

The Role of Artificial Intelligence in Automation

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Abstract

The quick growth of Artificial Intelligence has changed the way companies do work handle processes and make choices. This study looks at the role of Artificial Intelligence in automation and how AI tools can make work faster, cut down on boring jobs, reduce human errors, and support smarter decisions. The research looks at how AI used in automated systems in many different areas and checks the main advantages and problems that come with using AI to automate things. Special focus is, on how AI affects how much work gets done, how much money is saved, what jobs people do and how well companies perform. Also, the study talks about issues like keeping data safe making sure information is secure thinking about ethics and the chance that some jobs might disappear. By looking at what others have studied and looking at how AI is used now in automation, this research wants to give a full picture of how Artificial Intelligence can help make automated work better and more effective. The results are expected to show how much AI can help with lasting automation and to stress how important it is to use AI and have people watching over it.

Keywords: Artificial Intelligence, Automation, Human and AI Collaboration , Productivity

Introduction

Artificial Intelligence (AI) is one of the important technologies in the modern digital world. It is changing the way companies look at information and make choices. At the time automation has become very important for making business processes better. It helps reduce the amount of work that people do manually and makes things run smoothly. When AI and automation work together they create systems. These systems can do tasks with little help, from people. They can also adjust to situations by using the data they have.

AI-powered automation is used in lots of areas like healthcare, finance, manufacturing, transportation, education, and telecommunications. This kind of automation is different from the way, which just follows rules that are already set. AI-powered automation can look at a lot of information find patterns and learn from what happened. It can also help people make decisions. This means that organizations can automate things that're more complicated and make their work faster and better. AI-powered automation is really good at helping organizations do this.

This way of doing things has good things to offer. It can help save money when running the business. It can also make workers do their jobs faster. It can reduce mistakes that people make.. It can give employees more time to work on hard and creative tasks... There are also big problems to think about. There are worries about keeping data safe and private. There are questions about what's right and wrong when using machines. There are concerns, about whether the decisions made by AI're trustworthy. There are changes that might happen with jobs and what workers need to do. Because of this companies must look at both the parts and the bad parts before they start using AI to do work.

Background

Artificial Intelligence has grown a lot in the few years and it is now a big part of business and technology. Companies are using Artificial Intelligence more and more to do tasks that are repeated over and over, to look at a lot of data, and to help make decisions. Artificial Intelligence is different from the way of automating things, which just followed rules. Artificial Intelligence can learn from the data it gets. Change how it works in different situations.

Using Artificial Intelligence to automate tasks can help companies in ways. It can reduce the amount of work that people have to do make sure things are done correctly save time and help companies get work done. It can also help employees focus on the things that're really important like tasks that need people to think carefully and be creative.

Even though Artificial Intelligence can help companies in these ways there are still some problems that can come up when companies try to use it. Some of these problems are that it can be very expensive the data might not be good there are risks to the security of the companys information the company might not have the skills it needs and some employees might not want to use new technology. So companies need to understand what is good and what is bad about using Artificial Intelligence to automate tasks if they want to do it and make their business better, in the long run.

Problem Statement: Bridging the Gap Between AI Capabilities and Effective Automation

Artificial Intelligence has become an important technology driving global automation because companies use it to simplify tasks and reduce costs across areas like human resources and warehouses and education (Ekuma, 2024; Sodiya et al., 2024). However, a big problem remains because even though AI technology has improved very fast, many companies still struggle to use it well. This gap leads to disconnected systems and low user trust because the technology does not match the people or their work environments.

Regarding these operational challenges, Fügener et al. (2026) found that automation works best when tasks are clearly divided between humans and AI while AI augmentation is more effective when both work together. Without this clear operational design, AI can disrupt workflows, increase job polarization, and create resistance from employees (Tyson & Zysman, 2022). In addition, using AI quickly without proper governance can lead to ethical and social problems that organizations are not ready to manage (Khogali & Mekid, 2023). Although some studies suggest solutions for specific areas such as reducing teachers administrative work (Williamson et al., 2023) and improving logistics with computer vision (Sodiya et al., 2024), they do not fully address the wider challenge of managing AI effectively in organizations.

This creates an important research gap Most existing studies focus on the technical capabilities of AI instead of providing a practical framework for using AI effectively in real organizations As a result many organizations do not have clear guidance on how to use AI to improve efficiency while maintaining ethical standards and supporting collaboration between humans and AI Without addressing this gap organizations may achieve lower returns from digital transformation face more operational challenges and struggle to adapt their automated systems over time. Therefore, more research is needed to examine the overall role of AI in automation and develop practical sustainable and ethical implementation models that can improve automation across different industries

Research Objectives

Main objective:

To study how artificial intelligence can contribute to effective automation across industries while addressing the operational ethical and practical challenges that create a gap between AI capabilities and real world implementation.

Sub-objectives:

1. To analyze the current role of artificial intelligence in driving automation to simplify tasks and reduce costs across different sectors.
2. To identify the most prominent operational challenges associated with AI adoption including workflow disruption of job polarization and employee resistance.
3. To examine the ethical and governance issues related to rapid AI implementation and how organizations manage these social risks.
4. To explore how balancing task division and human-AI collaboration affect the overall effectiveness of automated systems.
5. To investigate practical and sustainable implementation models that can provide clear guidance for organizations to use AI effectively in the future.

Literature Review;

Artificial Intelligence (AI) serves as a main technology driving global automation because it helps companies increase productivity and reduce manual tasks and make better decisions. Today AI tools are growing fast across business and education and logistics and human resources. However, achieving success with AI requires companies to find a good balance between machine automation and human work while handling different organizational and ethical problems.

AI and Human Collaboration

Fügener et al. (2026) showed that AI helps automation in two distinct ways because automation works best when tasks are cleanly split between humans and AI. On the other hand, augmentation works better when humans and machines collaborate on the same task. Their study suggests that companies must carefully choose which specific tasks to automate and which tasks need teamwork.

AI and the Future of Work

Tyson and Zysman (2022) looked at how AI impacts jobs and the labor market because AI increases productivity while changing what companies need from workers. They expressed serious concerns about job polarization and flat wages and emphasized that governments need new policies to help workers adapt to these fast technologies.

AI in Warehouse Automation

Sodiya et al. (2024) investigated AI use in warehouse automation and found that machine learning and computer vision and robots improve efficiency by fixing logistics delays. However, the authors explained that high setup costs and infrastructure challenges still need more solutions before full adoption.

AI in Education

Williamson et al. (2023) studied AI in education and found that it successfully reduces administrative work for teachers. However, they warned that depending too much on AI can make learning processes too simple and lower the actual quality of education.

Implications for Future Research

The current literature shows that AI improves automation across many fields but also brings challenges in ethics and costs and human collaboration. Most past studies look only at single industries or specific tools which create a big gap in understanding the general role of AI. Therefore, future research must create a wider framework that connects technical and ethical sides to support successful AI adoption across all industries.

Research Scope

This research is about looking at how Artificial Intelligence's used in automation in different industries. It looks at how Artificial Intelligence can help make work easier save money and make decisions. Artificial Intelligence can also help with tasks that are done over and over again.

The study looks at the problems that organizations have when they start using Artificial Intelligence. These problems include changing how work is done people not wanting to use Artificial Intelligence, jobs changing keeping data safe doing the thing and following rules.

The research also looks at how people work with Artificial Intelligence and how we need to find ways to use Artificial Intelligence that're practical, good for everyone and fair. Artificial Intelligence implementation needs to be done in a way that's good, for people and the organization.

Literature review

Paper 1: Roles of Artificial Intelligence in Collaboration with Humans: Automation, Augmentation, and the Future of Work

This study shows that the best way to use AI at work depends on the type of task in some cases AI can do the whole task by itself (automation) In other cases AI works with people to improve their performance However the study also says that its results may not apply to all types of work because it was only tested in a few areas and did not consider the operational costs and challenges of using AI in real workplaces I have personally noticed this in many real life examples. (Fügener et al., 2026)

Paper 2: Artificial Intelligence and Automation in Human Resource Development

This research paper explains how artificial intelligence and automation can contribute to human resource development It shows that AI training and improves employee performance but this study is based on older research and not on practical experience and it states that it may not be suitable for small companies (Ekuma, 2024)

Paper 3: Automation, AI & Work

This study explained that artificial intelligence is replacing humans in most jobs that require physical and mental effort and it may that AI could reduce the number of jobs and lower wages for some workers and widen the gap between the rich and poor people The study also says that governments can help reduce these problems This research paper focused only on developed countries and is not suitable for developing countries (Tyson & Zysman, 2022)

Paper 4: AI-driven warehouse automation: A comprehensive review of systems

This study demonstrated how artificial intelligence improves warehouse and supply chain operations It showed how AI can predict customer demand identify products with high accuracy and help warehouse systems make better decisions when conditions change However this study did not address the significant costs of using AI systems nor did it mention the technical problems that can occur if the system is under heavy load (Sodiya et al., 2024)

Paper 5: The blended future of automation and AI: Examining some long-term societal and ethical impact features

This study explores how artificial intelligence and automation could change society in the future suggesting that AI may affect peoples daily lives It argues that we need clear rules to protect privacy limit unfair decisions and ensure AI fairness for all and also the study relies on ideas and discussions rather than real life experience and does not explain how these rules can be used in different countries (Khogali & Mekid, 2023)

Paper 6: Re-examining AI, automation and datafication in education

This research paper explains how artificial intelligence and automation can be used in education and how AI can help teachers and reduce administrative work and they also point out the possibility that it might make education too dependent on data Furthermore this study relied solely on ideas and reviews rather than actual school data so its results may not reflect what really happens in schools (Williamson et al., 2023)

Paper 7: Edge Artificial Intelligence Based Automation for Ultra-Low-Latency Control in Industrial Robotic Systems

This paper explains how Edge Artificial Intelligence can be used to achieve fast and reliable control of industrial robots, showing that a mature Edge AI system leads to more accurate and safer robotic control. The study points out that the key factor is not just the strength of the processing power, but how well the system integrates its components and how effectively it handles failures when they occur. However, this suggests the study focused more on system design and integration factors rather than testing performance under real unpredictable industrial conditions, which may limit how well the findings generalize to real-world deployment (Tarapder, 2026).

Paper 8: Generative artificial intelligence for automated essay scoring: Exploring teacher agency through an ecological perspective

This paper looks at how computers that can make things up're used to score essays and give feedback on writing. It thinks about how this affects teachers and their ability to make decisions. The paper considers the people, the schools and the society around them. It says that computers should only help teachers not make all the decisions. Teachers should check what the computer says to make sure it is fair and good for the students.. This paper is more about ideas and theories than, about what really happens

in classrooms. It does not have a lot of data from schools, which might make it harder to use in real life as noted by Barrot in 2026.

Paper 9: Perspectives for artificial intelligence in bioprocess automation

This paper is about how artificial intelligence's changing the way laboratories work. It talks about something called self-driving laboratories that can do experiments with help from people. The paper looks at bioprocessing, which's a bit more complicated because it involves living things has to follow safety rules and needs to be tested at different sizes, The people who wrote the paper think that of having machines do everything it would be better to have a system where artificial intelligence helps make decisions but people are still in charge. This seems like a realistic idea for now (Helleckes et al., 2026).

Paper 10: artificial intelligence–based automated echocardiographic analysis and the workflow of sonographers: a randomized crossover trial (ai-echo rct)

This paper reports on a randomized crossover trial testing the effect of AI-based automated analysis on echocardiographic workflow, involving 585 patients scanned over 38 study days. The study found that AI assistance reduced examination time, increased the number of daily examinations, and allowed sonographers to capture significantly more parameters per exam, while also lowering reported mental fatigue despite the higher workload. AI-generated measurements closely matched expert-endorsed values for most parameters, and image quality improved on AI days as well (Sakamoto et al., 2026).

Research Methodology

This study uses a mixed-methods approach to get an understanding of the role of Artificial Intelligence in automation. We want to know how Artificial Intelligence works in automation.

Phase 1: Literature Review

We look at what other people have found out about Artificial Intelligence and automation. We read about what they learned and what problems they faced. This helps us see what we already know about Artificial Intelligence in automation and what we still need to learn.

Phase 2: Qualitative Analysis (Conceptual Interviews)

We talk to people who work with Artificial Intelligence in automation. We ask them about the problems they face when using Artificial Intelligence. We want to know about the things and the bad things. We also want to know how people work with Artificial Intelligence.

Phase 3: Analysis (Conceptual Survey)

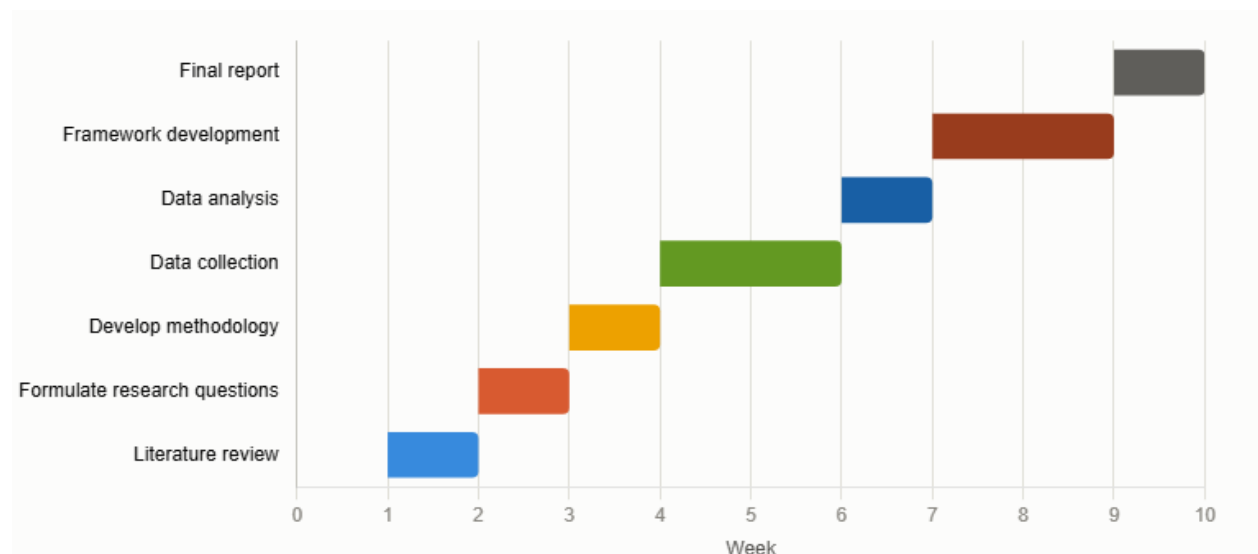
We ask a lot of people, about Artificial Intelligence in automation. We want to know if Artificial Intelligence helps organizations work better. We want to know if it saves them money and if it changes the jobs people do. We look at the answers to see if we can find any patterns.

Phase 4: Framework Development

We use what we learned from the phases to make a plan. This plan will help organizations use Artificial Intelligence in automation in a way. We want to help them use Artificial Intelligence to work and be more efficient. We also want to make sure they use Artificial Intelligence in a way that's fair and responsible. Artificial Intelligence should help people not hurt them.

Expected Results

The study is expected to show that AI improves efficiency, productivity and decision-making in automated systems. It will also identify challenges such as data privacy, ethics and employee trust, in AI. The research is expected to propose a framework that helps organizations adopt AI-based automation more effectively while maintaining human oversight.



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