

HOW ARTIFICIAL INTELLIGENCE IS AFFECTING THE LABOR, INTENSIVE BUSINESSES

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ABSTRACT

The increasing adoption of Artificial Intelligence (AI) is transforming the way businesses operate, with significant implications for labor-intensive industries. This paper investigates the impact of AI on labor-intensive businesses, examining the effects on employment and productivity. Using a mixed-methods approach, we analyze both quantitative and qualitative data from a range of industries, including manufacturing, healthcare, and finance.

Our findings suggest that AI is having a profound impact on labor-intensive businesses, with automation replacing routine and repetitive tasks, and augmenting human capabilities. While AI has the potential to increase productivity and efficiency, it also poses significant risks to employment levels, particularly for low-skilled and low-wage workers. Our results indicate that AI-induced job displacement is already occurring, with some industries experiencing significant job losses. However, we also find that AI can create new job opportunities, particularly in areas such as data analysis, machine learning, and programming. Furthermore, our study suggests that businesses that invest in AI are more likely to experience increased productivity and competitiveness, which can lead to increased employment opportunities.

This paper provides valuable insights for policymakers, business leaders, and workers alike, highlighting the need for a proactive approach to addressing the challenges and opportunities posed by AI. Our research underscores the importance of upskilling and reskilling workers to adapt to the changing job market, and the need for policymakers to develop policies that support workers who are displaced by AI.

Keywords : Artificial Intelligence (AI), Labor-Intensive Businesses, Employment, Productivity, Automation

1. INTRODUCTION

The world is undergoing a technological revolution, driven by the rapid advancement of Artificial Intelligence (AI) and its applications in various industries. AI has the potential to transform the way businesses operate, making them more efficient, productive, and competitive. However, the impact of AI on labor-intensive businesses is a complex and multifaceted issue, with both positive and negative consequences for employment and productivity (Manyika et al., 2017).

Labor-intensive businesses, such as manufacturing, healthcare, and finance, are those that rely heavily on human labor to produce goods or services. These industries have traditionally been characterized by manual labor, routine tasks, and a high level of human intervention. However, the increasing adoption of AI technologies, such as machine learning, robotics, and automation, is changing the nature of work in these industries. AI is capable of performing tasks that were previously thought to be the exclusive domain of humans, such as data analysis, pattern recognition, and decision-making (Frey & Osborne, 2017).

The automation of routine and repetitive tasks has the potential to significantly increase productivity and efficiency in labor-intensive businesses. According to a study by McKinsey, AI could automate up to 40% of work-related tasks by 2020 (Manyika et al., 2017). This could lead to significant cost savings and increased competitiveness for businesses that adopt AI technologies. However, the automation of tasks also poses significant risks to employment levels, particularly for low-skilled and low-wage workers who may not have the necessary skills to adapt to changing job requirements (Freeman & Askinasi, 2019).

One of the key concerns about AI-induced job displacement is that it may disproportionately affect certain groups of workers, such as women, minorities, and low-skilled workers. A study by the McKinsey Global Institute found that up to 75% of jobs in the United States could be at risk of automation by 2030 (Manyika et al., 2017). This raises concerns about income inequality, poverty, and social unrest.

In addition to the potential negative consequences of AI-induced job displacement, there are also concerns about the impact on worker skills and education. As AI replaces routine tasks, workers may need to develop new skills to remain employable. However, many workers may not have access to the necessary training and education to adapt to changing job requirements (Frey & Osborne, 2017).

Despite these concerns, there are also opportunities for AI to create new job opportunities in emerging industries such as data science, machine learning, and artificial intelligence engineering. A study by Glassdoor found that the demand

for data scientists has increased by 20% over the past five years (Glassdoor, 2020). This suggests that while AI may displace certain jobs, it also has the potential to create new ones.

The impact of AI on labor-intensive businesses is a complex and multifaceted issue. While AI has the potential to increase productivity and efficiency, it also poses significant risks to employment levels and income inequality. It is essential for policymakers, business leaders, and workers alike to develop strategies to address these challenges and ensure that workers are equipped with the necessary skills to adapt to changing job requirements.

2. LITERATURE REVIEW

Advances in artificial intelligence (AI) may unsettle the established narrative on the risk of employment loss from automation. The most recent wave of AI started around 2011 when advances in machine learning, a branch of computational statistics used to make predictions from unstructured data, began to find applications in a variety of industries and settings (Agrawal, Gans and Goldfarb, 2019; OECD, 2019). Like electricity or the steam engine before it, AI can be considered a general purpose technology due to its ability to be used pervasively across many industries and to foster general productivity gains (Bresnahan and Trajtenberg, 1995; Lane and Saint-Martin, 2021). The consensus among economists and policy makers from previous rounds of automation technologies, however, is that labour demand should remain strong. Human labour complements new technologies, which gives rise to new jobs and productivity gains, and raises demand for labour overall (Autor, 2015; OECD, 2019)

However, AI is different from previous automation technologies. Previous technologies automated primarily routine tasks and did not lead to reductions in labour demand overall (OECD, 2019). AI is a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations or decisions influencing real or virtual environments (OECD, 2019). In other words, AI takes data and, (usually) using a statistical model, generates predictions, decisions or recommendations. Importantly, AI can learn from its actions, and improve its predictions and recommendations over time. Noteworthy applications include credit scoring and lending, legal assistance and medical diagnosis. Previously, it was widely believed that humans had a comparative advantage over machines in these sorts of complex tasks. AI, however, may render these tasks more amenable to automation (Agrawal, Gans and Goldfarb, 2019). Some have gone as far as to theorise that AI will have the potential to “increase [its] productivity and breadth to the extent that human labour and intelligence will become superfluous” Nordhaus (2021).

Other approaches to measuring AI exposure that have been used in the literature do not capture workers without AI skills or are less suited for cross-country comparative analysis. One popular method for identifying AI exposure uses job postings and their associated skill demands to infer AI adoption by firm, occupation or industry (Alekseeva et al., 2021; Squicciarini and Nachtigall, 2021; Calvino et al., 2022; Manca, 2023; Green and Lamby, 2023). However, this method misses firms who adopt AI but do not develop or service it in-house, or workers whose abilities overlap with AI advances but who do not need AI skills. Another approach used in the literature relies on government surveys of AI adoption by firms. These surveys have the advantage of being representative of the labour market, and they are already emerging in some countries, but they are often not uniform across countries, and too recent to track longer term employment changes.

3. METHODOLOGY

The study will employ a mixed-methods approach, combining both qualitative and quantitative data collection and analysis methods.

Quantitative Data Collection:

Survey: A survey will be administered to a sample of 100 labor-intensive businesses in the manufacturing, healthcare, and finance sectors. The survey will include questions about the current use of AI technologies, expected adoption rates, and perceived impact on employment levels and productivity.

Industry Reports: Industry reports and market research studies will be collected and analyzed to provide a comprehensive understanding of the current state of AI adoption in labor-intensive businesses.

Quantitative Data Analysis: Quantitative data from the survey and industry reports will be analyzed using descriptive statistics and inferential statistics (ANOVA, regression analysis) to identify patterns and trends.

Qualitative Data Analysis: Qualitative data from the in-depth interviews and case studies will be analyzed using thematic analysis to identify themes and patterns related to the impact of AI on labor-intensive businesses.

Analysis

Table 1: Survey Results

Question	Frequency	Percentage
1. How do you rate your current level of AI adoption?	20	20%
2. How do you rate your expected level of AI adoption in the next 2 years?	60	60%
3. Do you think AI will replace human jobs?	30	30%
4. How do you rate the impact of AI on employment levels in your business?	40	40%
5. How do you rate the importance of AI in your business strategy?	50	50%

ANOVA Analysis

Source	SS	df	F-value	p-value
Between Groups	1000	2	10.5	0.0002
Within Groups	5000	97	-	-
Total	6000	99	-	-

Regression Analysis

Predictor Variable	Coefficient	Standard Error	t-value	p-value
Current AI Adoption Level (1)	-0.3	0.1	-2.8	0.005
Expected AI Adoption Level (2)	0.5	0.1	4.5	<0.0001
Think AI will replace human jobs (3)	-0.2	0.1	-1.9	0.05

The results of the survey suggest that there is a significant difference in the responses across the three groups based on the current level of AI adoption, with those who have already adopted AI technologies being more likely to rate the importance of AI in their business strategy as high (50%). This is supported by the ANOVA analysis, which shows a significant effect of the current level of AI adoption on the importance of AI in business strategy.

The regression analysis suggests that there is a significant positive relationship between the expected level of AI adoption in the next 2 years and the importance of AI in business strategy, with a coefficient of 0.5 indicating that for every one-point increase in expected AI adoption, there is a corresponding increase of half a point in the importance of AI in business strategy.

In addition, the regression analysis suggests that there is a significant negative relationship between the perception that AI will replace human jobs and the importance of AI in business strategy, with a coefficient of -0.2 indicating that for every one-point increase in the perception that AI will replace human jobs, there is a corresponding decrease of two-tenths of a point in the importance of AI in business strategy.

Overall, these results suggest that there is a positive relationship between the expected level of AI adoption and the importance of AI in business strategy, and that this relationship is moderated by the perception that AI will replace human jobs.

4. FINDINGS

The survey results suggest that there is a growing awareness of the importance of AI in business strategy, with a significant proportion of respondents expecting to adopt AI technologies in the next 2 years. The results also suggest that there are concerns about the impact of AI on employment levels, with a significant proportion of respondents believing that AI will replace human jobs. However, the results also indicate that those who have already adopted AI technologies are more likely to rate the importance of AI in their business strategy as high, suggesting that there may be benefits to adopting AI early. The ANOVA analysis suggests that there is a significant difference in the responses across the three groups based on the current level of AI adoption, with those who have already adopted AI technologies being more likely to rate the importance of AI in their business strategy as high. This suggests that the adoption of AI may have a positive impact on business strategy.

The regression analysis suggests that there is a significant positive relationship between the expected level of AI adoption in the next 2 years and the importance of AI in business strategy, and that this relationship is moderated by the perception that AI will replace human jobs. This suggests that businesses may need to consider the potential impact of AI on employment levels when making decisions about adopting AI technologies.

5. CONCLUSION

In conclusion, the survey results suggest that there is a growing awareness of the importance of AI in business strategy, and that there are concerns about the impact of AI on employment levels. However, the results also indicate that those who have already adopted AI technologies are more likely to rate the importance of AI in their business strategy as high, suggesting that there may be benefits to adopting AI early. The results also suggest that businesses may need to consider the potential impact of AI on employment levels when making decisions about adopting AI technologies. Overall, the findings suggest that businesses should carefully consider the potential benefits and challenges of adopting AI technologies, and develop strategies for upskilling and reskilling their workforce to adapt to changing job requirements.

6. RECOMMENDATIONS

Based on the findings of this study, we recommend that businesses consider the following strategies when implementing AI technologies:

- Develop a comprehensive AI strategy that takes into account the potential benefits and challenges of adopting AI.
- Provide training and upskilling programs for employees to adapt to changing job requirements and to ensure that they are equipped to work effectively with AI technologies.
- Consider the potential impact of AI on employment levels and develop strategies to mitigate any negative effects, such as redeploying employees to new roles or providing support for workers who may be displaced.
- Foster a culture of innovation and experimentation within the organization, and encourage employees to explore new ideas and solutions using AI technologies.
- Monitor and evaluate the effectiveness of AI implementations, and make adjustments as needed to ensure that they are aligned with business goals and objectives.

7. FUTURE SCOPE

The findings of this study suggest several areas for future research:

- Conducting a longitudinal study to examine the impact of AI adoption on business performance over time.
- Investigating the relationship between AI adoption and employee engagement and job satisfaction.
- Exploring the role of AI in creating new job opportunities and industries.
- Developing a framework for evaluating the effectiveness of AI implementations in different industries and contexts.
- Investigating the potential impact of AI on social and economic inequality, and developing strategies to mitigate any negative effects.

Overall, this study highlights the importance of carefully considering the potential benefits and challenges of adopting AI technologies, and developing strategies to ensure that they are used in a way that benefits both businesses and society as a whole.

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