Proceedings of ICMRED 2025 symposium: Effective Communication as a Powerful Management Tool
DOI: 10.54254/2754-1169/184/2025.BL23302

Analysis of Artificial Intelligence-Driven Job Replacement in the Service Industry and Unemployment Response Strategies

Zhuo Kong[1*], Zhanyan Li[2], Yazhuo Song[3]

[1]UC San Diego, La Jolla, USA
[2]St. Andrews' Schools, Honolulu, USA
[3]University of British Columbia, Vancouver, Canada
**Corresponding Author. Email: z3kong@ucsd.edu*

Abstract: This paper explores the dual impact of AI in the service industry labor market. Focusing on the service industry, AI fuels productivity by automating mundane tasks, improving customer online service, and generating additional jobs, especially in AI administration and digital services. Despite these benefits, AI adoption simultaneously produces severe challenges, including workforce displacement, unequal income distribution, and rising unemployment rates. The unintentional production of AI puts significant pressure on human capital, and traditional jobs are gradually being replaced by AI technology. In order to maintain human labor dominance in the job market, this paper proposes several possible solutions, such as reskilling and upskilling initiatives, education reform, and stronger social safety systems, including targeted unemployment insurance schemes with skill-matching requirements and implementing progressive universal basic income pilots indexed to regional living costs to help reduce the negative effects while maximizing the benefits of AI in the workforce. The paper advocates for a labor market model prioritizing human-centric technological integration, where AI augments rather than replaces human capabilities.

Keywords: Job Displacement, Artificial Intelligence, Service Industry

1. Introduction

1.1. Research background

The rapid advancement of AI is reshaping the global workforce, particularly in the service industry, raising concerns about job displacement and unemployment. McKinsey & Company estimates that, depending on various adoption scenarios, automation could displace between 400 and 800 million jobs by 2030, requiring up to 375 million people to transition into different job categories [1]. The rapid adoption of AI has significantly transformed the service industry. As AI grows and advances, the potential to automate jobs like manual jobs in customer service, retail cashiers, hospitality, finance, and logistics will be largely influenced. Several studies have shown that AI may be beneficial for worker productivity across tasks like business writing, programming, customer support, and consulting, with the greatest benefits observed among less-experienced workers [2]. The ability of AI to automate routine and repetitive tasks presents opportunities for companies; however, one of the biggest threats of robotic automation is fronted by artificial intelligence: the rise of concerns of widespread unemployment and the displacement of workers who rely on these roles for livelihood.

DOI: 10.54254/2754-1169/184/2025.BL23302

The central issue focuses on the extent to which AI can replace human labor in the service industry and what strategies can be developed to mitigate the potential detrimental effects, especially in terms of unemployment. This study is essential because it could help inform how businesses, policymakers, and workers can respond to the changing labor market by understanding how they can best prepare for the impacts of AI adoption and how they can maximize the benefits of AI adoption while also minimizing its negative effects on employment.

1.2. Literature review

Maggie Smith from the North Carolina Department of Commerce highlights the risk of technological unemployment due to AI, especially in high-tech developing economies [2]. The paper discusses how AI could lead to mass unemployment, something that wouldn't be the first time humans have to deal with technological displacement on a massive scale. This view resonates with historical narratives of technological advancement replacing human labor and indicates the importance of governance measures to address the socioeconomic impact of job losses caused by AI.

According to a recent article by Blake Morgan on Forbes, AI is disrupting customer service now more than ever, creating challenges [3]. AI is making serious strides, ranging from taking your fast food order at the drive-thru to eliminating more traditionally done customer service functions. There have been fears of AI taking over human jobs, especially customer service jobs, but the majority of experts believe that AI will complement, not eliminate, human workers.

The service sector, which accounts for about two-thirds of global GDP, is the most important engine of economic growth and job creation. According to Hospitality Insights, AI is estimated to have a strong influence on this area, with a contribution of $15 trillion to the world economy by 2030, along with a 30% increase in efficiency within service industries [4]. While fears exist surrounding job displacement, the article pointed out that it is important for organizations to see AI as a strategic tool, not a threat, which helps organizations optimize operations and customer service. By 2019, however, only 10% of companies were effectively creating value from AI, suggesting a need for managerial interventions at the strategic level.

However, not every study has the scope of AI's impact on employment. Some research claims that the automation wave driven by AI is less likely to impact the services sector and lead to mass unemployment of jobs. Using provincial panel data from China (2007-2020), Ting-Ting Gu, San-Feng Zhang & Rongrong Cai analyzed the fixed-effect model to investigate the effect of AI development on the service industry employment [5]. The results indicate that AI is predicted to supplement human labor rather than replace it entirely. Automation may make repetitive tasks more efficient, but many service jobs involve complex problem-solving, emotional intelligence, and human interaction-tasks with which AI has difficulty.

This study addresses the gap in understanding AI's impact on employment structure and workforce adaptation in the service industry. There is a growing acknowledgment of the role of AI nowadays, with recent findings stressing the importance of AI in the service sector and targeting its proper incorporation to boost the operations and productivity of labor in the service sector. Although some studies have shown that AI will not lead to widespread unemployment in the service industry, its subsequent impacts-such as changes in job structure, cross-industry labor mobility, and changes in skill requirements-have been largely ignored. In addition, the uneven impact of AI on service sector employment in different regions remains unexplored, highlighting the importance of understanding the differences in AI adoption in service sector employment across different economic environments.

DOI: 10.54254/2754-1169/184/2025.BL23302

1.3. Research framework

This study seeks to fill these gaps by exploring AI's impact on job displacement, employment structure, and the adaptation of the workforce in the service sector, as well as providing a holistic account of potential job losses and mitigating strategies. A structured exploration will investigate the double-edged sword of AI on employment in the service sector and the potential approach to handle the negative connotation.

In particular, both direct and indirect impacts that AI has on the service sector job market, looking specifically at changes in the structure of the workforce. This analysis seeks to draw out the extent to which AI complements or replaces human labor in different service sectors and to see the differences between each sector.

Second, it assesses comparative datasets to observe patterns for positive and negative impacts of employment in the service industry.

Third, the study also discusses the implications of finding unintended job destruction and the role of governments, companies, and workforce training in alleviating the effects of AI employment destruction. It explores ways organizations can harness AI to increase productivity without displacing human workers, highlighting solutions like reskilling programs and hybrid human-AI collaboration frameworks.

Under this framework, the goal of the research is to deliver practical solutions for navigating AI-based employment, particularly within the service industry, while also providing guidance for policymakers, practitioners, and employees to adapt to the new landscape of labor. This study aims to provide actionable insights for navigating AI-driven changes in the service industry, offering guidance for policymakers, businesses, and workers.

2. Case description

AI has significantly replaced mechanical jobs in the service industry, particularly in repetitive tasks, and the service industry is the one that is heated and faces job insecurity due these rapid technological advancements. The service job mentioned in this article refers to the human interactive jobs that work with customers, such as restaurant waiters, shopping guides, and cashiers. However, this can also inform more advanced jobs such as online customer service and diagnostic services. In Huang and Rust's paper, they informed four different intelligences that represent the labor work that human employees provide: mechanical, analytical, intuitive, and empathetic skills [6]. These are the important human capital that form occupations that are unique for humans to be involved in the service industry before artificial intelligence intrudes. Nowadays, AI has successfully replaced many mechanical jobs and has started to invade analytical works both online and offline. There are two typical examples to inform these first two intelligence replacements.

Firstly, mechanical jobs require skills for simple routine work that is easy to operate and needs less education and professional training [6]. Mechanical jobs are primarily replaced in the first and second industries that mainly focus on creating products. As artificial intelligence becomes more advanced, it has started to participate in the service industry, which mainly replaces repetitive service tasks such as food ordering, delivery, and checking. Using China Haidilao as an example, Haidilao is one of the biggest Chinese hotpot chain restaurants, and it attracts people with its attentive service. Most of the work in the restaurants is repetitive, routine work that involves ordering, delivering, and cleaning up tables. The jobs are easily trained and highly replaceable. The only difference from the product industry is the need for affinitive employees that satisfy customers. Therefore, in order to maximize company profits and minimize costs, Haidilao introduced digital self-service technologies that make food ordering and delivery more automatic by robots. However, this replacement of advanced technology has resulted in a negative impact on self-learning, according to Biao [7].

DOI: 10.54254/2754-1169/184/2025.BL23302

Secondly, analytical jobs require basic logical performance and problem-solving skills that will be more convoluted than mechanical jobs [6]. The effect of analytical jobs mainly focuses on automation and the promotion of human ability. It is a double-edged sword that will assist in more efficient work but replace the human capital of laborers. Analytical job replacements are far more recent than mechanical substitutions. As society starts to become more prevalent with online shopping, online customer service will become more popular, and AI agents will start to replace real human employees. The robot agents can provide personalized service based on customers' questions. Most e-commerce companies, such as Amazon, eBay, and Alibaba, have introduced automatic agents to replace human labor. However, many online customer service companies still need to have intuitive and empathetic skills to address complex reasoning and emotional interaction. Both of the examples illustrate the dual impact of AI on service industry jobs, highlighting both replacement and complementarity. The replacement of analytical jobs by AI highlights the need for reskilling and re-adapting in the service industry. Therefore, human labor will not be replaced completely under the customer service category and will still have space to develop its unique characteristics that cannot be substituted by technology.

3. Analysis of the problem

As the service industry grew as a key economic driver, AI began replacing human labor in areas like restaurants and online customer service, exemplified by Haidilao's self-serve technology and Amazon's robot agents. It has been developed at a speed that cannot be predicted and has brought significant advantages that assist societal growth that companies cannot refuse. However, it also produces unintentional latent functions that create a competitive environment stressing the human labor market. The following section will summarize the prosperity and crisis that AI brings to the works of humans.

3.1. Positive impact of AI on service sector jobs

3.1.1. Higher efficiency and lower costs

AI brings a huge leap forward in the efficiency of the service sector as it provides automation for everyday tasks. AI's dual impact on employment mainly stems from its ability to automate and enhance human capabilities. For example, while replacing repetitive work, AI also provides humans with more efficient tools, improving overall work efficiency. In daily life, technologies such as robot cleaners, self-service kiosks, intelligent chatbots, and automated check-in systems have infiltrated the hospitality, retail, and financial sectors. For example, Amazon Go relies on AI-built sensors and vision systems to enable cashier less shopping, where shoppers can pick up their food and then be charged automatically [8]. In addition, these AI-based tools are also having a significant impact on the hotel industry, such as by enhancing reservation operations, payment processing, room management, etc. [2]. According to research by Hospitality Insights, this cutting-edge technology to bring AI to the service sector could increase efficiency by 30% while contributing an estimated $15 trillion to the global economy by 2030 [4].

3.1.2. Better customer experience and personalized service

There is no doubt that AI has made life easier for customers. Therefore, companies are investing heavily in virtual assistants and chatbots designed to be available 24/7 to answer consumers' questions. These intelligent chat AIs do not need to rest and do not need to be paid, and they need to follow the program while constantly running. Thus, some banks use this technology to provide specialized financial advice, which is personalized according to a source of individual information, thereby improving customer satisfaction [9]. Since AI can analyze the behavior and trends of

DOI: 10.54254/2754-1169/184/2025.BL23302

customer preferences, it can provide targeted personal sales and service pitches that increase customer loyalty and profitability. It can be seen that using marketing automation to make every consumer enjoy better service quality is a new way for the company to develop.

3.1.3. New job opportunities

To some extent, AI will create a large number of new jobs in areas such as system development, maintenance, and monitoring because as AI advances, the demand for AI ethics officers, data analysts, digital experience designers, and other positions will also increase. In addition, workers will have access to hybrid jobs where human skills complement AI tools. Specifically, AI is designed to replace standardized processes quickly in an organization, speedily increase the number of cars, or improve the speed of operation. In industries such as banking and mechanical engineering, demand is high for dynamic systems and AI, which are flexible, agile, and personalized. Piotrowski and Orzeszko cited that AI technology could be used to broaden the customer base in banking operations. Therefore, it is not only a trend in banks but also in many other service industries to efficiently use artificial intelligence to handle monotonous tasks [9]. The emergence of new roles underscores the need for reskilling in the service industry. This result shows that, if properly trained, AI does have the opportunity to be a boon to the service industry. Also, these new roles highlight the potential for AI to complement human labor rather than replace it entirely.

3.2. Negative impact of AI: job loss and societal challenges

3.2.1. Displacement of low-skilled workers

AI threatens to eliminate many low-skill jobs, such as cashiers, receptionists, and fast-food workers, which involve predictable and repetitive tasks. AI has the potential to replace many low-skilled jobs, such as cashiers, receptionists, and fast-food restaurant employees, that involve predictable, repetitive tasks. Kudoh and Miyamoto's research shows that unskilled workers, i.e., workers in the labor market who participate in routine tasks, are most vulnerable to replacement by AI technology [10]. In economies that are rapidly adopting AI, especially in regions where digitalization is developing rapidly, the risk of technological unemployment is no longer just speculation but a direct threat to the labor market. In fast-adopting venues, such as rapidly developed economies, worries take on a stark reality of technological unemployment.

The argument points out that job losses due to AI will largely impact workers in services as they often do not have training provisions available to them to learn any other skill [2].

AI's replacement of low-income workers stems primarily from its ability to automate repetitive tasks, and low-income workers often lack opportunities for retraining. It does hurt the livelihood of individuals, as well as the socioeconomic structure of services-dependent communities.

3.2.2. Widening income inequality and skills gap

In some obvious examples, high-skilled workers have proven to be reskilled and unskilled people above all. Unskilled workers who never make it to any lateral work paths find that highly skilled workers with nothing to do could assume their tasks. This propels some more low-wage job openings by machinery, which further drags protesters over long spells or shears them intermittently into gig economy slots. PwC found in a study that only 10% were benefiting from AI, and this makes the case that a broader approach may be needed to avoid favoritism and make sure equal justice is delivered across the board [4]. The widening income gap highlights the need for targeted reskilling programs to address AI-driven disparities. With an unsupervised AI, such discrepancies can appear significantly and create disparities not only within but also among diverse territories at the molecular level.

DOI: 10.54254/2754-1169/184/2025.BL23302

3.2.3. Psychological pressure and social instability

Uncertainty caused by AI violates individual freedom, exacerbates depression, lowers individual worth, and increases anxiety when job insecurity leads to unemployment. It affects a larger area of the social sphere, including family and community stability. Additionally, the World Economic Outlook assumes that mass layoffs may reach a difficulty that the welfare system cannot cope with, at which point both the health care system and temporary unemployment insurance will be under enormous strain, or large amounts of public money will be required to run [11]. AI could lead to the same dislocations, such as rising crime and political unrest, especially in countries without robust safety nets. Therefore, while strengthening innovation, the process of development needs to pay attention to the social costs of AI and the problems addressed by the policy support framework. Addressing these challenges requires comprehensive policy frameworks to mitigate the social costs of AI-driven job displacement.

4. Suggestion

4.1. Reskilling and upskilling: bridging the AI-driven skills gap

A plausible academic suggestion to solve the issue of low-skilled workers being displaced from the workforce due to AI and automation is for both public and private sectors to introduce substantial workforce reskilling and upskilling initiatives. Workers whose jobs are significantly affected by change are better served by reskilling. They can be trained for new jobs in emerging industries, such as digital services, renewable energy, health care, and logistics. Most importantly, these areas provide not only high-demand jobs but also target skills that people can learn through specialized training programs—making this a long-term solution for displaced workers. Manufacturing workers, for instance, can be retrained to operate advanced robotics instead of being replaced by them. This process encompasses equipping them with entirely new skills, often in preparation for emerging roles in fields such as data analysis, AI management, or digital operations.

For the upskilling initiatives, companies should help employees develop and grow their existing skill sets to meet the changing demands of current responsibilities or take on new responsibilities in similar functions, making it a more efficient and accessible strategy for adapting to technological changes. To ensure equitable access to reskilling, public education systems must first address foundational skill gaps.

4.2. Equitable education and redistributive subsidies for displaced workers

The inequality of incoming and skills can be balanced by education in a significant way. Society should introduce ground study in a public range that is accessible to everyone. This wide-spreading education is most efficient in college study as colleges are admitting applications through merit traits. Therefore, there will be a relatively equal chance for both upper-class and lower-class students to get into the same school based on their skills. The colleges apply the same academic and life skills for students, which decreases their knowledge gap and increases their potential job opportunities. When students learn the skill to study, they will always have the ability to learn new knowledge and will never be replaced by AI technology.

Moreover, when AI replaces people's work, the working class is significantly heated. Therefore, to facilitate their reintegration, support their basic needs, and balance average income, the best way is to increase governmental subsidies for substituted people. Since machines can be more efficient than human capital and earn more money, the extra money that profits from machines should be delivered to working-class people who were dragged down by AI replacement. This subsidy system can decrease the income inequality between upper and lower-class people but also promote societal

DOI: 10.54254/2754-1169/184/2025.BL23302

life quality in an overall aspect. Such subsidies could be funded through taxation of AI-driven productivity gains, ensuring a fair redistribution of economic benefits. For instance, a 2% tax on corporate revenue from automated processes could generate funds for displaced worker subsidies, as proposed by the World Economic Forum in 2023.

4.3. Psychological and community support systems for AI transition

In addition to economic measures, addressing AI-induced unemployment also necessitates psychological support to mitigate its social consequences. From a social perspective, it must be perceived as utterly critical for society to equip a very comprehensive support system to put off psychological stress and reduce the social instability that accompanies AI-induced unemployment. Various empirical studies have established that AI-related changes in employment are strongly associated with increases in anxiety, loss of self-efficacy, and depressive symptoms in the unemployed. As discussed by Frude, it is important to note that such mass unemployment, as caused by automation, has a long-lived and very damaging effect on a person's perception of subjective well-being and the state of mental health. Intelligent machines have obvious advantages over human workers: a higher degree of accuracy and reliability, immediate substitutability, wide adaptability, and 24-hour availability. Hence, psychological problems are likely to occur among individuals subjected to unemployment by automation, such as frustration or anxiety, depression, and others [12]. In addition, 62% of workers reported worsening anxiety after losing their jobs because of automation in a 2023 OECD study, which strongly suggests that targeted intervention measures are needed. Social organizations should also expand the list of mental health services to include setting up unemployment therapy support groups or free counseling services to help deal with psychological pressure due to unemployment.

Efforts at the community level should not be ignored. Unemployment often leads to the breakdown of family and social relations and brings many negative consequences, such as family disappointment. Under this mental pressure, people are prone to feel isolated and lost. Therefore, in the context of today's global capitalist expansion, increasing unemployment and marginalization, survival security, and social integration at the community level are particularly important [13]. Communities can have activities such as re-employment training, AI adaptation lectures, and public communication forums. In that case, it can enhance the emotional connection between the community and alleviate people's psychological distress.

Finally, the country should establish a social and psychological impact monitoring system for AI to observe the various impacts of AI on human society over the long term, especially the long-term impacts that are not easy to discover directly, to prevent emotional problems from turning into social unrest.

5. Conclusion

5.1. Key insights: AI's divergent impacts on service jobs

The study uses two typical case studies from the service job market to illustrate the AI substitution of mechanical jobs in food delivery and Analytical jobs for online customer service. Advanced AI technology generates divergent outcomes: while driving capitalist efficiency and profit, it simultaneously replaces low-skill workers and increases social instability in a significant way. There are still ways to maintain human market dominance by providing workers with reskilling and upskilling initiatives, educating them with knowledge and skills that are irreplaceable, and advocating support systems to mitigate technology-induced stress both on individual and community levels.

DOI: 10.54254/2754-1169/184/2025.BL23302

5.2. Theoretical and practical contributions

This study provides insights into the yet-evolving intersection of AI and jobs in the service industries, with practical, business, and social contributions. On a practical level, it addresses the need for institutions in the service sector to adopt practical approaches to counter the glaring shadow of job displacement brought about by AI adoption, aiming to strike a balance between advanced technology and maintaining workforce equilibrium. Socially, It highlights the need for inclusive development to mitigate the risks of widening inequality resulting from AI-induced job loss, particularly for low-skilled workers. By pointing out reskilling and upskilling, the research promotes greater social cohesion and aids communities in adapting to technological change. The findings can also heavily influence companies from a business perspective on how to embrace AI without causing too much disruption, facilitating progress toward sustainable growth in tandem. It supports companies in decision-making and creates a future-ready workforce in a fast-evolving digital economy by identifying sector-specific strategies. These measures must be complemented by systemic support, as explored in the following limitations.

5.3. Limitations and future research directions

This study mainly relies on secondary data resources, including academic literature, government reports, and industry public information. Although these materials provide rich theoretical and background support, they may not fully reflect the real-time changes in the current labor market or the specific problems of social groups at the psychological level. Therefore, the lack of primary data limits the empirical depth and cannot directly measure the real data on the impact of AI on employment. In addition, this article mainly uses qualitative analysis and comparative research methods, which are helpful in identifying macro trends and proposing hypotheses but may ignore differences in different regions, cultural backgrounds, or service industries. Specifically, primary data should validate the reskilling frameworks proposed in Section 4.1. Future research can further collect primary data through questionnaires, interviews, or case studies, covering the views of corporate employers, policymakers, and front-line service industry employees. At the same time, longitudinal research can also be conducted to continuously track the unique employment characteristics of the service industry and provide solid data support for the formulation of more targeted policies.

Authors contribution

All the authors contributed equally and their names were listed in alphabetical order.

References

[1] *McClelland, C. (2023, January 30). The Impact of Artificial Intelligence -Widespread Job Losses. IoT for All. https://www.iotforall.com/impact-of-artificial-intelligence-job-losses*

[2] *Smith, M. (2024, February 29). Insights on Generative AI and the Future of Work. North Carolina Department of Commerce. https://www.commerce.nc.gov/news/the-lead-feed/generative-ai-and-future-work*

[3] *Morgan, B. (2023, August 16). What Impact Will AI Have On Customer Service? Forbes. https://www.forbes.com/sites/blakemorgan/2023/08/16/what-impact-will-ai-have-on-customer-service/*

[4] *Challenges of AI and maximizing value in the service sector. (n.d.). Hospitalityinsights.ehl.edu. https://hospitalityinsights.ehl.edu/challenges-of-ai-maximizing-value-servic-sector[WZ29]*

[5] *Gu, T.-T., Zhang, S.-F., & Cai, R. (2022). Can Artificial Intelligence Boost Employment in Service Industries? Empirical Analysis Based on China. Applied Artificial Intelligence, 36(1). https://doi.org/10.1080/08839514.2022.2080336*

[6] *Huang, M. H., & Rust, R. T. (2018). Artificial intelligence in service. Journal of service research, 21(2), 155-172. https://journals.sagepub.com/doi/full/10.1177/1094670517752459*

[7] *Biao, L., & Rojniruttikul, N. (2023, April). Impact of digital technologies, modern infrastructure, self-service learning experience, and customer satisfaction at Haidilao restaurant in China. In Proceedings of the 2023 5th Internat*

DOI: 10.54254/2754-1169/184/2025.BL23302

ional Conference on Management Science and Industrial Engineering (pp. 136-143). https://dl.acm.org/doi/abs/10.1145/3603955.3604005

[8] Wankhede, K., Wukkadada, B., & Nadar, V. (2018, July). Just walk-out technology and its challenges: A case of Amazon Go. In 2018 International Conference on Inventive Research in Computing Applications (ICIRCA) (pp. 254-257). IEEE.

[9] Piotrowski, D., & Orzeszko, W. (2023). Artificial intelligence and customers' intention to use robo-advisory in banking services. Equilibrium (Toruń), 18(4), 967-1007. https://doi.org/10.24136/eq.2023.031

[10] Kudoh, N., & Miyamoto, H. (2025). Robots, AI, and unemployment. Journal of Economic Dynamics & Control, 174, 105069. https://doi.org/10.1016/j.jedc.2025.105069

[11] World Economic Forum. (2023). The Future of Jobs Report 2023, https://www.weforum.org/reports/the-future-of-jobs-report-2023/

[12] Frude, N. (2019). Technological Unemployment and Psychological Well-being—Curse or Benefit?. Education and technological unemployment, 95-113.

[13] Elsen, S., & Wallimann, I. (1998). Social economy: Community action towards social integration and the prevention of unemployment and poverty. European Journal of Social Work, 1(2), 151-164.