggesting courses of action. Healthcare practitioners can concentrate on patient care thanks to this help. AI-powered systems and robots can carry out intricate assembly tasks, keep an eye on equipment that needs repair, and guarantee quality control, efficiency, and perfection.

New Trending Job Categories

Machine learning experts, data scientists, and AI engineers are in high demand. These experts develop, deploy, and manage AI. As AI is used more widely, there is an increasing demand for initiatives centered on AI ethics and governance.

An Increase in Efficiency

AI streamlines demand forecasting, inventory control, and routing, increasing overall supply chain effectiveness and cutting costs. AI streamlines the hiring process by reviewing resumes, setting up interviews, and even carrying out initial screenings, freeing up HR staff members to concentrate on positions in a practical way.

Training and Upskilling

Systems powered by AI provide employees with training and development plans that are specifically tailored to their needs, enabling them to advance and adjust to shifting work demands. AI makes it easier for employees to learn continuously by suggesting relevant courses, monitoring their progress, and offering feedback. This keeps employees up apprised on the latest advancements in technologies.

Flexibility and Remote Working

Collaboration Tools: Artificial Intelligence improves communication and productivity in remote work by offering sophisticated collaboration tools including virtual meeting assistants, real-time transcription, and language translation.

Task Management: AI-powered task management solutions promote a more productive and adaptable work environment by assisting remote teams in staying organized, setting priorities, and meeting deadlines. Educating staff members on the newest trends and technologies through course recommendations, progress monitoring, and feedback. Job responsibilities and duties have evolved as a consequence of artificial intelligence (AI) being integrated into the workplace. Through the integration of contemporary research, the highlighting of significant concerns, and the integration of conclusions from many studies, this literature review offers an in-depth analysis of the influence of AI on business. In the future, it is anticipated that human and AI collaboration will grow.

A McKinsey & Company (2018) analysis claims that artificial intelligence (AI) will not only transform how organizations are operated, but will also open up new avenues for human-AI collaboration that will spur innovation and increase employee satisfaction. According to the paper, for organizations to fully utilize AI, they must cultivate a culture of ongoing learning and adaptation. Artificial intelligence is known to be capable of handling normal and repetitive jobs.

Brynjolfsson and McAfee (2014) contend in their influential book "The Second Machine Age" that automation through artificial intelligence is revolutionizing the industry by decreasing the necessity for human involvement in repetitive tasks. This tendency may be seen in sectors like manufacturing, where assembly line labor is done by robots, and data processing applications, where artificial intelligence (AI) manages data entry and basic analysis. Automation driven by AI has the potential to replace some businesses, but it also opens up new possibilities.

In their OECD analysis, Arntz, Gregory, and Zierhn (2016) present a complex picture, arguing that although certain industries are in danger, others will change or entirely emerge. For instance, machine learning engineers, data scientists, and AI ethicists are among the new occupations brought about by AI (Manyika et al., 2017). Instead of eliminating humans, artificial intelligence is augmenting human capabilities to transform current jobs.

According to Frey and Osborne (2017), AI is anticipated to improve and make it easier to automate tasks that call for creativity, social intelligence, and sophisticated decision-making. For instance, AI helps doctors in the healthcare industry by evaluating medical imaging and making treatment recommendations, freeing up medical professionals to concentrate on patient care (Jiang et al., 2017).

Brynjolfsson et al. (2018), who support lifelong learning programs to assist employees in adapting to the quickly changing technology environment, acknowledge the need for more research in this area. Workers must participate in these programs to grow into new responsibilities and learn new skills.

According to Bessen (2019), education systems must adapt to satisfy the rising need for people with expertise in data analytics and artificial intelligence.

According to forecasts made by the World Economic Forum (2018), for workers to stay competitive in their job by 2022, over half of them will need to retrain or improve their abilities. A major transformation in training and skill sets is necessary for the shift to an AI-driven workplace. Bessen (2019) emphasizes how education systems must adapt to provide AI and data analytics skills.

According to the World Economic Forum (2018), to stay up with technological advancements, at least 54% of all workers will need new or considerably upskilled abilities by 2022. AI is also propelling the development of new companies.

According to a McKinsey & Company (2023) report, there is a significant demand for professionals with expertise in machine learning, data science, and AI ethics. The shift to a workforce that is increasingly technology-focused and manages, manages, and manages is reflected in the importance of this function for AI strategy (McKinsey & Company, 2023).

According to a Brookings Institution report from 2024, artificial intelligence is not just replacing occupations but also changing them. For instance, the application of AI in healthcare improves the precision of patient care administration and assessment, freeing up medical professionals to concentrate on the intricate interpersonal components of patient care (Brookings Institution, 2024). It is essential to be able to learn and adjust on the go.

According to the International Labour Organisation (2024), for employees to stay relevant, they must embrace lifelong learning. This involves retraining and skill development through programs for emerging technologies in ongoing education and training (International Labour Organisation, 2024). Even though technological abilities are prioritized, soft skills are still crucial.

According to Deloitte research for 2024, when artificial intelligence (AI) takes on more routine activities, creativity, critical thinking, emotional intelligence, and problem-solving will become more crucial. With the help of these abilities, managers can assist and provide AI technology that improves both human and AI performance (Deloitte, 2024).

Sectors Most Affected by AI and Automation

a. Manufacturing

b. The manufacturing sector has been impacted by AI and automation, leading to increased efficiency and productivity through advanced robotics and data analytics. Automation has streamlined production processes, reduced labor costs, and minimized human error, resulting in faster production cycles and higher precision. However, it has also led to job displacement as routine tasks are increasingly performed by machines. While AI enables predictive maintenance and optimized supply chains, it also requires substantial investment and upskilling of the workforce to adapt to new technologies.

c. Automation and Robotics: The manufacturing sector has seen significant adoption of automation and robotics, leading to the automation of assembly lines, quality control, and inventory management. This results in increased efficiency and reduced labor costs but also leads to job displacement for low-skilled workers (Manyika et al., 2017).

Smart Manufacturing: Integration of IoT and AI for predictive maintenance, energy management, and production optimization. This shift enhances productivity and reduces downtime, but requires a workforce skilled in managing and operating advanced technologies (Schwab, 2017).

d. Retail

e. The retail sector being majorly impacted by AI and automation has been seen enhancing efficiency, personalizing customer experiences, and optimizing inventory management in today's era. Automated systems streamline operations, reducing labor costs and minimizing human error, while AI-driven analytics help retailers understand consumer behavior and tailor marketing strategies. Additionally, technologies like chatbots and virtual assistants improve customer service, and automated supply chain solutions ensure better stock management. Overall, these advancements have led to more responsive, data-driven retail environments that better meet consumer needs and drive growth.

E-commerce and Logistics: AI-driven logistics and supply chain management systems optimize inventory, predict demand, and streamline operations. This impacts jobs in traditional retail and warehousing sectors, creating a need for skills in managing automated systems and data analytics (McKinsey Global Institute, 2019).

Customer Service: Implementation of AI-powered chatbots and virtual assistants to handle customer inquiries, reducing the need for human customer service representatives while improving response times and customer satisfaction (Accenture, 2018).

f. Finance

Algorithmic Trading: Use of AI for high-frequency trading, risk management, and fraud detection. This leads to job displacement in traditional trading roles while increasing the demand for data scientists and AI specialists (Davenport & Kirby, 2016).

Customer Interactions: AI-driven robot advisors and chatbots provide financial advice and customer support, enhancing efficiency but potentially reducing the need for human financial advisors and customer service personnel (PwC, 2020).

g. Healthcare

b. AI and automation have transformed the healthcare sector by boosting diagnostic precision, customizing treatments, and increasing operational efficiency. AI tools analyze medical data, like imaging and genetics, for more accurate diagnoses and personalized care plans. Automation streamlines administrative tasks such as scheduling, billing, and record-keeping, reducing errors and allowing healthcare professionals to concentrate on patient care. Moreover, AI-driven predictive analytics enable early disease detection and preventive measures, leading to improved health outcomes and more effective healthcare services.

Diagnostics and Treatment: AI applications in medical imaging, diagnostics, and personalized treatment plans enhance accuracy and efficiency in healthcare delivery. However, this may reduce the demand for certain medical professionals while increasing the need for AI and data management experts (Topol, 2019).

Administrative Tasks: Automation of administrative tasks such as scheduling, billing, and patient records management streamlines operations but displaces clerical jobs, necessitating reskilling of the workforce (Deloitte, 2020).

i. Transportation and Logistics

j. AI and automation have transformed the transportation and logistics industry by boosting efficiency, cutting costs, and enhancing safety. Automated solutions improve route planning and scheduling, resulting in quicker deliveries and reduced fuel use. AI helps with predictive maintenance and real-time tracking, decreasing downtime and streamlining processes. The rise of autonomous vehicles and drones is set to further disrupt traditional methods by introducing new delivery options and minimizing human errors.

k. Autonomous Vehicles: The development and deployment of self-driving cars, trucks, and drones impact jobs in the driving and delivery sectors. While these technologies promise greater efficiency and safety, they require new skills for the maintenance and oversight of autonomous systems (Litman, 2020).

Logistics Optimization: AI-driven route optimization and fleet management improve logistics efficiency but can lead to job losses in traditional logistics roles (McKinsey & Company, 2017).

Emerging Skills Requirements

The employment landscape is changing due to the rapid advancements in AI technology, which is driving up demand for previously undersupplied new talents. The workforce's skill requirements are drastically changing as a result of the incorporation of AI into many different organizations. Along with psychological and interpersonal talents like critical thinking, creativity, and emotional intelligence, technical skills like machine learning, data science, and cybersecurity are in high demand. To prosper in an AI-driven society, one must possess leadership qualities, digital literacy, productivity, and a lifelong learning attitude. The workforce's skill set will evolve as an outcome of AI's integration into various sectors. Retraining and upskilling workers are now essential tactics to guarantee that they can adjust to these advancements and flourish in an AI-driven workplace. The significance of reskilling and upskilling cannot be emphasized as AI proceeds to transform the landscape of employment.

For the workforce to be competitive and relevant, they must pick up new technical, conceptual, and cross-functional abilities. By atomizing and adapting continuing education, individuals and organizations can effectively overcome the opportunities and challenges presented by AI integrating integration. Formal education, online learning, on-the-job training, corporate training programs, and self-directed learning are all important ways to acquire these skills.

Software and Programme Development: Integration is led by AI It is necessary to be proficient in programming languages like Python, R, Java, and C++. These languages serve as the foundation for artificial intelligence applications, thus it's critical to comprehend AI frameworks and libraries like Scikit-learn, TensorFlow, and PyTorch. These technologies allow companies to create, implement, and refine AI models of superior quality.

Deep Learning and Machine Learning: A thorough understanding of neural networks, machine learning techniques, and natural language processing is necessary. This covers both theoretical knowledge and hands-on expertise in creating and refining machine learning models. Sophisticated AI systems that can learn from data and make wise decisions are the result of expertise in these fields.

Complex Thinking and Problems: Only when entrepreneurs can assess complex issues and create novel solutions will AI's potential be fully realized. The ability to reason logically and make decisions is essential for interpreting and using AI products to solve challenges in the real world.

Creativity and innovation: While AI is capable of handling repetitive chores, human creativity remains a unique quality. Together with AI, new thoughts and ideas must be developed. To boost efficiency and creativity, establishing new AI applications and refining current procedures require creative thinking.

Emotional Intelligence: It's evident that emotional intelligence is crucial for controlling one's own emotions and comprehending those of others as AI systems replace regular labor. Effective leadership and teamwork in AI-integrated environments require the possession of communication, empathy, and conflict-resolution abilities.

Techno-Functional Expertise: The workforce of the future needs to be composed of both domain-specific knowledge and technical abilities. For instance, creating successful AI solutions in the healthcare sector requires an understanding of both AI technology and the unique difficulties faced by the sector. The divide between technical teams and business stakeholders is closed by such hybrid competence.

Economic and Social Implications of AI and Automation

AI and automation drive economic growth by increasing productivity and creating new markets, but they also lead to job displacement and wage inequality as certain roles become obsolete. On a social level, they can improve quality of life through enhanced services and efficiency but may exacerbate social divides and require significant investments in reskilling workers. Balancing these impacts involves managing technological advancement while addressing economic disparities and ensuring equitable opportunities.

Increased Efficiency: AI and automation significantly enhance productivity by streamlining processes, reducing errors, and optimizing resource use. This leads to economic growth as businesses can produce more with less input (Brynjolfsson & McAfee, 2014).

Cost Reduction: Automation reduces labor costs and operational expenses, allowing companies to reinvest savings into innovation and expansion (Manyika et al., 2017).

Displacement of Low-Skill Jobs: Automation of routine and repetitive tasks leads to the displacement of low-skill jobs, particularly in manufacturing, retail, and administrative roles (Chui et al., 2016).

Creation of High-Skill Jobs: New job opportunities arise in fields such as AI development, data science, cybersecurity, and robotics maintenance. These roles often require advanced skills and education, shifting the demand toward more specialized labor (Bessen, 2019).

Widening Income Gap: The benefits of AI and automation are often unevenly distributed, leading to a widening income gap between high-skilled workers who can leverage these technologies and low-skilled workers who may face job losses (Autor, 2015).

Regional Disparities: Economic benefits tend to concentrate in regions with strong technology infrastructures and education systems, potentially exacerbating regional inequalities (Acemoglu & Restrepo, 2020).

l. Social Implications

AI can enhance quality of life through improved services and convenience, but it also raises concerns about privacy, job displacement, and increased social inequality. The technology's impact on daily life and employment patterns can deepen existing divides, requiring thoughtful strategies to manage its effects on society and ensure fair benefits for all.

Changing Nature of Work

Shift in Job Types: As routine jobs are automated, there is a shift towards roles that require complex problem-solving, creativity, and emotional intelligence. This necessitates continuous learning and adaptability among the workforce (Frey & Osborne, 2017).

Gig Economy and Freelancing: AI and automation facilitate the growth of the gig economy, where short-term contracts and freelance work become more prevalent. While this offers flexibility, it also raises concerns about job security and benefits (Manyika et al., 2016).

Education and Skills Training

Reskilling and Upskilling: There is an urgent need for reskilling and upskilling programs to prepare workers for the jobs of the future. Governments, educational institutions, and private companies must collaborate to provide relevant training (World Economic Forum, 2020).

Lifelong Learning: The rapid pace of technological change necessitates a culture of lifelong learning, where individuals continuously update their skills to stay relevant in the job market (OECD, 2019).

Social Inequality

Access to Technology: Disparities in access to technology and digital literacy can exacerbate social inequalities. Ensuring equitable access to technological resources is crucial for inclusive growth (Eubanks, 2018).

Ethical and Privacy Concerns: The widespread use of AI raises ethical issues, including data privacy, surveillance, and the potential for biased algorithms. Addressing these concerns is essential to maintain public trust and social cohesion (Binns, 2018).

AI and the Future Workforce

The integration of AI into the workforce is leading to significant changes in job roles across various sectors. Traditional roles that involve routine, repetitive tasks are being automated, leading to the displacement of certain low-skill jobs (Chui et al., 2016). For instance, in manufacturing, tasks such as assembly line work and quality control are increasingly being handled by robots and automated systems. Similarly, in the retail and service industries, AI-powered chatbots and automated customer service platforms are reducing the need for human operators in these roles (Manyika et al., 2017).

Conversely, there is a growing demand for high-skill jobs that require expertise in AI development, data analysis, and machine learning. These roles are essential for designing, implementing, and managing AI systems, highlighting the need for a workforce that is proficient in advanced technological skills (Brynjolfsson & McAfee, 2014).

m. Skills and Education Requirements

The future workforce will require a diverse set of skills to adapt to the changes brought about by AI. Technical skills in AI, machine learning, data science, and cybersecurity are becoming increasingly important (World Economic Forum, 2020). Educational institutions and training programs must evolve to provide the necessary knowledge and skills for these emerging fields. Additionally, soft skills such as critical thinking, creativity, and emotional intelligence will be crucial, as they are less likely to be automated and are essential for managing and collaborating with AI systems (Frey & Osborne, 2017). Lifelong learning and continuous skill development will be key strategies for individuals to remain relevant in the evolving job market (OECD, 2019).

n. Economic and Social Implications

The widespread adoption of AI in the workforce has profound economic and social implications. Economically, AI can drive productivity and growth by optimizing processes and reducing costs (Manyika et al., 2017). However, the displacement of jobs and the creation of new roles will lead to a significant restructuring of the

labor market. There is a risk of increased economic inequality if the benefits of AI are not distributed equitably, as high-skill workers who can leverage AI will likely see greater economic gains compared to those in low-skill positions (Autor, 2015).

Socially, the transition to an AI-driven workforce will require robust policies to support workers through reskilling programs and social safety nets to mitigate the impact of job displacement. Ensuring equitable access to AI education and technology is also critical to prevent widening social disparities (Eubanks, 2018). Overall, while AI presents significant opportunities for economic advancement, careful management of its integration into the workforce is essential to address the accompanying challenges.

Conclusion

In conclusion, integrating automation and artificial intelligence profoundly transforms key sectors like manufacturing, retail, finance, and healthcare. These technologies are driving innovation and economic growth by significantly enhancing productivity and enabling the creation of new markets. For example, in manufacturing, AI-powered robotics and automated assembly lines streamline production processes, reduce errors, and increase output. In finance, AI algorithms optimize trading strategies, detect fraud, and provide personalized financial advice. Healthcare benefits from AI through improved diagnostics, predictive analytics for patient care, and streamlined administrative tasks.

However, the rapid adoption of AI and automation also leads to substantial labor displacement, particularly in roles that involve repetitive and routine tasks. This displacement contributes to wage inequality and exacerbates social divides as certain jobs become obsolete. For instance, automated checkout systems in retail reduce the need for cashier positions, while AI-driven data entry systems in various industries minimize the requirement for clerical roles.

On a social level, the benefits of AI and automation, such as improved services, efficiency, and quality of life, must be balanced with the need for significant investments in reskilling and upskilling workers. Addressing economic disparities requires targeted policies to support those affected by job displacement and ensure equitable access to new opportunities. To navigate this evolving landscape, the future workforce will need to acquire a diverse set of skills.

Technical competencies in AI, machine learning, data science, and cybersecurity are becoming increasingly important. Understanding AI algorithms, data management, and cybersecurity measures will be crucial for developing, implementing, and maintaining AI systems. Additionally, skills in critical thinking, problem-solving, and adaptability will be essential as workers engage with advanced technologies and complex, data-driven environments.

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