



Artificial Intelligence Driven Smart Office: Enhancing Employee Efficiency and Productivity in the Age of Machine Autonomy

Fazril Muhamad Mursyidhan^{1*}

Business Administration
Politeknik Negeri Bandung
Bandung, Indonesia
fazril.muhamad.abs24@polban.ac.id

Rakha Yathaqi Witsqa²

Business Administration
Politeknik Negeri Bandung
Bandung, Indonesia
rakha.yathaqi.abs24@polban.ac.id

ABSTRACT

Digital transformation is accelerating the adoption of smart offices powered by Artificial Intelligence (AI) and the Internet of Things (IoT) to enhance operational efficiency and employee productivity. This study examines the level of AI adoption, patterns of use, and employee perceptions regarding comfort and the perceived importance of AI in supporting workplace performance. A descriptive approach was applied through a literature review and a 5 point Likert based questionnaire. Primary data were collected from 28 respondents using convenience sampling and analyzed descriptively with Microsoft Excel. The findings show that 46.4% of respondents work in offices without AI, 32.1% in offices that already implement AI, and 21.4% in offices with potential adoption. AI usage is mostly occasional (46.4%), while 21.4% report never using it. The mean scores for comfort working alongside AI and the perceived importance of AI are both 3.75 (on a 1-5 scale), indicating a generally positive attitude despite limited adoption. The study concludes that AI driven smart offices have the potential to improve efficiency and productivity, but further advancements in digital literacy, employee training, and infrastructure readiness are needed. Practical recommendations and avenues for future research are provided to encourage broader and more responsible adoption.

Keywords: Smart Office; Artificial Intelligence; Internet of Things (IoT); Efficiency; Employee Productivity



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INTRODUCTION

Advances in technology indicate that integrating Artificial Intelligence (AI) and the Internet of Things (IoT) into human resource management has substantial potential to boost organizational efficiency and productivity. The combined use of these technologies enables companies to reduce operational costs, streamline recruitment processes, strengthen employee motivation, and accelerate performance evaluations. However, their implementation also presents several challenges, including information security vulnerabilities, complex system integration, and limited technical expertise. For this reason, a strategic and collaborative implementation plan is essential to fully harness the benefits of AI and IoT in developing a smart office (Ramya *et al.*, 2024).

The title “AI-Driven Smart Office: Enhancing Employee Efficiency and Productivity in the Age of Machine Autonomy” reflects the structural changes occurring in modern work environments. Various studies show that the adoption of AI not only reshapes work mechanisms but also redefines patterns of collaboration between humans and intelligent systems. This transformation underscores a broader paradigm shift from conventional work models toward more adaptive human machine interaction (Chaniago, 2026, Efawati *et al.*, 2025). Within this context, the concept of machine autonomy, referring to a system’s ability to operate, make decisions, and perform tasks independently has become increasingly integrated into digital work processes. Recent studies indicate that artificial intelligence is increasingly shaping organizational decision making processes, yet several important aspects remain insufficiently explained. Shrestha *et al.* (2021) show that deep learning algorithms can improve the quality of decisions, but their study does not describe how human autonomy and machine autonomy interact in everyday work practices. Meanwhile, Dwivedi *et al.* (2023) highlight the significant opportunities and challenges presented by generative AI in the workplace, although their analysis focuses more on macro level issues such as ethics, organizational readiness, and policy rather than the micro level dynamics that determine how autonomy is formed when employees and AI systems work together (Efawati & Rinawati, 2026).

As a result, the existing literature has not clearly mapped the mechanisms through which human autonomy and AI autonomy are negotiated, the factors that shape this distribution of autonomy, and how these dynamics influence coordination, decision making processes, and organizational performance. However, the relationship between machine autonomy and human autonomy and its implications for organizational performance remains underexplored, emphasizing the need for more in depth academic investigation. A growing body of research also confirms AI’s contribution to productivity improvement. For instance, generative AI has been shown to improve customer service agents’ performance by 14%, particularly among novice employees and individuals with basic skills. Although AI enhances efficiency and customer satisfaction, its use often raises concerns about job stability, autonomy, and employee well being. Balancing technological advancement with employee welfare thus becomes a crucial challenge in developing smart offices (Generative AI at Work, 2023; Chaniago *et al.*, 2025).

Furthermore, AI integration in organizational settings is projected to generate up to USD 4.4 trillion in global economic value through productivity gains. Despite this potential, it also introduces risks such as shifting job roles and a growing demand for upskilling, making responsible implementation imperative to ensure that the benefits are

realized without exacerbating workplace inequalities (“Challenges and Opportunities Involved in Implementing AI in Workplace,” 2023).

Given these developments, this article aims to provide a comprehensive understanding of how AI driven smart offices can enhance employee efficiency and productivity in increasingly automated work systems. The discussion covers the concept of smart offices in the AI era, the role of machine autonomy in supporting employee tasks, and recent research on productivity enhancement and digital work dynamics. In addition to outlining theoretical foundations, the article highlights practical implications for organizations and employees, such as accelerating workflows, reducing administrative burdens, and improving decision making quality. Ultimately, this article offers strategic recommendations for designing smart offices that elevate productivity while preserving human roles and autonomy in an increasingly digitized work ecosystem.

LITERATURE REVIEW

Definition of Smart Office and AI

A smart office refers to a modern workplace concept that leverages digital technologies primarily Artificial Intelligence (AI) and the Internet of Things (IoT) to create a more efficient, responsive, and adaptive work environment. Over time, the idea of a smart office has expanded beyond automating simple tasks to encompass systems capable of analyzing data, learning from user behavior, and generating recommendations that support strategic decision making. AI functions as the central control mechanism that connects devices, sensors, and applications, enabling the office ecosystem to operate intelligently and seamlessly.

AI within the innovative office framework encompasses a wide range of approaches, including machine learning, deep learning, natural language processing, and digital assistants. These technologies allow systems to process workspace utilization data, understand employee activity patterns, automatically schedule meetings, and adjust lighting and room temperature based on user preferences. This adaptive capability transforms office automation from rigid, rule based systems into dynamic structures capable of responding to organizational needs in real time. With its predictive and analytical strengths, AI supports organizations in making faster, more accurate, and better aligned decisions (Shrivastava, 2024).

The integration of AI with supporting systems such as occupancy sensors, automated lighting controls, motion detection, HVAC regulation, and energy monitoring enables organizations to manage resources more efficiently and systematically (Ulla *et al.*, 2024). By analyzing user behavior and facility usage patterns, companies can design work environments that align with employee activities, spatial needs, and daily performance cycles. Data collected from various IoT devices can be transformed into strategic insights that facilitate space management, energy efficiency, and comprehensive facility operations.

As technology advances, smart offices have evolved from simple automated spaces into core elements of broader digital transformation initiatives. Connected data ecosystems allow organizations to monitor room occupancy levels, employee preferences, and facility usage trends in real time. When analyzed by AI driven systems, these datasets yield precise recommendations that help organizations sustainably enhance work quality (Efawati, 2024; Nurain *et al.*, 2024). For example, AI can coordinate meeting room schedules based on participant availability, propose optimized

use of underutilized spaces, and estimate energy saving opportunities by reducing device usage during specific hours.

Through this approach, employee comfort, well being, and performance can consistently improve (Ulla *et al.*, 2024; Efawati, 2020). A workspace designed according to individual preferences helps increase focus, reduce stress, and cultivate a more productive work atmosphere. Additionally, integrating smart office systems with safety infrastructures such as smart alarms and access monitoring enhances the overall security of the work environment. Aligned with these concepts, findings from various institutional settings confirm that AI, sensor, and IoT based technologies significantly influence energy efficiency and work effectiveness. Research in vocational education environments, for instance, demonstrates that using light sensors, automated temperature controls, and centralized energy management systems reduces energy waste and simplifies facility supervision (Komalasari *et al.*, 2025). These findings reinforce the relevance of smart office applications not only in the corporate sector but also in education, government, and other institutions that require modern facility management.

However, much of the existing literature still centers on technological development and hardware infrastructures. Few studies thoroughly examine how implementing smart offices affects employee behavior, individual performance, and overall organizational productivity. Human centered aspects often remain overlooked, even though the success of digital transformation is strongly influenced by employee comfort, adaptability, and acceptance of new technologies.

This limited understanding of how smart office practices shape employee behavior and performance creates a research gap that warrants further attention. Organizations may possess advanced technologies, but without insights into how employees use and experience these tools, implementation may fall short of its potential. Therefore, studies incorporating organizational behavior variables such as workplace comfort, employee satisfaction, perceptions of technology, and levels of digital facility utilization are essential.

A more comprehensive research approach is needed to directly measure the impact of smart office adoption on work efficiency and employee productivity. Examining the relationships among AI, digital work environments, and human performance is crucial to bridging existing gaps. Through this lens, the smart office can be understood not merely as a technological innovation but as a new work system that unifies technical components with human centered design principles to support the organization's broader goals.

Implementation of AI Technology in Smart Offices

The application of artificial intelligence in smart office environments is achieved through the integration of interconnected hardware and software components that form a unified digital ecosystem capable of operating autonomously. IoT sensors such as occupancy, temperature, humidity, and light sensors serve as the primary data collectors, while actuators such as LED lighting, smart relays, and automated temperature controllers execute commands generated by AI driven systems. All these devices are managed through mobile applications or web based monitoring platforms that connect to cloud services such as ThingSpeak and Blynk. The operational data gathered are processed using machine learning techniques to predict space utilization patterns, optimize energy consumption, and support more effective communication between

devices and among employees (“Artificial Intelligence Support System Design for Smart Offices,” 2023).

In practice, ESP32 based microcontroller systems have become one of the most widely adopted technologies for smart office implementation due to their ability to integrate occupancy sensors, intelligent lighting, climate control, and access management within a centralized platform. This system can automatically adjust lighting intensity and room temperature based on user presence and detected activity patterns. When a room is unoccupied, the system reduces lighting levels or switches off certain devices to minimize energy use. Conversely, when employees enter the space, lighting and temperature settings shift to the most comfortable levels. Real time monitoring enhances the system’s responsiveness to changes in the work environment, thereby significantly improving operational flexibility (Gatea *et al.*, 2024).

The integration of AI, IoT, and blockchain further accelerates workflow optimization by automating repetitive tasks and streamlining organizational processes. Blockchain adds a layer of security to sensor data and device activity records, ensuring stronger data integrity and traceability. The synergy among these three technologies fosters simpler, more efficient, and better coordinated workflows, while simultaneously promoting collaboration between humans and machines. Empirical findings confirm that combining these technologies modernizes organizational practices and consistently improves productivity. Reduced administrative workloads, faster communication flows, and automated facility management systems are among the major advantages organizations experience (Suram, 2024).

The development of interactive smart workspace systems reinforces the essential role of real time data in managing the modern work environment. Systems that integrate temperature, humidity, CO₂ sensors, light intensity meters, and mobility tracking via RFID and Bluetooth can dynamically adjust room conditions to meet user needs. When CO₂ levels rise, the system automatically increases ventilation to maintain optimal air quality. Similarly, humidity and temperature are controlled to ensure environmental stability. Experimental results indicate control stability rates of 92% for CO₂ levels, 94% for humidity, and 96% for temperature demonstrating the system’s capability to consistently maintain comfort and energy efficiency (Garg *et al.*, 2025).

In actual organizational settings, the use of AI in smart offices also involves automated devices such as motion, light, and temperature sensors, as well as programmable relays that independently activate or deactivate equipment. Komalasari *et al.* (2025) found that occupancy and light sensors could automatically control air conditioners, lighting systems, and electronic devices based on room conditions. When natural light is sufficient, the automatic system reduces artificial lighting intensity to lower energy consumption. At the same time, the Office Automation System (OAS) serves as a foundational component in smart office development, accelerating administrative processes, minimizing human error, and strengthening inter process integration through interconnected digital technologies (Chaniago, 2025).

The integration of automated devices not only influences work process efficiency but also shapes employees’ perceptions of comfort and ease in performing tasks (Efawati, 2023). These perceptions play an important role in driving productivity and overall work effectiveness. Smart office implementation affects employee behaviors in several ways, including adaptation to new technologies, improvements in digital literacy, and readiness to work within data driven workflows. The human technology interaction dimension becomes a strategic element in ensuring successful smart office adoption. Although technology plays a central role, its success ultimately depends on employees’

acceptance, understanding, and comfort in using the system. Therefore, this human centered component requires deeper investigation to enable organizations to maximize technological benefits while cultivating a flexible, adaptive, and highly productive work environment.

Impact on Efficiency

The implementation of artificial intelligence in smart offices significantly improves facility efficiency and organizational operations. AI technologies, through adaptive automation and real time analytics, can make rapid decisions based on data from a network of IoT sensors. These systems regulate lighting, HVAC, and other electronic devices based on each room's occupancy level. When a space is not in use, lights and air-conditioning units automatically shut down to reduce energy consumption. Conversely, when employees enter the room, the system adjusts environmental conditions to maintain comfort. These improvements extend beyond energy savings; predictive maintenance powered by AI can detect potential device failures early, lowering the risk of malfunction and reducing repair costs. As a result, asset utilization becomes more efficient, and organizational productivity increases sustainably (Bin Masud *et al.*, 2025).

Gatea *et al.* (2024) emphasize that smart offices enhance energy efficiency through automatic adjustments aligned with employee needs. Optimizing energy use and adapting to user requirements create a workspace that is both energy efficient and highly responsive to occupant comfort. Automated systems that regulate lighting, ventilation, and temperature contribute to a stable and efficient working environment. Consequently, operational costs can be reduced substantially. Several studies indicate that although the initial investment required to implement a smart office is relatively high, the long term savings particularly in energy consumption, improved work time efficiency, and accelerated administrative workflows allow the investment to pay off within a few years. The integration of AI and IoT also supports more measurable and efficient use of energy, time, and operational budgets.

Smart workspaces utilize real time monitoring and data analytics to optimize spatial management. AI technologies help identify areas that are frequently, rarely, or never used. Such insights enable organizations to plan space more effectively, including adjusting room capacity, reorganizing layouts, or even reducing the utilization of certain areas to save costs. Additionally, automated administrative processes such as document approvals, digital file management, interdepartmental coordination, and reduced meeting delays or bureaucratic waiting times directly improve work efficiency and cost-effectiveness within modern smart office environments (Ndaguba & Arukwe, 2024). Consistent with these findings, Komalasari *et al.* (2025) report that IoT and intelligent automation can reduce electricity consumption from 225 kWh to 155 kWh per month, amounting to approximately 31% energy savings. This demonstrates that sensors and AI not only enhance workplace comfort but also directly contribute to measurable energy efficiency. On the administrative side, Chaniago (2025) finds that AI based digital office systems can reduce manual tasks, accelerate document processing, and improve decision-making accuracy. With integrated digital systems, workflows from document distribution to data verification and archival storage become significantly shorter, increasing operational efficiency by up to 40% in several cases.

Across the literature, improvements in smart office efficiency generally arise through two main mechanisms. First, the efficiency of physical facilities is enhanced

through automated energy management, intelligent lighting, HVAC optimization, and more measurable space utilization. Sensors and AI work together to reduce resource wastage while maintaining employee comfort. Second, administrative workflows become more efficient through shorter waiting times, faster employee coordination, and higher process accuracy. This digitalization allows organizations to conduct operations more quickly and with greater precision.

However, most previous studies have focused primarily on technical outcomes and have not examined how employees perceive the efficiency these technologies produce. Employee perception is critical, as it shapes technology acceptance, workplace comfort, and the long term sustainability of system use. Smart office implementation can only be considered successful when the efficiency achieved is not only measurable from a technical perspective but also directly experienced by employees in their daily work routines. This gap highlights the need for empirical research on the relationship between smart office implementation and employee work efficiency, particularly in modern work environments that increasingly rely on digital technologies.

Impact on Employee Productivity

The rapid development of modern technologies, including smart office systems, plays an essential role in enhancing organizational productivity. Automating routine tasks allows employees to shift their attention to strategic, analytical, or creative work. When automated systems handle time consuming administrative activities, employees gain more mental space to think broadly, innovate, and improve the quality of their decisions. (Rk & Mk, 2024) emphasize that the management of implementation challenges, such as infrastructure readiness, employee training, and alignment with organizational culture must accompany the use of technology. Without sufficient preparation in these areas, the productivity gains offered by technology cannot be fully realized.

Findings by Gatea *et al.* (2024) demonstrate that intelligent systems are capable of creating “intelligent, responsive, and efficient workplace environments that increase productivity, lower expenses, and promote employee well being.” A responsive work environment emerges because IoT and AI integration enables workspace conditions to adapt to employee preferences, thereby improving comfort. Appropriate lighting, automated temperature control, and flexible workspaces have been shown to enhance focus and employee satisfaction. Over time, sustained comfort supports stable productivity and reduces fatigue and workplace disruptions.

The application of AI has also been proven to increase the speed and accuracy of task completion. Processes such as report generation, data processing, scheduling, and task monitoring can be automated, allowing employees to focus mainly on supervision and final analysis. Human machine collaboration significantly enhances productivity but requires employee adaptation and sufficient human capital readiness. For this reason, recent studies recommend aligning AI system adoption with training programs, digital literacy development, and ongoing skill enhancement to ensure technology is used optimally. The study (“Exploring the Impact of Artificial Intelligence on Employee Productivity,” 2025) further confirms that AI driven smart offices can create better working conditions, enhance physical comfort, and accelerate the completion of complex tasks.

AI’s role in boosting productivity becomes even more evident through the automation of repetitive tasks, predictive analytics, and personalized recommendations. Technologies such as natural language processing, machine learning, and data driven

recommendation systems provide significant assistance in decision making. Although not specifically focused on smart offices, research by Gowda A. G. *et al.* (2023) demonstrates that AI powered systems enable employees to prioritize tasks more effectively, reduce workload intensity, and lower stress levels. These implications are highly relevant in modern smart office settings, where administrative burdens can be greatly reduced through automation. Contemporary management literature also highlights the importance of digital technologies such as automated dashboards, electronic archives, cloud based document management, and data oriented workflows in accelerating work processes. Chaniago (2025) finds that AI based digital offices can expedite document distribution, improve accuracy, and reduce reliance on manual procedures ultimately accelerating task completion and supporting employee productivity. Meanwhile, research by Komalasari *et al.* (2025) demonstrates that smart offices create responsive, comfortable, and technically stable working environments, enabling employees to concentrate more effectively without the need to manually adjust office facilities.

Nevertheless, previous studies reveal variations in the degree of effectiveness of intelligent technologies in enhancing productivity. Some studies report substantial improvements, while others identify obstacles such as employee resistance to new technologies, digital literacy gaps, and challenges in adapting to the system. A limited understanding of technological functions may also prevent employees from utilizing smart office features to their full potential. These varied findings indicate that productivity is influenced not only by technology but also by human factors.

Therefore, further research is needed to evaluate the impact of technological implementation not only on quantitative aspects such as work speed or the number of tasks completed but also on qualitative dimensions, including comfort, job satisfaction, technological perception, and work life balance. Productivity analysis in the context of modern smart offices must consider psychological and environmental factors as mediators that may strengthen or weaken the effects of technology on performance. With a more comprehensive approach, organizations can better understand how smart offices truly affect long term employee productivity.

Challenges and Risks of Machine Autonomy

The implementation of AI and automation in the workplace presents several ethical issues that modern organizations must address carefully. These challenges include the potential disappearance of certain job roles, diminished recognition of human contributions, and reduced autonomy and moral responsibility among employees as algorithms begin to make a portion of organizational decisions. Such circumstances highlight the importance of creating a fair, inclusive, and transparent work ecosystem. Additionally, integrating AI increases the risk of privacy violations and cybersecurity threats, making it essential for organizations to adhere to ethical principles, enforce strong data protection policies, and establish robust information governance frameworks (Kayyali, 2025).

The management of employees' personal data is a central concern in the deployment of intelligent technologies. Many smart office systems rely on activity monitoring, occupancy sensors, behavioral data, and access control logs elements that can raise significant privacy concerns. Vulnerabilities to cyberattacks, limited digital infrastructure, and employees' low awareness of information security further complicate efforts to maintain data integrity. To address these risks, organizations must enforce strict

data protection policies, provide comprehensive security training, and invest in technologies such as encryption, multi factor authentication, and intrusion detection systems. These challenges also demand collective moral responsibility and underscore the importance of preventing algorithmic bias to ensure that management processes remain objective and free from discrimination (Hadi *et al.*, 2025).

Within the context of human resource management, the adoption of AI continues to face barriers, including low trust in algorithmic systems and limited digital skills among professionals. Concerns arise when AI driven decisions are perceived as unfair or biased, particularly in recruitment, promotion, or performance evaluation. Excessive reliance on algorithms may also reduce employees' sense of autonomy and influence workplace dynamics. When digital literacy gaps persist, the implementation process can be hindered, as some employees may feel unprepared for organizational changes brought by new technologies (Wójcik, 2025).

Komalasari *et al.* (2025) identify constraints, including limited budgets, low staff digital competence, and continued reliance on manual processes in administrative environments. These findings indicate that the transformation toward a smart office cannot be achieved instantly without a well prepared adaptation strategy. Chaniago (2025) further argues that successful digital transformation depends on human resource readiness, leadership that encourages innovation, and an organizational culture open to change. Employee resistance and fears of job loss due to automation remain significant challenges that must be addressed through continuous training, skill development, and clear communication about the technology's purpose and benefits.

From a theoretical standpoint, these interconnected challenges demonstrate that the success of smart office implementation depends not only on technological sophistication but also on organizational readiness and employee's capacity to adapt. This condition underscores the importance of incorporating moderating variables, such as digital literacy, organizational support, and technological readiness, into research models. These variables may influence the relationship between smart office systems and employee performance. Therefore, a deeper understanding of risks, resistance, and technological preparedness provides a strong conceptual foundation for developing the moderating hypotheses in this study.

RESEARCH METHOD

This study employs a descriptive research method to provide an objective overview of employees' perceptions, comfort levels, and patterns of AI utilization in workplace environments. A descriptive method is appropriate because earlier studies on smart office systems also focus on identifying observable tendencies, environmental responsiveness, and user behavior without experimental manipulation (Komalasari *et al.*, 2025; Ulla *et al.*, 2024).

The literature review was carried out by examining scientific works related to smart offices, IoT based workplace environments, environmental monitoring, workflow automation, and employee technology interaction. These studies provided the conceptual foundation for determining questionnaire indicators, particularly those related to environmental adaptation, digital facility management, productivity support, and user experience (Chaniago, 2025; Gatea *et al.*, 2024; Gowda A. G. *et al.*, 2023; Rk & Mk, 2024; Suram, 2024).

Primary data were collected on 10 December 2025 through a digital questionnaire distributed via Google Forms. The questionnaire items were developed based on themes

discussed in the literature, including sensor supported workplace comfort, AI driven workflow integration, and employee readiness toward smart office technology (Garg *et al.*, 2025; Komalasari *et al.*, 2025). A five point agreement scale was used to capture respondents' perceptions of comfort, usability, and the perceived importance of AI in supporting workplace performance.

This study used convenience sampling due to limited access to the broader population. Similar smart office studies also rely on convenience sampling because it allows researchers to access respondents who interact directly with digital systems and automated environments in their daily work activities (Komalasari *et al.*, 2025; "The Intersection of AI and Employees: Evolutionary Trends in Research," 2025).

All collected data were analyzed descriptively using Microsoft Excel to identify tendencies in respondent's answers. This analytical method aligns with previous research that describes technology usage patterns, environmental stability, and user comfort in AI and IoT enabled workplace settings (Gatea *et al.*, 2024; Ulla *et al.*, 2024).

Table 1. Age Distribution of Respondents (n = 28)

Age Group	Percentage	Frequency
20-30 years	7.1%	2
31-40 years	28.6%	8
>40 years	64.3%	18

Source: Own Compilation (2025)

As shown in Table 1, the majority of respondents are aged 40 or older, accounting for 64.3% (18 individuals). The 31-40 age group represents 28.6% (8 individuals), while respondents aged 20-30 constitute only 7.1% (2 individuals). This composition suggests that most participants are from a more mature, experienced age group, which may influence how they perceive, respond to, or adopt new technologies such as AI in the workplace.

Table 2. AI Implementation Status and Frequency of AI Use in the Workplace (n = 28)

Variable	Category	Percentage	Frequency
AI Implementation in the Workplace	Not yet implemented	46.4%	13
	Already implemented	32.1%	9
	Potential implementation	21.4%	6
Frequency of AI Use	Never	21.4%	6
	Occasionally	46.4%	13
	Fairly often	17.9%	5
	Frequent / intensive	14.3%	4

Source: Own Compilation (2025)

Table 2 shows that the largest proportion of respondents (46.4%) work in environments where AI has not yet been implemented, whereas 32.1% reported existing AI implementation and 21.4% indicated the possibility of future adoption. This suggests that although the current level of AI integration remains relatively low, there is considerable room for growth. In terms of usage frequency, the majority of respondents use AI only occasionally (46.4%), and 21.4% have never used it. Only a small portion reported using AI fairly often or intensively. Overall, these findings indicate that AI use remains limited and has not yet become routine in daily work activities. All instruments,

data, and supporting materials are available to readers upon request. There are no access restrictions regarding any materials or procedures used in this study.

RESEARCH RESULTS

The findings show that the respondent composition is dominated by individuals aged 40 or older, accounting for 64.3% of the total sample. The 31-40 age group follows with 28.6%, while respondents aged 20-30 represent the smallest proportion. This distribution provides an overview of the basic characteristics of participants who completed the questionnaire and indicates that most respondents are employees with relatively long work experience. The uneven age distribution also reflects generational variation in the workplace, which may influence the extent of their understanding and engagement with modern technologies.

Regarding the implementation of artificial intelligence (AI) in the workplace, the data reveal differences among respondents. A total of 46.4% reported that their workplace has not yet adopted AI in any form. Meanwhile, 32.1% indicated that AI has been implemented in their organization, whether through automation systems, data driven applications, or digital tools supporting administrative tasks. Additionally, 21.4% stated that their workplace has the potential or is considering the possibility of adopting AI. These findings suggest varying levels of adoption and indicate that the integration of AI in workplaces is still in a developmental stage.

The frequency of AI use among employees also varies. The largest group consists of respondents who use AI only occasionally, representing 46.4%. Furthermore, 21.4% stated that they have never used AI in their work. Only a small proportion of respondents reported more frequent or regular use of AI, though this group remains relatively small. Employee perceptions of AI were assessed through two main indicators: comfort when working alongside AI technologies and perceptions of AI's importance for organizational development. Both indicators yielded an average score of 3.75, suggesting that respondents generally feel reasonably comfortable with AI and view it as beneficial for supporting organizational progress.

Overall, the results of this study provide a descriptive overview of the respondent's characteristics, the extent of AI adoption in the workplace, the frequency of employee use, and their perceptions of the technology, without offering further interpretive analysis.

DISCUSSION

The findings indicate that the use of artificial intelligence (AI) in the workplace is still at an early stage. However, employee perceptions already reflect a generally positive outlook toward the technology. The respondent profile, dominated by individuals aged 40 years or older (64.3%), shows that most participants are senior employees with long professional experience, particularly in administrative and manual tasks. Meanwhile, 28.6% are aged 31–40, and only a small portion belong to the 20–30 age group. This distribution illustrates a generational setting in which long serving employees who are accustomed to conventional office environments are gradually encountering more digital systems. Their extensive experience tends to shape their perceptions of AI often with caution, yet coupled with openness to technological advancements (Gowda A. G. *et al.*, 2023; Komalasari *et al.*, 2025).

The level of AI implementation across workplaces shows substantial variation. Nearly half of the respondents (46.4%) reported that their offices have not implemented AI in any form. In contrast, 32.1% stated that AI is already used in their workplaces, although likely in limited functions such as automated attendance, digital document processing, or sensor based monitoring (Garg *et al.*, 2025; Gatea *et al.*, 2024). A further 21.4% noted that their offices have plans or potential to adopt AI systems. These findings suggest that AI development in office environments is progressing gradually and has yet to achieve consistent implementation across organizations (Komalasari *et al.*, 2025; Suram, 2024). The frequency of AI use among employees similarly shows limited engagement. The largest proportion (46.4%) use AI only occasionally, while 21.4% have never used AI in their daily tasks. Only a small number report regular or continuous use. Despite this low utilization, respondents expressed positive perceptions in two key areas: their comfort working with AI and their views on AI's relevance for organizational growth. Both indicators achieved a mean score of 3.75, suggesting that employees regardless of the current adoption level in their workplace recognize AI's potential to improve work quality (Gowda A. G. *et al.*, 2023; Rk & Mk, 2024).

The findings also align with the concept of smart offices, which integrates AI, IoT, and sensor based technologies to create adaptive, efficient, and responsive work environments (*Technology Assisted Smart and Sustainable Workspace*, 2023; Ulla *et al.*, 2024). In such settings, automation, predictive analytics, and facility management operate simultaneously. Devices such as temperature, lighting, and occupancy sensors support real time environmental adjustments, while AI based systems contribute to digital document management, performance monitoring, and data driven recommendations (Garg *et al.*, 2025; Gatea *et al.*, 2024). Literature consistently shows that these technologies enhance comfort, energy efficiency, and workplace productivity (Rk & Mk, 2024; Shrivastava, 2024). Thus, the positive perceptions found in this study indicate employee awareness of the benefits associated with smart office systems, even if practical implementation remains limited.

From a technical perspective, previous studies describe AI enabled smart offices as requiring integrated systems involving sensors, microcontrollers, cloud computing, and digital data management (Gatea *et al.*, 2024; Suram, 2024). These technologies collectively enhance lighting, air circulation, and spatial management. The survey results, however, highlight that challenges emerge not only from technical readiness but also from human resource characteristics. The dominance of older employees may indicate potential digital literacy gaps, as younger workers generally adapt more quickly to new technologies (Gowda A. G. *et al.*, 2023). Komalasari *et al.* (2025) further note that constraints such as limited digital competence, budget restrictions, and reliance on manual processes remain common obstacles to smart office adoption. Beyond technical and human factors, issues of ethics and security also influence AI acceptance. Concerns related to data protection, misuse of personal information, and algorithmic bias have become increasingly prominent (Hadi *et al.*, 2025; Kayyali, 2025; Wójcik, 2025).

Despite these challenges, employees' positive perceptions regarding the importance of AI suggest significant opportunities for organizations to transition toward technology driven work environments. Numerous studies show that AI can expedite task completion, reduce manual workloads, and enhance accuracy and consistency in administrative processes (Bin Masud *et al.*, 2025; Gatea *et al.*, 2024). In addition, AI contributes to energy efficiency, optimized space utilization, and improved workplace comfort, all of which support higher productivity levels (Chaniago, 2025; Rk & Mk,

2024). These insights indicate that employees recognize the value of technological progress and understand how AI can transform work processes.

This study contributes to a deeper understanding of AI adoption and human resource readiness in Indonesian workplace settings. The findings provide empirical evidence of the current state of AI use, emphasize the importance of developing employee competencies alongside technological investments, and offer a contextual understanding that enriches Indonesia's smart office literature (Komalasari *et al.*, 2025; Ulla *et al.*, 2024). Although practical implementation remains limited, employees already demonstrate positive perceptions of AI's potential to reshape workplace dynamics (Rk & Mk, 2024).

CONCLUSIONS

The study successfully achieved its objective of understanding employees levels of awareness, perceptions, and utilization of AI to support smart office practices. The findings indicate that employees hold positive views toward the technology, reflected in the average score of 3.75 for both comfort working alongside AI and perceptions of AI's importance for organizational development. However, overall AI adoption remains relatively low, as most workplaces have not yet fully integrated it into their daily operations. These results highlight significant opportunities for organizations to enhance efficiency, productivity, and the overall quality of the work environment by adopting intelligent office systems. During the development of this research, several challenges were encountered, particularly in obtaining contextual references, maintaining consistency in interpreting employees' perceptions, and aligning the findings with the rapid development of AI technologies.

These limitations should be considered when interpreting the study's outcomes. Given these challenges, future researchers are encouraged to involve a broader and more diverse sample to obtain richer insights into employees readiness for AI adoption. Further studies may also explore additional variables, such as digital literacy or organizational support, to deepen the understanding of factors influencing AI implementation in the workplace. Strengthening methodological approaches and incorporating more updated literature will help generate findings that are more comprehensive and relevant to ongoing developments in smart office practices.

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