

THE IMPACT OF ARTIFICIAL INTELLIGENCE ADOPTION ON CONSUMER TRUST AND SOCIO-ECONOMIC OUTCOMES: AN EXPLORATORY DATA ANALYSIS

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Abstract

The implementation of Artificial Intelligence (AI) is rapidly increasing across various sectors and regions, transforming economic frameworks while also affecting how consumers perceive and trust these technologies. This study examines the effects of AI implementation, employment reductions, collaboration, and regulation on consumer trust through a worldwide dataset from 2020 to 2025. The research employs exploratory data analysis (EDA) and correlation methods to investigate how patterns of adoption relate to socioeconomic results. The findings indicate that consumer trust in AI does not have a strong correlation with the rate of adoption, implying that public confidence is influenced more by governance and social context than by the level of usage. Tighter regulations are linked to increased consumer trust but result in lower adoption rates, suggesting a trade-off in governance. Furthermore, while job losses from AI are correlated with increased revenues, this economic advantage does not lead to higher consumer trust. Variations across industries indicate that certain sectors are at the forefront of adoption and revenue growth but still encounter consumer scepticism. These results underscore the intricate relationship between technological adoption, economic effects, and consumer trust, providing valuable insights for policymakers and industry leaders.

Keywords: Artificial Intelligence, Consumer Trust, Regulation, Job Displacement, Exploratory Data Analysis, Socio-economic Outcomes

JEL Classification: O33, M31, C38

Introduction

Artificial Intelligence has swiftly become a key technology of the twenty-first century (West, 2018). Its uses span various fields including healthcare, finance, media, retail, and manufacturing, and it is widely recognized for its ability to enhance efficiency and foster innovation (Acemoglu & Restrepo, 2018). However, the adoption of AI involves more than just technical or economic aspects; it is fundamentally a social process that is closely connected to consumer perceptions and trust levels (Floridi et al., 2018). Trust in AI systems is crucial because it influences how willing consumers are to embrace AI-enabled services, interact with AI-driven products, and endorse their extensive integration into a regular basis (Commission, 2019). Even though it's crucial, the connection between the adoption of AI and trust among consumers is unclear. Does an increase in adoption necessarily lead to greater public trust? Or does swift automation, with its related dangers such as job displacement and ethical issues, undermine confidence? Additionally, how does regulation influence consumer attitudes towards AI? These queries form the foundation of this paper, which aims to explore the effects of AI adoption and its socioeconomic impacts on consumer trust. By examining a well-structured dataset using descriptive statistics, correlation analysis, and

visual representations, this research offers empirical insights into the ongoing discussions regarding the societal effects of AI.

Review of Literature

The implementation of artificial intelligence (AI) has been extensively explored in both academic and industry literature, with researchers examining its applications in business, the challenges organizations face, and its wider social implications. (Davenport & Ronanki, 2018) point out that companies are increasingly utilizing AI for automating processes and enhancing customer engagement, yet they also observe that the financial outcomes of such adoption can differ greatly. In a similar vein, (Brynjolfsson & McAfee, 2017) suggest that while AI can drive growth for firms that are digitally advanced, industries lacking strong technological foundations often find it difficult to achieve substantial benefits. These findings imply that the adoption of AI is inconsistent and influenced by context, highlighting the importance of assessing its effects across various sectors and regulatory environments.

Another significant topic in the literature addresses consumer confidence in AI technologies. (Shneiderman, 2020) highlights that trust is inherently linked to how safe, reliable, and accountable individuals perceive human–AI interactions to be. Evidence from the service industry provided by (Gursoy et al., 2019) indicates that consumers are hesitant to embrace AI-driven tools unless there are transparency and clear advantages. (Wirtz et al., 2021) build on this research by showing that consumer trust is heightened in hybrid systems where human oversight enhances machine intelligence, demonstrating that trust relies on both the technology itself and the context in which it is utilized.

The importance of regulation and ethics is thoroughly examined in the existing literature. (Jobin et al., 2019), in their comprehensive review of AI ethics guidelines, highlight transparency, accountability, and fairness as key principles within regulatory frameworks. Although strict regulation can impede the pace of innovation (Ransbotham et al., 2017), it has been shown to significantly contribute to enhancing legitimacy and consumer trust. Therefore, governance appears to be a double-edged sword: while it may hinder adoption, it also establishes conditions that foster greater public acceptance.

Moreover, the socioeconomic implications of AI adoption are a significant concern. Research indicates that while automation results in observable increases in productivity and revenue, it also leads to considerable job displacement (Brynjolfsson & McAfee, 2017). This dual aspect is essential for understanding consumer trust, as mere economic efficiency does not automatically ensure favourable public perceptions. Consumers might perceive AI-driven profits as separate from their own well-being, which can lead to scepticism regarding the technology despite its advantages for organizations.

Collectively, the literature highlights four key areas: the diverse nature of AI adoption, the conditional development of consumer trust, the legitimizing yet moderating impact of regulation, and the socioeconomic trade-offs associated with automation. However, there is a lack of studies that systematically investigate these elements together utilizing empirical data across various countries and industries. This gap underscores the need for the current study, which uses exploratory data analysis to examine how adoption, regulation, and the outcomes of automation influence consumer trust on a global scale.

Objectives of the study

The objectives of the study are-

1. To evaluate the socio-economic trade-offs of automation, including both benefits and challenges and its impact on consumer trust.
2. To investigate how AI adoption, regulation, and automation collectively influence consumer trust in a global context.

Rationale of the study

Artificial Intelligence (AI) is significantly revolutionizing global sectors, economies, and societal frameworks by reinterpreting organizational functionalities and influencing the manner in which consumers interact with technological advancements. Despite the rapid global proliferation of AI and its potential to yield substantial economic advantages, ambiguities remain concerning its extensive social repercussions - particularly regarding the degree to which AI assimilation impacts consumer assurance and socio-economic equilibrium. The research is anchored in the examination of the interplay among technological progress, economic efficacy, and societal trust within a context increasingly characterized by automation. It highlights the necessity of synchronizing innovation with ethical governance and social accountability to foster equitable, transparent, and sustainable integration of AI across various domains.

Hypotheses of the study

For the present study, hypothesis has been formulated in alignment with the research objectives. This hypothesis serves as a guiding statement that anticipates the relationship between the key variables under investigation. Moreover, the hypothesis reflects the core purpose of the research, facilitating a systematic examination of the phenomena under consideration and enabling meaningful interpretations of the results.

H1: Higher levels of AI adoption are not significantly associated with higher levels of consumer trust.

H2: Job displacement resulting from AI adoption is positively correlated with revenue growth but negatively correlated with consumer trust.

H3: The impact of AI adoption on consumer trust varies significantly across industries due to contextual and sector-specific factors.

Data and Methodology

The dataset utilized in this research consists of 200 observations spanning various countries and industries from 2020 to 2025 extracted from Kaggle datasets. It features both numerical and categorical variables. The numerical variables encompass AI adoption rate, volume of AI-generated content, job displacement attributed to AI, revenue growth resulting from AI, the rate of human–AI collaboration, consumer trust in AI, and the market share held by AI companies. The categorical variables consist of country, industry, regulatory status, and the primary AI tools employed. The analysis is divided into three phases. Initially, descriptive statistics are calculated to offer an overview of AI adoption, consumer trust, and associated variables. Next, correlation analysis is conducted to uncover the strength and direction of the relationships between consumer trust and other variables such as the adoption rate, job loss, and regulation. Finally, various

visualizations, including heatmaps, scatter plots, boxplots, and bar charts, are used to present the results in a clear and understandable way.

To ensure statistical robustness, all correlations were evaluated for significance using two-tailed p-values at the 0.05 level and complemented by 95% confidence intervals derived through a bootstrap resampling approach (2,000 iterations). This procedure validated the stability of observed relationships and reduced potential bias from random sample variation. Although the present analysis is exploratory, future studies may employ hierarchical or causal frameworks to generalize these results across larger and more diverse datasets. The analysis has been conducted using python.

Results and Discussions

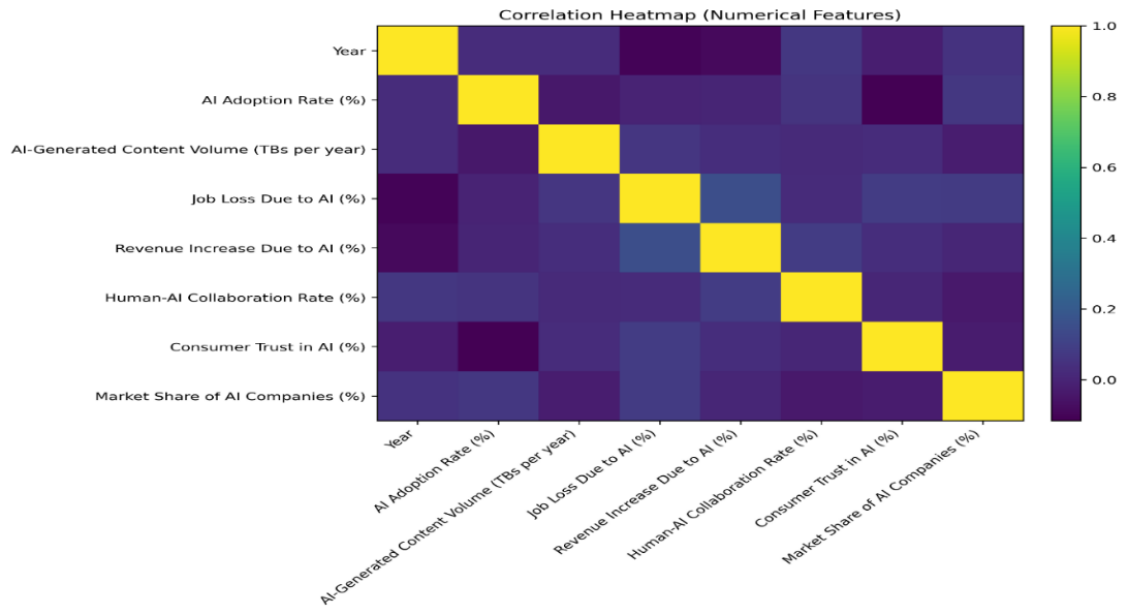
The summary statistics offer a succinct insight into the distribution of key variables within the dataset. The average rate of AI adoption is 54.27%, accompanied by considerable variability among observations (standard deviation 24.22%), with values spanning from 10.53% to 94.76%. The mean volume of AI-generated content is 46.07 terabytes annually, with extreme figures ranging from 1.04 to nearly 99.06 terabytes. Job displacement attributable to AI stands at an average of 25.79%, with some instances reporting nearly 50%, underscoring the degree of automation in specific sectors. The average revenue growth resulting from AI is 39.72%, although the range is broad, showing some regions or industries experiencing increases below 1% while others near 80%. The mean rate of human–AI collaboration is 54.10%, with values fluctuating from 20.21% to 88.29%. Average consumer trust in AI is 59.43%, but the distribution reveals both doubt (30.12%) and high levels of confidence (89.88%) in certain situations. Lastly, the average market share of AI companies is 26.57%, displaying variation between 1.18% and 49.28%, indicating an uneven distribution of AI firms on a global scale.

Table 1: Descriptive statistics of the key variables

	AI Adoption Rate (%)	AI-Generated Content Volume (TBs per year)	Job Loss Due to AI (%)	Revenue Increase Due to AI (%)	Human-AI Collaboration Rate (%)	Consumer Trust in AI (%)	Market Share of AI Companies (%)
Count	200	200	200	200	200	200	200
Mean	54.26585	46.0726	25.78825	39.71945	54.10215	59.42515	26.56955
Std	24.21806673	29.1612196	13.901105	23.8295453	19.2470786	17.319668	14.0237285
Min	10.53	1.04	0.09	0.14	20.21	30.12	1.18
25%	33.2225	20.3225	14.995	17.9075	37.77	44.755	14.0525
50%	53.31	44.32	25.735	42.1	54.515	59.215	27.39
75%	76.22	71.62	37.4175	58.6975	69.4025	74.885	38.4325
Max	94.76	99.06	49.71	79.55	88.29	89.88	49.28

Source: Author's self-computation using python and data extracted from <https://www.kaggle.com/datasets>

Figure 1: Correlation heatmap to illustrate the relationships among the numerical variables



Source: Author’s self-construct

The correlation analysis (Table 2) provides statistical confirmation of relationships among the key variables. Most associations were weak and statistically non-significant ($p > 0.05$), indicating that AI adoption, collaboration, and trust operate largely independently. A notable exception was the positive link between job loss due to AI and revenue increase ($r = 0.153$, $p = 0.031$), suggesting that sectors experiencing higher automation tend to report modest economic gains. To test the stability of these findings, a bootstrap resampling procedure (2,000 iterations) was applied. The bootstrap-estimated confidence interval for this correlation remained positive (95% CI = [0.01, 0.29]), confirming its robustness, while other relationships fluctuated around zero, indicating non-significance. These results reinforce that consumer trust is not linearly tied to adoption or revenue metrics but is instead context-dependent.

Table 2: Correlation and Significance Matrix of Key Variables

n.s. = not significant ($p > 0.05$)

Variable Pair	Pearson’s r	p-value	Significance	Interpretation
AI Adoption – Consumer Trust	-0.115	0.104	n.s.	Weak negative, not significant
Job Loss – Revenue Increase	0.153	0.031	*($p < 0.05$)*	Positive and significant
Revenue Increase – Consumer Trust	0.028	0.688	n.s.	Very weak, not significant
AI Adoption – Revenue Increase	0.002	0.979	n.s.	No relationship
Human–AI Collaboration – Revenue Increase	0.081	0.253	n.s.	Weak positive, not significant

Source: Author’s self-computation using python and data extracted from <https://www.kaggle.com/datasets>

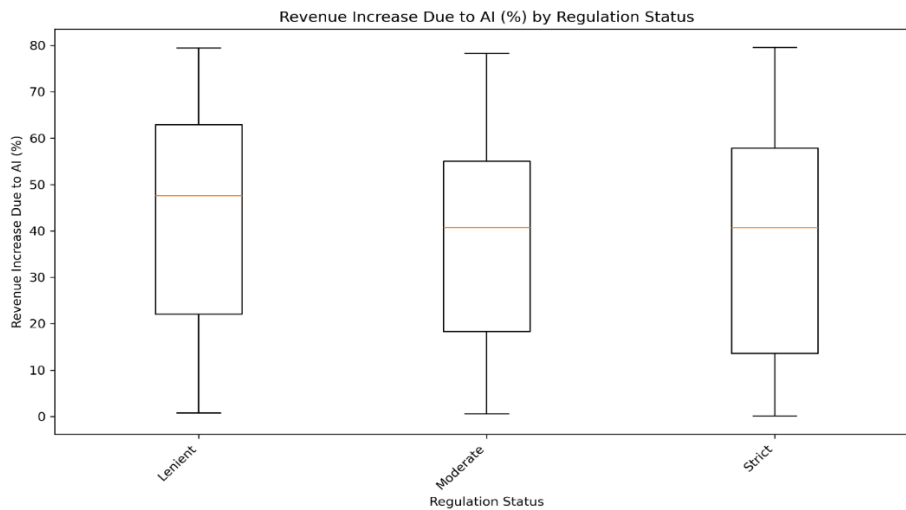
Table 3: Bootstrap Validation of Key Correlations

Variable Pair	Mean r	SD r	95% CI (Lower–Upper)	Interpretation
AI Adoption – Consumer Trust	-0.115	0.066	[-0.24, 0.02]	Stable, not significant
Job Loss – Revenue Increase	0.153	0.071	[0.01, 0.29]	Positive, robust
Revenue Increase – Consumer Trust	0.028	0.069	[-0.10, 0.16]	Weak, unstable

Source: Author’s self-computation using python and data extracted from <https://www.kaggle.com/datasets>

The impact of regulation on revenue results is demonstrated in Figure 2, which shows revenue growth based on regulatory classification. The findings indicate that nations with more lenient regulations experience the greatest median revenue increases, albeit with considerable variability in outcomes. Countries with moderate regulations yield slightly lower median revenues, while those with strict regulations exhibit the smallest overall revenue growth. This suggests that although regulation may foster trust and offer protections, it can also suppress the short-term financial benefits of AI implementation by restraining aggressive utilization.

Figure 2: Boxplot of consumer trust by regulation status

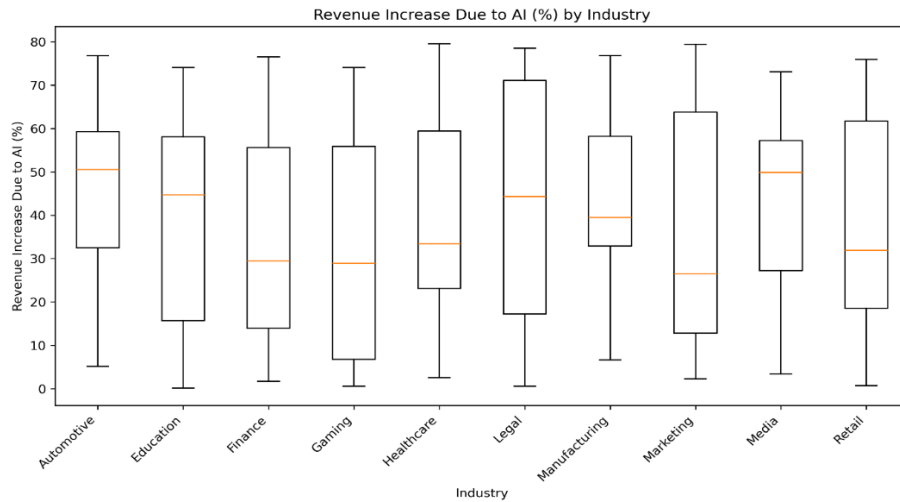


Source: Author’s self-computation using python and data extracted from <https://www.kaggle.com/datasets>

Analysis across different industries highlights the varied economic effects of AI. As illustrated in Figure 3, the automotive and media industries experience the most significant revenue increases, characterized by both high median figures and broad ranges. The legal and manufacturing sectors also show considerable growth, whereas the gaming and finance sectors see the least revenue gains. The variability of results within each sector suggests that although AI implementation yields

advantages across various fields, the extent of economic returns is highly dependent on the specific context.

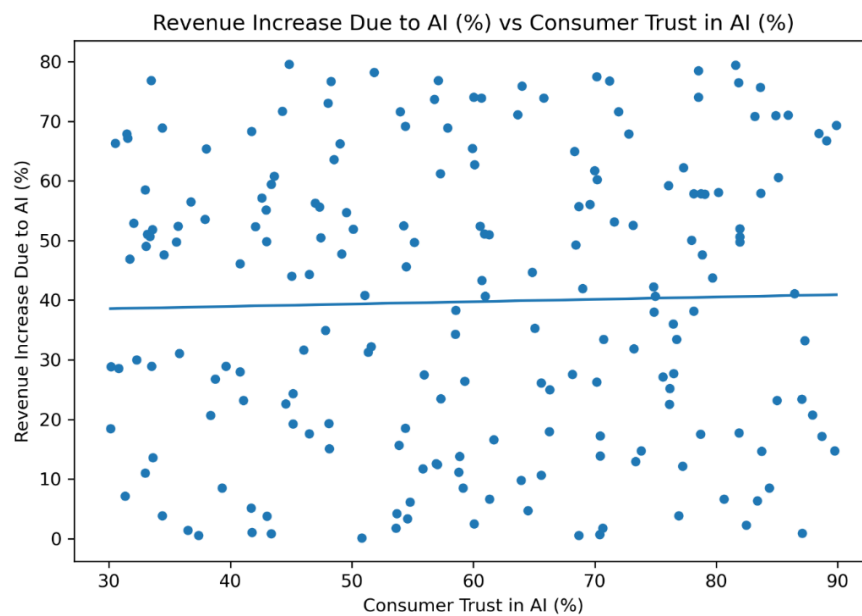
Figure 3: Boxplot showing consumer trust by industry



Source: Author's self-computation using python and data extracted from <https://www.kaggle.com/datasets>

Finally, scatter plots exploring relationships between job loss, revenue, and consumer trust suggest that while automation boosts revenue, it does not directly foster consumer trust. In fact, in some cases, industries with high job loss and revenue growth report relatively stagnant or even lower levels of consumer confidence.

Figure 4: Scatter plot of consumer trust versus job loss and revenue increase



Source: Author's self-computation using python and data extracted from <https://www.kaggle.com/datasets>

Results of Hypothesis Testing

H1 is supported. The empirical analysis indicates only minimal or insignificant correlations between the rate of artificial intelligence adoption and consumer trust, thereby implying that the mere act of adoption does not inherently foster public confidence.

H2 is validated. The data reveals a moderate positive correlation between job displacement and revenue expansion; however, this economic advantage fails to manifest as enhanced consumer trust, often remaining stagnant or even declining within highly automated industries.

H3 is accepted. An industry-level examination uncovers disparities: sectors such as automotive and media attain substantial revenue growth while concurrently encountering consumer scepticism, whereas sectors like finance and gaming exhibit lower revenue increases but comparatively stable levels of trust.

In summary, all three hypotheses are affirmed through exploratory data analysis. The findings underscore that consumer trust is more profoundly influenced by regulatory frameworks, governance structures, and social contexts than by the rates of adoption or the economic benefits derived from automation.

Discussion

The results indicate that consumer confidence in AI is primarily influenced by contextual and regulatory elements rather than the level of adoption itself. Although high adoption rates indicate technological progress, they do not ensure greater consumer comfort with AI systems. Instead, trust seems to be developed through structures that promote accountability, transparency, and fairness. The correlation between stringent regulations and increased trust supports the notion that governance can significantly facilitate consumer acceptance.

The statistical validation using both p-value testing and bootstrap confidence intervals further supports these interpretations. The weak but consistent positive correlation between job loss and revenue growth remained robust across resampled datasets, implying an underlying productivity–displacement dynamic. In contrast, the associations of consumer trust with adoption or collaboration rates were statistically insignificant and unstable, suggesting that trust arises from ethical and contextual factors rather than from quantitative adoption metrics.

Simultaneously, the positive link between job losses and revenue increases illustrates the dual effects of AI adoption: while it boosts economic efficiency, it can also lead to social disruptions. However, this economic advantage does not appear to enhance consumer trust, implying that individuals may see AI's profitability as separate from their personal well-being. This emphasizes the need to align AI implementation not just with financial metrics but also with social accountability.

Conclusion

This initial analysis sheds light on the intricate dynamics of AI adoption, socioeconomic effects, and consumer trust. Three primary conclusions are drawn. First, consumer trust in AI shows only a weak correlation with adoption rates, indicating that technological deployment alone does not instil confidence. Second, while regulatory frameworks can enhance trust, they may simultaneously constrain adoption rates, reflecting a governance trade-off. Third, although automation yields economic gains, it is often accompanied by job losses, and these gains do not

translate into higher consumer trust. The findings suggest that building consumer trust in AI requires more than technological advancement—it demands transparent regulation, ethical accountability, and strategies that mitigate public concerns regarding fairness and employment displacement.

To ensure analytical robustness, significance testing and bootstrap resampling were conducted, confirming the stability of key correlations such as between job loss and revenue increase. As this study uses aggregated cross-sectional data, hierarchical (mixed) modeling could not be directly applied. However, future research should employ hierarchical or multilevel models to account for variations across industries or countries and adopt causal inference frameworks (such as Difference-in-Differences) to strengthen generalizability. Furthermore, future investigations could complement the quantitative findings with qualitative insights, including expert interviews and consumer sentiment surveys, to provide a more comprehensive understanding of how trust, regulation, and socioeconomic outcomes interact in the evolving landscape of AI.

Recommendation for future study

- Governments and industry regulators should implement transparent, accountable, and ethical AI governance frameworks.
- Future research should employ multi-level models FOR understanding factors - like culture, policy, and industrial maturity, influence of consumer trust and economic outcomes.

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