

IMPACT OF AUTOMATION AND ARTIFICIAL INTELLIGENCE ON EMPLOYMENT AND WAGES: AN ANALYSIS

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1. Introduction

1.1 Research Background

Automation and artificial intelligence (AI) have vast impacts on the reformation of technology and operational backgrounds in different sectors. Automation refers to the application of machinery and utilisation of technology to complete work with limited human interference. It simplifies the systems and develops performance (Acemoglu & Restrepo, 2018). AI is the formulation of intelligent machines, where machines have the qualities of thought and learn as humans, for example, natural language processing. The technologies can be seen in the industries like manufacturing, healthcare, finance and customer support. Automation and advancement of AI have shaken the productivity and operational procedures (Webb, 2019). The adoption of these technologies shows a substantial transformation of traditional working norms and human interaction.

1.2 Research Rationale

To comprehend the implications of labour-saving technology and its impact on employment and wages for the class's college-level writing, it is important to recognize its deep effects on societies and their economic structures. Not only do these technologies increase productive capacity and innovation, but they also pose hard questions on displacement or the polarisation of wages (Petropoulos, 2018). These effects are the key parameters of labour market adjustment for mitigating the negative implications, providing unique opportunities for skills formation and workforce development and promoting economic growth today and into the future (Tschang & Almirall, 2021). Grounded in the contemporary empirical context of rapidly expanding automation and artificial intelligence, this work has critical insights for policymakers interested in comprehending the consequences of these disruptive forces, for businesses that want to manage these forces well, and for the workers who must confront these forces directly.

1.3 Research Objective

- To examine the impact of automation and AI on job availability across different sectors.
- To investigate how automation and AI influence wage levels within the workforce.

1.4 Research Question

Q. What is the impact of automation and artificial intelligence on employment and wages?

1.5 Research Gap

A research gap is a part of existing literature that has not yet been studied or given too little attention so critical questions or concerns have not yet been raised. As indicated above, it is putatively broad and subject to refinement through the development of a working model for approaching the research question. The researcher proposes here that one major gap in the literature on automation and artificial intelligence (AI) concerns the sustained, sector-specific impacts of these technologies on employment and wages. Existing studies have given a good sense of automation's immediate effects and the overall story of automation and AI is clear in broad economic terms, but a lot less work has been able to examine how automation affects different groups of workers, how workers adapt, how job roles are changing, and how wage trends are emerging.

1.6 Chapter Summary

In the introduction, the investigation of employment and wage effects of automation and AI is previewed and the importance of understanding how these technologies reconfigure the labour market is emphasised. It states the objectives to study job availability and wage levels in different sectors and points out the necessity of fully addressing the existing research vacuum.

2. Literature Review

Sectoral Impact of Automation and AI

Bruun & Duka, (2018), the rapid growth of the AI market is shown by its expectation of reaching \$407 billion by 2027, defining its ability to transform many sectors. AI is hugely impacting manufacturing, and by 2035 it could create \$3.8 trillion in benefits for the sector (Maheshwari, 2024).

As per Thormundsson, (2023), in this sector AI is showing a two-sided impact on jobs: Turning low-skilled jobs mechanical by speeding up productivity and increasing the quality of products being produced or taking jobs away if they do not evolve with the AI industry. In the same way,

self-driving technology is going to take 10 % of all vehicles by 2030 to a completely automated Uber service (Thormundsson, 2023). This development impacts jobs related to driving and vehicle production but in turn creates job opportunities in designing, testing, and maintaining the AI systems that will run the self-driving cars. In the business productivity realm, the fact that 64% of businesses are optimistic about AI's ability to boost productivity points to its place not just in taking away jobs, but in adding higher value work.

According to HandelMichael, (2022), voice search technology adoption by 50% of US mobile users, in addition, betrays AI's penetration into services, in turn impacting customer service jobs, but also necessitating AI programming or user experience design experts. The pair of developments are indicative of AI and automation's nuanced job availability impact: creating new employment opportunities and removing jobs at a rate that varies across sectors.

Wage Dynamics in the Age of Automation and AI

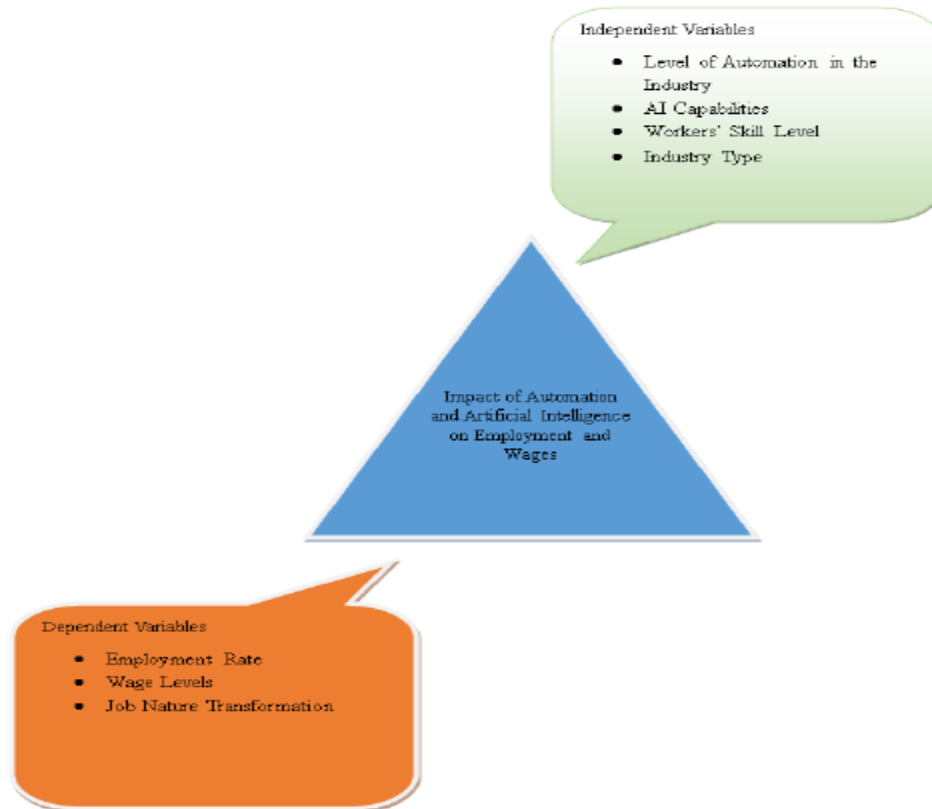
As per Brookings (2022), the rise of automation and AI has deeply affected wage dynamics, producing a trend frequently referred to as wage polarization. This development consists of a rising income gap between high-skill labourers whose wages advance thanks to technological breakthroughs—and low-skill labourers, who suffer from wage stagnation or decline.

According to Raj & Seamans, (2018), high-skill labourers, especially analytical workers with advanced degrees, frequently see their compensation grow as they take on tasks that complement AI and automation. These labourers “work on machines” instead of “working for machines,” which raises their productivity, elevates their value and lifts their wages.

On the other hand, Schlogl & Sumner, (2018) argued that workers with lower skill levels suffer head-to-head competition with machines, as their work is easily automated. Their wage growth is similarly limited and they are more likely to be displaced. In addition, automation increased wage disparity by transferring remunerations from labour to capital, causing gains in earnings to drive up business profits at the expense of wages. After that, schooling and training are more significant in this context. Those who devote more time to education and training can more easily adapt to roles which cannot be substituted by machines, which is helpful to work together with machines and consequentially, wage level increases.

As per Bessen, (2018), the dynamic nature of the situation serves as a reminder that this must recognize how wage structures are influenced across different sectors and skill levels, by automation and AI. This study want to ensure that public policy also supports workforce adaptation and skill development in the face of constantly increasing technological change.

2.1 Theoretical Framework



Source: Self Created

2.2 Literature Gap

Despite the same topic which is the labour market consequences of automation and AI being examined pretty carefully by a lot of researchers, there is still a huge space in longitudinal research that focuses on the long-term influence on employment and wages across various sectors from these technologies. The majority of studies are concerning immediate consequences or decomposing the short-term impulse, therefore, there is not any study that sufficiently answers about job creation, job replacement and how significant will the wage difference be in the long run in light of automation and AI.

3. Methodology

3.1 Research Philosophy

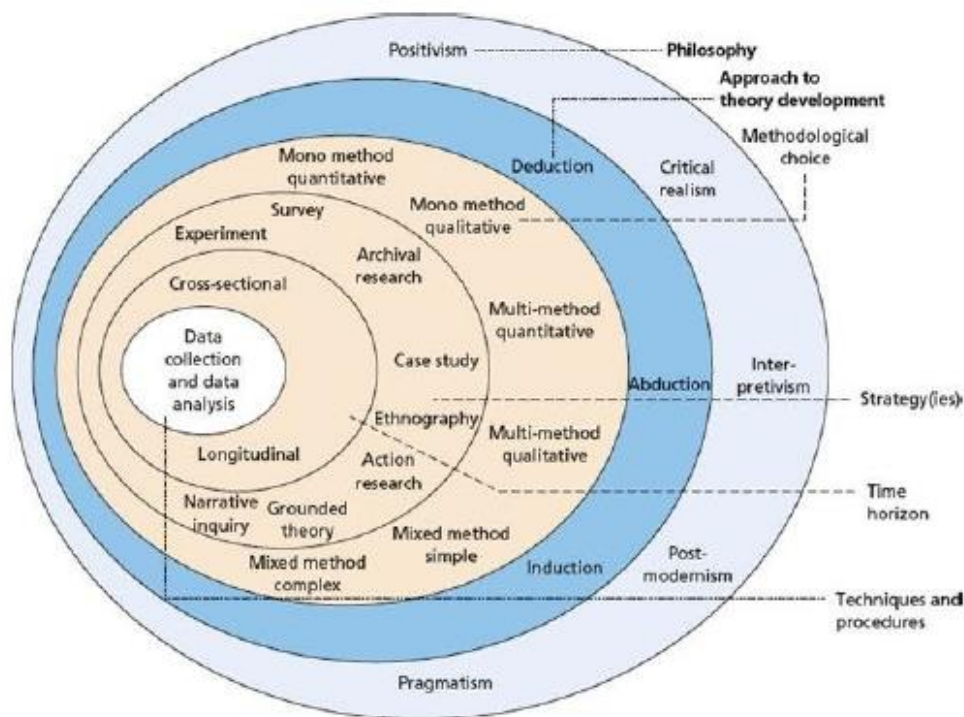
The research study takes on a positivist research philosophy where it explains heavily on pre-

existing theories and datasets to contextualise the study. Positivism recognises that knowledge is gained through empirical evidence enabling an analytical and objective examination of the impact of technologies on the labour market (Snyder, 2019). Also, the research critically ensures that our investigation is undertaken based on observable and measurable data, therefore, increasing the reliability of the research findings.

3.2 Research Approach

By employing a qualitative secondary research strategy, the present research aims to comprehend job polarisation and wage inequality arising from automation and artificial intelligence (AI), using an inductive theoretical framework (Maher et al. 2018). From extant scholarly articles and empirical references, it reviews diverse impacts on industry related to technology integration. The above approach allows for an analysis of how automation and AI have impacted job composition and wages and identifies the different effects of technological advancement on labour in terms of industry differences and overall labour market conditions. Additionally, it narrows down the gap of various views, concerning automation and wage inequality concerning developing various faces of work in progress via technology (Mehrad & Zangeneh, 2019).

Figure 1 (Research Onion)



Source- (Mehrad & Zangeneh, 2019)

3.3 Research Strategy

Utilising a qualitative secondary research design, the methodology of this research centres around an extensive literature review to investigate the nexus of automation, AI, and the labour market. The method will explore comprehensive academic, industry, and empirical publications to dominate the detailed subject (Mehrad & Zangeneh, 2019) behind the situation. The literature review will ensure the research rests on the relevant literature at present and in doing so, it will set a benchmark against which the results can be compared while determining the key areas for further research. The approach guarantees that the research findings from this study will always generate a qualitative insight into the reconfiguration of employment and wage dynamics by automation and AI at a high level when taken through a stringent analysis.

3.4 Research Choices

Methodologically, a robust examination of secondary data quality is employed. It assesses the nuanced effects of Automation and AI on employment and wages. The technique, in-depth, investigates deeply the intricate variables and patterns. Those are not easily visualised in the quant data only. An advanced evaluation of the socioeconomic repercussions of tech progress (Snyder, 2019)

3.5 Time Horizon

This investigation uses a cross-sectional perspective from the point of view of time, turned into the present (Snyder, 2019). This shows "how it is now and what immediate impact the rise of technology has on employment and wages".

3.6 Data Collection

Primary data may be gathered using a variety of approaches including online polls, surveys, questionnaires, interviews, and focus groups. Also, primary data collection enables the investigator to gain firsthand knowledge of the collected data. Primary data is regarded as reliable and accurate data as this data has not been yet explored by any researcher. Ultimately, primary data collection contributes to the fundamental analysis of experiments.

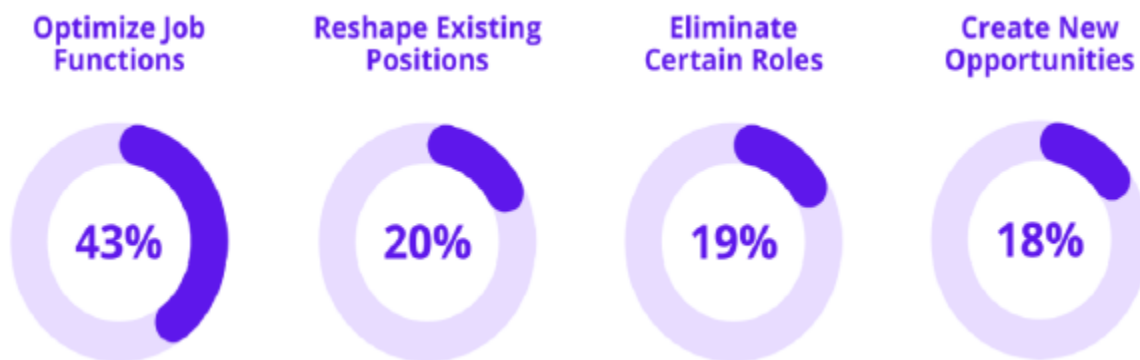
3. Data Analysis

Q. What is the impact of automation and artificial intelligence on employment and wages?

The examination of how automation and artificial intelligence (AI) will impact work is an important area of research that has surfaced as digitization and AI have developed faster than expected and are being incorporated into various industries (Tschang & Almirall, (2021). This

question looks at the complex relationship between technology transformation, technological change that saves labour, labour-saving technological innovation, labour market outcomes, technology, economic and labour market change, and technology as a disrupter. Automation and artificial intelligence (AI) can change work by reshaping traditional work roles, causing the automation of routine boring tasks, creating new types of work, shaping pay and shaping labour demand (Bruun & Duka, 2018). These effects, though, are not the same in each industry, which means that each industry will experience different outcomes. This can mean relatively more or less equality in the economy and the workforce. Understanding these is important to making public and business policy is important if anyone wants to get the benefits of this progress and limit its negative side (Aghion et al. 2019).

Figure 2 (Impact of AI in Jobs)



Source- (De Stefano, 2019)

The analysis has been guided by a theoretical framework that draws on the established ideas of technological change, and the impact on the economy and implies that for unemployment due to technology to exist, two propositions must hold (De Stefano, 2019).

First, there must be sectors in the economy that are being revolutionised by technology. Second, the result of this revolution must be unemployment in the sectors that are being revolutionised (Frank et al. 2019). The initial theory analyses economic growth from the traditional manufacturing sectors to the industries that are affected by the Bill Gates virus and the internet and computer revolution happening in the sector.

Analysis of the Impact on Employment

Job displacement is something automation and AI will continue to do. It's pretty self-explanatory that automation and AI make work/tasks so much easier that in turn drops many people from jobs and is very repetitive and robotic work. From sector to sector, of course, many have

witnessed and will witness attendant disadvantages (Korinek & Stiglitz, 2018). For instance, automation and AI arguably eliminate many tasks as work in routine, rule-based jobs, eradicating many middle-class clerical workers in sectors from truck driving to radiology. Deep-data analysis and AI will also similarly displace many attendant staple industries the US small-town banking, loan and insurance office being an obvious example as ‘trivial’ chatbots replace knowledge-based workers. Not even so-called unskilled manual work is safe from displacement (Acemoglu & Restrepo, 2020). Already, manufacturing has been hollowed out by offshoring and outsourcing. Similarly, in-store retail automation mechatronics allows one important climbing employee in signage carrying a wallet to do what once took several a storefront checkout attendant (Raj & Seamans, 2018).

If automation and AI have disrupted industries and job loss, automation and AI have also created jobs in certain industries or fields and industries that have greatly been impacted by automation or AI. These jobs have been created in technology-driven sectors and professions where jobs have changed due to the developments of AI (Schlogl & Sumner, 2018). For instance, the technology sector has experienced a rise in the demand for AI specialists, cybersecurity experts, and data scientists to satisfy the growing need for AI-driven analytics as businesses increasingly use AI in decision-making, data analyses, and protecting cyberspace (Bessen, 2018). Also, in new industries which have evolved in the last ten years like self-driving cars and artificial Intelligence-driven Healthcare solutions, there will be jobs coming up which were never there before. In this way, overall the impact of automation as regards jobs some which have been displaced and also, and it has also created jobs due to technological innovation.

The sector-specific impact of AI and automation is not consistent in terms of labour displacement but also job creation. One area that experiences a significant impact from AI is the manufacturing sector, an area where direct labour has been relied heavily on (Bessen, 2018). On the other hand, healthcare IT experiences more growth from AI but is more of a job transformation. AI has created new jobs, in care and medical data analyst roles in the healthcare sector and is currently experiencing a growing demand for AI and machine learning experts in the IT sector (Vermeulen et al. 2018). The differences between the different sectors show that technology has a duality aspect. It is true to some extent when people argue that technology displaces jobs especially when these sectors are considered (Mutascu, 2021). On the other hand, there is an opportunity for new employment for the same sectors in the transforming roles. Automation and AI, and their effect on the labour market, are not a simplifier issue.

Analysis of the Impact on Wages

Wage Polarisation: The developments in automation and AI have implications for wage dynamics, leading to an increased polarisation in the wage structure. This means that high-skill

workers, whose jobs are complementary to technology, usually see an increase in their wages, while low-skill workers see their wages stay constant, or in some cases decline (Aghion et al. 2018). In this sense, people who work as high-skill AI specialists and data scientists, for example, are in high demand, commanding high wages, since these individuals play a central role in AI system design, implementation and maintenance, and there are not many of them about (Battina, 2018). Meanwhile, people who do lots of fairly routine tasks that are very easy to automate, such as work done on assembly lines or data inputting, have seen their wages remain constant or slide because their jobs are less important or have been replaced by machines.

Figure 3 (AI and Usage)



Source- (Battina, 2018)

Wage and Salary Pressure Points: Automation and AI affect wages differently in various sectors, reflecting the different patterns of wage suppression and growth. In industries more directly affected by technology and AI, wages have so far gone up as demand for scarce skills has increased to build and run advanced AI systems (Schlogl & Sumner, 2018). In sectors further from the technology frontier, such as manufacturing and retail, automation has meant wage suppression: As demand for human labour has fallen, so has workers' bargaining power in those sectors.

One angle of AI and automation's impact revolves around the issue of income going from labour to capital. As AI and automation begin to make investments more worthwhile, the income pool

going to capital versus wages made by employees becomes larger (Bhargava et al. 2021). Once the shift becomes larger, the concept of income inequality is slowly seen more and more in the real world. As productivity booms, only the people who own the company will see the rewards of automation and AI in the form of income (Raj & Seamans, 2018). Over time, technology is designed to affect income inequality within wage structures. The power is then shifted to the technology controllers, which then begin to aggregate capital and income, furthering the wage and income inequalities.

The exploration of automation and artificial intelligence reveals a nuanced impact on the labour market which includes the opportunity for efficiency as well as a significant displacement of the workforce. Replacing jobs with artificial intelligence comes with benefits and is a sealed agreement to create new jobs for psychologists and psychiatrists to further help with psychology and issues of the human mind.

4. Findings

An examination of automation and Artificial Intelligence (AI) in the labour market reveals a complex landscape of technology's effect on jobs and wages. Research makes a case for automation and AI is a marvel of efficiency and ingenuity as well as a driver of displacement and devaluation, which requires an intricate set of policies to capitalise on this incredible technology while minimising its detriment (Schlogl & Sumner, 2018).

One of the key findings from the research is that automation and AI exhibit a double-edged impact on jobs. As the technology has matured, in many sectors and occupations it has reached a level of maturity at which it can fully substitute humans for machine-based alternatives to the performance of routine, and therefore payable tasks. Automation and AI have made jobs less secure and left many men, in particular, feeling vulnerable to displacement (Bessen, 2018). The researcher's position is that this is not a moment of transient labour market friction but an epochal shift that the economy must recognize and to which it must broadly adjust. But automation and AI are also creating jobs, just not them and not in the places they are taking them away from (Vermeulen et al. 2018). In some cases, these jobs require specialist skills that did not exist a few decades ago and in other cases, they require no more than a skills profile of general technical proficiency alongside the AI tool in question. This broken-back characterization underscores the notion that rather than ushering in a first-past-the-post third-millennium condition of 10-90 inequality, all are in the opening act of a profound rewriting of the contract between human beings and work to which at least some are currently irrevocably and pathologically committed.

Additionally, the author explores the intricate influence of automation and AI on wage

polarization, foregrounding how these technologies have amplified the fortification of the wage gap between top and bottom-tier employees. The upper echelons of employees, who are adept at using technology as an enhancement to their work ethic, have witnessed steady wage growth, while employees at the bottom of the sector face stiff competition from automation, and have seen stagnant or decreased wages (Mutascu, 2021). The claim here is not that technological progress is flawed but that economic inequalities that have been left unaddressed and have been profusely magnified. Moreover, the report also uncovers sectoral wage dynamics that reinforce the case for policy intervention. Technology-intensive industries have seen wage growth due to the strong demand for skilled labour, while high duplication sectors have struggled with wage stagnation because of automation eliminates the need for human labour (Bruun & Duka, 2018). The finding underscores the case for customizable strategies that promote skill enhancement and immediate a nation-beat across the economy.

5. Conclusion and Recommendation

Conclusion

To conclude, the researcher emphasizes the depth and range of impacts of automation and AI in the labour market and expounds on the extent of their impact through employment opportunities, job displacement and wage polarization. It is evident from the findings that detailed strategies and smart policies are necessary to offset the negative implications and gain from the advanced advent of the technologies. On one hand, being proactive, and conducive to the education and training sector and economic policies are advised to effectively tackle the complexities caused by automation and AI. Conversely, the researcher urges additional research to evaluate the related implications on jobs and earnings for gearing up labor force to be comprehensive and equitable.

Recommendation

- Given these findings, the author offers a number of prescriptions for addressing the opportunities and challenges raised by automation and AI to work. First, investments in education and in continuous skills development programs match the changing requirements of a technology-driven economy. It means not just a better focus on STEM education but also integrating critical thinking, creativity, and digital literacy throughout the entire school in which a workforce can adequately complement technological progress.
- In addition, the researcher recommends the implementation of workforce adjustment policies, which encompass re-training services as well as welfare programs for those workers that were eliminated from work by the automation. The purpose of these policies is to ensure a smooth transition to alternate job opportunities and minimize the socio-

economic costs of the dislocated workforce.

- The author also suggests the introduction of progressive wage policies and enhanced labor rights to counterbalance wage polarization and ensure fair compensation for all employees especially those in the sectors most affected by automation—through, for instance, minimum wage increases, wage subsidy programs, or support in enhancing workers' collective bargaining power.
- In summary, there is a plea to support creativity and business acumen so that fresh places of work may be created in growing sectors. Authorities and companies should unite to finance up-and-coming artificial intelligence and automation firms and small and micro-enterprises and provoke jobs and wealth.

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