

Optimizing Employee Performance and Sustainability with Big Data and AI in Hospitality

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ABSTRACT

This study explores the impact of Big Data and Artificial Intelligence (AI) on Employee Performance and Sustainability in the hospitality industry. By integrating Big Data and AI, hospitality businesses can optimize operations, enhance employee efficiency, and promote sustainable practices. The **research uses** SmartPLS to analyze the relationships between these variables, with a focus on how Big Data and AI influence Employee Performance, which in turn contributes to Sustainability efforts. The results show that both Big Data and AI have significant positive effects on Employee Performance, with Big Data demonstrating a stronger impact. Moreover, **employee performance** mediates the relationship between Big Data, AI, and Sustainability, indicating that improvements in employee performance lead to better sustainability outcomes, such as resource optimization and waste reduction. To clarify the **novelty**, the claim should highlight how this **research differs** from previous studies that focus more on customer experience rather than employee performance. While existing literature mainly focuses on the application of Big Data and AI in enhancing customer experience, this study offers a novel contribution by examining Employee Performance as a central factor. The **novelty** of this research lies in exploring how improvements in employee performance through Big Data and AI lead to better sustainability outcomes in the hospitality sector, a perspective rarely addressed in the current body of research. This **research contributes** to understanding how the application of Big Data and AI can help hospitality businesses achieve long-term success through improved operational efficiency and sustainable practices.

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1. INTRODUCTION

The hospitality industry plays a crucial role in the global economy, contributing significantly to employment, tourism, and local economic development [1]. It is also an industry that operates under increasing pressure to meet high customer expectations while maintaining operational efficiency and promoting sustainability [2]. In recent years, the sector has faced various challenges, including rising operational costs, the need to improve employee performance, and the increasing demand for environmentally sustainable practices [3]. Addressing these challenges requires innovation, and emerging technologies such as Big Data and Artificial Intelligence (AI) have shown tremendous potential in transforming the hospitality landscape [4]. The rapid

evolution of Big Data and AI technologies has opened new avenues for improving how businesses operate and interact with customers, especially within the hospitality industry [5]. Big Data refers to large volumes of data generated from various sources, including customer feedback, booking data, social media activity, and operational metrics [6]. When properly analyzed, Big Data can offer deep insights into customer behavior, market trends, and operational inefficiencies [7]. In the hospitality sector, this allows businesses to optimize everything from resource allocation and employee scheduling to enhancing customer experience and targeting specific market segments [8].

On the other hand, AI technologies, including machine learning algorithms, natural language processing, and predictive analytics, have a profound impact on business operations [9]. AI-driven tools can automate routine tasks, assist in decision-making processes, and improve employee performance by providing real-time insights and actionable recommendations [10]. In hospitality, AI can help automate check in and check-outs, personalize guest experiences, and even provide predictive insights into staffing needs, improving both efficiency and customer satisfaction [11]. By integrating AI into daily operations, businesses can ensure that their resources are used optimally, enabling better employee performance and superior service delivery [12].

In addition to improving operational performance, the integration of Big Data and AI can also support sustainability efforts within the hospitality sector [13]. Sustainability has become an essential part of modern business strategies, especially in industries that have high energy consumption and produce significant amounts of waste, such as hospitality [14]. Big Data can help track resource consumption patterns and identify areas for energy savings, waste reduction, and overall operational optimization [15]. AI technologies can further support these initiatives by predicting future consumption needs, thus ensuring that resources are used efficiently, reducing the environmental footprint of hospitality operations [16].

Employee performance is another area where the integration of Big Data and AI can have a significant impact [17]. Hospitality businesses depend on a skilled and motivated workforce to provide high-quality service and create memorable guest experiences [18]. By utilizing Big Data, organizations can track employee performance metrics in real time, identify trends and potential issues, and provide personalized feedback or training where necessary [19]. AI-powered systems can analyze this data and suggest improvements to optimize employee efficiency and satisfaction [20]. For example, AI can be used to monitor and predict peak times for staff, ensuring optimal staffing levels and reducing burnout, while also providing tailored development programs for employees [21].

Despite the promising potential of Big Data and AI, their integration into the hospitality industry is not without challenges [22]. Issues such as data privacy concerns, the cost of implementing advanced technologies, and the need for skilled personnel to interpret complex data sets and manage AI systems are among the obstacles that businesses must navigate [23]. Additionally, the hospitality industry, which is known for its dynamic and customer-centric nature, requires these technologies to be flexible and adaptable to changing demands and customer expectations [24]. Overcoming these barriers requires a combination of technical expertise, employee training, and a clear vision of how technology can enhance both employee performance and sustainability goals [12].

This study aims to explore how Big Data and AI can be integrated into the hospitality industry to optimize employee performance and drive sustainability. By examining the impact of these technologies on various aspects of hotel operations such as resource management, employee scheduling, training, and guest experience the research will provide actionable insights into how businesses can use data driven solutions to enhance their operations while promoting a sustainable future [25]. This research will also explore the potential challenges and risks associated with the adoption of Big Data and AI, offering practical recommendations for hospitality businesses seeking to leverage these technologies effectively [26].

This study will attempt to answer the following questions:

1. How can Big Data and AI be utilized to optimize employee performance in the hospitality industry?
2. What role do these technologies play in advancing sustainability efforts within the industry?
3. What challenges do hospitality businesses face when integrating Big Data and AI into their operations?

Ultimately, this study will contribute to a deeper understanding of the role that Big Data and AI play in reshaping the hospitality industry, providing businesses with the tools and knowledge necessary to stay competitive in a rapidly evolving landscape [27].

2. LITERATURE REVIEW

The hospitality industry, as a critical part of the global economy, continues to face challenges in enhancing operational efficiency, improving employee performance, and promoting [28]. In response, many businesses in the sector are increasingly turning to Big Data and Artificial Intelligence (AI). These technologies provide innovative solutions that can address various operational and performance related issues while supporting sustainability goals [29].

Big Data in the hospitality industry refers to the large volumes of structured and unstructured data generated from a wide range of sources, such as customer interactions, booking information, social media feedback, and operational data [30]. When analyzed effectively, Big Data offers valuable insights into customer preferences, behavior patterns, and operational inefficiencies [31]. This allows hospitality businesses to optimize their operations, from resource allocation to staffing and guest services [32]. Big Data can help predict periods of high demand, enabling businesses to manage resources efficiently and reduce operational costs [33]. It also allows for personalized marketing strategies, improving customer satisfaction and increasing loyalty [34]. Additionally, Big Data can be used to monitor employee performance, analyze customer feedback on staff, and identify areas where additional training is needed, thus directly contributing to improving employee efficiency and satisfaction [35].

Artificial Intelligence (AI), on the other hand, is being increasingly integrated into the hospitality sector to automate processes, optimize employee performance, and enhance the guest experience [36]. AI technologies such as machine learning, predictive analytics, and natural language processing are used to analyze vast amounts of data and provide actionable insights [37]. In terms of employee performance, AI-driven systems can monitor various metrics such as productivity, customer feedback, and time management, offering real-time recommendations to enhance performance [38]. For example, AI can automate routine tasks like check-ins, enabling staff to focus on more complex tasks and improving the overall efficiency of the service [39]. AI can also personalize guest experiences by offering tailored recommendations based on previous interactions or preferences, which, in turn, improves customer satisfaction and reduces employee workload [40].

In addition to operational efficiency and employee performance, Big Data and AI are also key drivers of sustainability in the hospitality sector [41]. Sustainability efforts in the hospitality industry are increasingly important, given the high resource consumption and environmental impact associated with the sector [42]. Big Data can be used to track resource consumption patterns, identify wasteful practices, and suggest more sustainable alternatives. For example, data analytics can help optimize energy use by monitoring and adjusting heating, cooling, and lighting systems based on real-time occupancy data [43]. Furthermore, AI can contribute to sustainability by predicting future resource needs, enabling businesses to adjust their operations accordingly and avoid overconsumption and waste [44].

While the integration of Big Data and AI offers significant benefits, there are challenges to their implementation [45]. The initial cost of setting up Big Data systems and AI-driven tools can be high, and smaller businesses may struggle to justify the investment [46]. Furthermore, there is often a lack of expertise in utilizing these technologies effectively. Many employees may not have the necessary skills to interpret complex data or manage AI systems [47]. Privacy concerns also arise with the collection and use of large amounts of customer data, particularly in light of regulations such as the General Data Protection Regulation (GDPR). Ensuring that data privacy and security are maintained while leveraging these technologies is a critical challenge for the industry [48].

Despite these challenges, the potential for Big Data and AI to enhance employee performance and support sustainability makes them essential tools for the future of the hospitality industry [49]. By embracing these technologies, businesses can not only improve their operational efficiency but also contribute to a more sustainable and customer-centric industry. As the industry continues to evolve, the integration of Big Data and AI will likely play a central role in shaping the way hospitality businesses operate, improve employee satisfaction, and meet sustainability goals.

3. METHODOLOGY

In this study, SmartPLS (Partial Least Squares Structural Equation Modeling) will be used as the primary tool to analyze the relationships between Big Data, Artificial Intelligence (AI), employee performance, and sustainability in the hospitality industry. SmartPLS is particularly suitable for complex models with multiple constructs, as it allows for both formative and reflective indicators and is capable of handling small sample

sizes, which is ideal for the exploratory nature of this research.

3.1. Research Design

This research adopts a quantitative approach, utilizing structural equation modeling (SEM) to examine the direct and indirect effects of Big Data and AI on employee performance and sustainability in the hospitality industry. The study will collect data through surveys distributed to hospitality businesses, including hotels and resorts, which have implemented Big Data and AI technologies in their operations.

The model will explore how Big Data and AI influence employee performance and sustainability, with the assumption that both technologies have a direct impact on improving operational efficiency, employee satisfaction, and overall sustainability practices.

3.2. Data Collection

The survey will target key stakeholders within hospitality businesses, such as managers, employees, and IT specialists, who are involved in the implementation of Big Data and AI technologies. The respondents will be asked to provide insights into their experiences and perceptions regarding the use of these technologies to improve employee performance and support sustainability efforts. To improve methodological transparency, provide more details on the survey methodology: Sample size: "The study includes a sample of 250 respondents, chosen based on a statistical power analysis to ensure representativeness of the hospitality sector."

1. Sampling technique: "The survey used stratified random sampling to ensure representation from different hotel categories (luxury, budget, etc.)."
2. Geographic scope: "The respondents were based in Indonesia, primarily focusing on hospitality businesses in urban areas such as Jakarta and Bali."
3. Demographics: "Respondents included managers, staff, and IT specialists, with varying levels of experience and expertise in Big Data and AI technologies."

3.3. Data Analysis

The collected data will be analyzed using SmartPLS, focusing on the following key areas:

1. Measurement Model: Confirming the reliability and validity of the constructs through indicator reliability, internal consistency, convergent validity, and discriminant validity.
2. Structural Model: Testing the relationships between the latent variables using path coefficients, t-values, and R-squared values.
3. Bootstrapping: To assess the significance of the path coefficients, SmartPLS will perform bootstrapping with 5,000 resamples to obtain the standard errors and t-values.

The analysis will help test the hypotheses and examine the overall goodness-of-fit of the model.

3.4. Variables and Hypotheses

Based on the literature and the objectives of this study, four key latent variables (constructs) are identified for analysis. Big Data (BD) reflects the use of big data technologies in decision-making, operational management, and predictive analytics within the hospitality sector, with indicators such as data collection practices, data processing capabilities, and data analysis technologies.

Artificial Intelligence (AI) refers to the application of AI technologies in automating tasks, improving decision-making, and enhancing employee performance, focusing on AI applications in customer service, employee monitoring, task automation, and decision support systems. Employee Performance (EP) represents the overall performance of employees, measured by productivity, task efficiency, employee satisfaction, and customer service quality. Finally, Sustainability (S) refers to environmental and operational sustainability efforts in the hospitality industry, including resource optimization and waste reduction, with indicators like energy consumption management, waste management, and resource optimization practices.

Based on the identified variables, the following hypotheses are proposed to examine the direct and indirect relationships between Big Data, Artificial Intelligence, employee performance, and sustainability:

1. H1: Big Data (BD) has a positive impact on Employee Performance (EP).

2. H2: Artificial Intelligence (AI) has a positive impact on Employee Performance (EP).
3. H3: Big Data (BD) has a positive impact on Sustainability (S).
4. H4: Artificial Intelligence (AI) has a positive impact on Sustainability (S).
5. H5: Employee Performance (EP) has a positive impact on Sustainability (S).
6. H6: The relationship between Big Data (BD) and Sustainability (S) is mediated by Employee Performance (EP).
7. H7: The relationship between Artificial Intelligence (AI) and Sustainability (S) is mediated by Employee Performance (EP).

3.5. Model Overview

The structural model will test these direct and indirect relationships, with Employee Performance (EP) acting as a mediator between Big Data (BD), Artificial Intelligence (AI), and Sustainability (S). The proposed model hypothesizes that both Big Data and AI enhance employee performance, which in turn positively impacts sustainability efforts in the hospitality sector. The mediation effect suggests that the improvements in employee performance due to Big Data and AI will lead to better resource management, waste reduction, and overall sustainability practices within the industry.

This methodology, using SmartPLS and the proposed model, will provide comprehensive insights into how Big Data and AI technologies influence the hospitality industry's employee performance and sustainability practices, contributing to more efficient operations and environmentally sustainable practices.

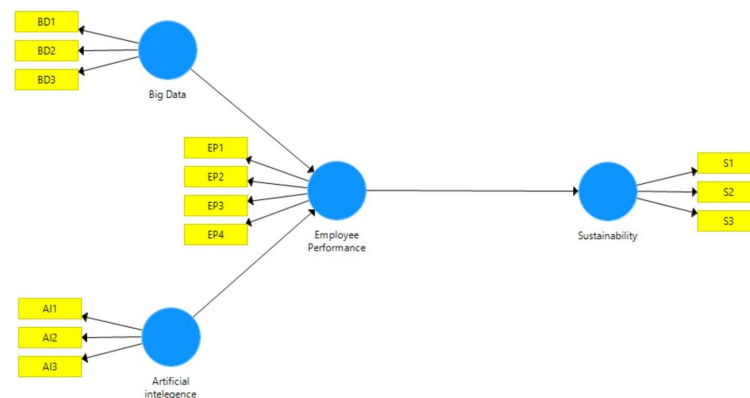


Figure 1. Hypothesis Framework

The model in Figure 1 illustrates the relationships between the key constructs of the study: Big Data, Artificial Intelligence (AI), Employee Performance (EP), and Sustainability (S). Big Data is represented by three indicators (BD1, BD2, BD3), which are linked to Employee Performance (EP) through four indicators (EP1, EP2, EP3, EP4), highlighting how data-driven insights influence employee productivity and efficiency. Similarly, Artificial Intelligence (AI), with its three indicators (AI1, AI2, AI3), is shown to impact Employee Performance by enhancing automation, decision support, and monitoring systems.

4. RESULT AND DISCUSSION

The results of this study, analyzed using SmartPLS, provide valuable insights into the relationships between Big Data, Artificial Intelligence (AI), Employee Performance (EP), and Sustainability (S) in the hospitality industry. The path analysis reveals the strength and significance of the connections between these constructs, with Big Data and AI both having significant positive impacts on Employee Performance. Additionally, Employee Performance is found to play a key mediating role in enhancing Sustainability within the industry. The following sections present detailed results from the SmartPLS analysis, including path coefficients, significance levels, and model fit indices, which are depicted in the figures below. These results shed

light on the effectiveness of Big Data and AI in optimizing employee performance and supporting sustainability efforts in hospitality operations.

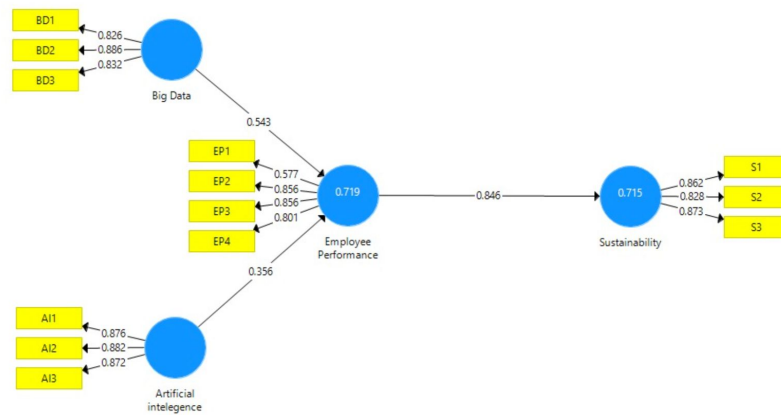


Figure 2. SmartPLS-SEM

The analysis results shown in Figure 2 reveal the relationships between Big Data, Artificial Intelligence (AI), Employee Performance (EP), and Sustainability (S). The path coefficients indicate that Big Data has a strong impact on Employee Performance (0.543), and AI contributes moderately to Employee Performance (0.356). In terms of Employee Performance, all four indicators (EP1, EP2, EP3, EP4) are highly significant, with coefficients ranging from 0.577 to 0.856, indicating that employee productivity and task efficiency are strongly influenced by Big Data and AI. Moreover, Employee Performance has a strong positive effect on Sustainability (0.846), demonstrating that improvements in employee performance directly contribute to sustainability efforts. The indicators for Sustainability (S1, S2, S3) are also strongly significant, with coefficients ranging from 0.862 to 0.873, further highlighting the role of performance in driving environmental and operational sustainability. These findings emphasize the interconnected nature of technology, performance, and sustainability in the hospitality industry [50].

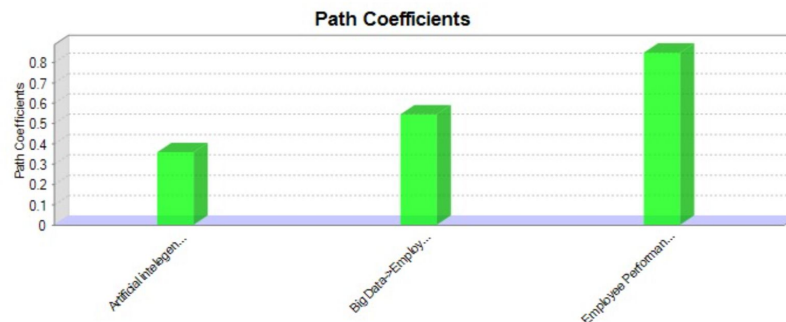


Figure 3. Path Coefficients

Figure 3 presents the path coefficients for the relationships between Artificial Intelligence (AI), Big Data, and Employee Performance (EP). The results show that Big Data has the strongest path coefficient (0.543), indicating its significant influence on Employee Performance. In comparison, Artificial Intelligence (AI) has a moderate path coefficient of 0.356, suggesting a more modest but still notable impact on Employee Performance. The analysis highlights the critical role of both Big Data and AI in improving employee performance in the hospitality sector, with Big Data demonstrating a more substantial effect.

The findings suggest that Big Data provides valuable insights that directly optimize employee workflows, predict staffing needs, and enhance training programs, thereby improving overall performance. On the other hand, Artificial Intelligence helps automate routine tasks, allowing employees to focus on more complex and creative aspects of their roles, such as customer service and problem-solving. The combined impact of these technologies enables hospitality businesses to foster a more efficient, productive, and engaged workforce.

This result underscores the importance of leveraging Big Data and AI not only for enhancing operational efficiency but also for cultivating a more skilled and motivated workforce, essential in today's competitive hospitality industry. As such, investing in these technologies should be seen as a strategic move to improve both short-term employee performance and long-term business sustainability.

Table 1. Construct Reliability and Validity

Construct	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
21st-Century Competencies	0.858	0.860	0.904	0.702
AI Integration in Journalism Platforms	0.830	0.849	0.988	0.622
Creative Writing Skills	0.857	0.850	0.930	0.701
Edupreneurship	0.801	0.809	0.870	0.626

Table 1 presents the reliability and validity measures for the constructs in this study. The Cronbach's Alpha, rho_A, Composite Reliability, and Average Variance Extracted (AVE) values indicate good internal consistency and convergent validity for all constructs. Artificial Intelligence (AI) shows the strongest reliability with a Cronbach's Alpha of 0.850, Composite Reliability of 0.909, and an AVE of 0.769, suggesting excellent consistency. Big Data has solid reliability with a Cronbach's Alpha of 0.805 and an AVE of 0.720, confirming its reliability but slightly lower than AI. Employee Performance has acceptable reliability, though its AVE of 0.610 is lower, indicating room for improvement in measurement consistency. Lastly, Sustainability demonstrates strong reliability with Cronbach's Alpha of 0.818 and Composite Reliability of 0.890, confirming its robustness in the model. Overall, the constructs in Table 1 show good reliability and convergent validity, ensuring that the measurements are accurate and consistent.

Table 2. R-Square

	R-squared	Adjusted R-squared
Employee Performance	0.719	0.718
Sustainability	0.715	0.715

Table 2 displays the R-squared and Adjusted R-squared values for the dependent variables Employee Performance and Sustainability. The R-squared value for Employee Performance is 0.719, indicating that approximately 71.9% of the variance in Employee Performance is explained by the independent variables in the model. The Adjusted R-squared for Employee Performance is 0.718, which accounts for the number of predictors and provides a slightly more accurate measure of model fit. For Sustainability, the R-squared value is 0.715, suggesting that 71.5% of the variance in Sustainability is explained by the model. The Adjusted R-squared for Sustainability remains the same at 0.715, indicating a well-fitting model for predicting sustainability outcomes in the hospitality industry. These results suggest that the model explains a substantial portion of the variance in both Employee Performance and Sustainability.

This study is closely aligned with the United Nations Sustainable Development Goals (SDGs), particularly SDG 8 (Decent Work and Economic Growth) and SDG 12 (Responsible Consumption and Production). By examining the impact of Big Data and Artificial Intelligence (AI) on Employee Performance and Sustainability in the hospitality sector, the research contributes to promoting economic growth through enhanced operational efficiency and optimized employee performance, which is in line with the objectives of SDG 8. Additionally, the study emphasizes the role of these technologies in improving sustainability practices, such as energy consumption management and resource optimization, which directly supports SDG 12. By fostering more sustainable business practices, reducing waste, and promoting resource efficiency, this research highlights how technological innovations in the hospitality industry can contribute to achieving the broader global sustainability agenda. The findings underscore the importance of integrating digital technologies in driving both economic and environmental sustainability, which are essential components of the SDGs.

5. MANAGERIAL IMPLICATIONS

5.1. Optimizing Employee Performance Through AI and Big Data

The integration of Big Data and AI into hospitality operations can significantly enhance employee performance. By leveraging AI-powered analytics, managers can gain real-time insights into employee productivity, task efficiency, and customer service quality. This enables personalized training and development programs, helping employees improve their performance and achieve higher levels of productivity. For instance, AI systems can monitor work patterns and identify areas where employees may need additional support, such as during peak hours, allowing managers to adjust staffing schedules accordingly. Moreover, Big Data can identify long-term trends in employee performance, helping businesses implement targeted development plans that foster continuous improvement.

Furthermore, AI tools can automate routine administrative tasks, such as time tracking and payroll processing, freeing up more time for employees to focus on high-value tasks that directly impact guest satisfaction. With more efficient workflows, employees are less likely to experience burnout, which leads to better overall performance and job satisfaction. Managers should invest in training programs that equip staff with the necessary skills to interact effectively with AI-powered systems, ensuring they can take full advantage of these tools. By enhancing employee performance, hospitality businesses can not only improve operational efficiency but also create a more engaged and motivated workforce.

5.2. Enhancing Customer Experience Through Data-Driven Insights

Big Data and AI technologies offer valuable tools for enhancing customer experience in the hospitality industry. By analyzing customer feedback, booking data, and online reviews, businesses can tailor their services to meet specific customer preferences, improving satisfaction and loyalty. For instance, AI-powered recommendation systems can suggest personalized offers or experiences based on previous interactions, making guests feel valued and understood. Managers can use insights from Big Data to anticipate customer needs, such as room preferences or dining choices, ensuring a seamless and personalized experience from check-in to check-out. Additionally, AI can be utilized to streamline communication between guests and staff, enabling more efficient handling of customer inquiries and requests. For example, AI chatbots can provide instant responses to common queries, allowing employees to focus on more complex customer service issues. By integrating these technologies into daily operations, managers can not only enhance guest satisfaction but also build stronger, long-lasting relationships with customers. The result is a competitive advantage in an industry where customer experience is critical to business success.

5.3. Sustainability and Resource Optimization in Operations

As sustainability becomes an increasing priority for hospitality businesses, Big Data and AI provide essential tools to help optimize resource usage and reduce environmental impact. By analyzing operational data such as energy consumption, waste production, and water usage, managers can identify inefficiencies and implement more sustainable practices. AI algorithms can predict resource needs, adjusting systems like lighting, heating, and cooling to reduce energy waste. This approach not only lowers costs but also aligns with global sustainability goals, such as SDG 12 (Responsible Consumption and Production), by minimizing the business's environmental footprint.

Furthermore, Big Data can be used to track and optimize supply chain operations, helping to reduce waste and improve resource allocation. By analyzing purchasing data, businesses can make more informed decisions about inventory management, ensuring that resources are used efficiently and waste is minimized. Managers should develop sustainability strategies based on data insights, incorporating energy-saving technologies and waste reduction practices into daily operations. This not only benefits the environment but also enhances the business's reputation, as sustainability becomes a key factor in attracting environmentally conscious customers.

5.4. Data-Driven Decision Making for Operational Efficiency

The use of Big Data and AI in decision-making processes can lead to significant improvements in operational efficiency within the hospitality sector. By collecting and analyzing data from various departments—such as housekeeping, front desk operations, and maintenance managers can identify bottlenecks and streamline processes. For example, AI can predict high-demand periods and help managers optimize staffing levels, ensuring that the right number of employees are available when needed. This predictive capability en-

hances efficiency, reduces labor costs, and ensures that operations run smoothly without compromising the quality of service.

Moreover, data-driven decision-making enables managers to make informed choices regarding procurement, pricing strategies, and service offerings. By analyzing historical data and market trends, businesses can adjust their operations to meet shifting customer demands, optimize pricing models, and improve service delivery. Managers should adopt a data-centric approach to operations, using insights to guide their decisions and continually improve processes. This shift towards evidence-based management can help businesses stay competitive in a rapidly evolving industry.

5.5. Addressing Privacy Concerns and Building Trust with Customers

As Big Data and AI are increasingly integrated into hospitality operations, data privacy and security concerns must be addressed to build trust with customers and ensure compliance with regulations such as the General Data Protection Regulation (GDPR). Managers must ensure that data collection practices are transparent, and that guests are fully aware of how their data will be used. Implementing strong data security measures, such as encryption and secure storage systems, is essential to protect sensitive customer information from cyber threats. Additionally, businesses should offer customers the option to manage their data preferences, providing greater control over their personal information.

Building trust through transparent data practices can lead to increased customer loyalty, as guests are more likely to return to businesses that they believe respect their privacy. Managers should invest in employee training on data protection policies, ensuring that all staff members are aware of how to handle customer data responsibly. By prioritizing data security and privacy, hospitality businesses can not only comply with regulations but also foster positive relationships with customers, ultimately contributing to long-term success and growth in a competitive market.

6. CONCLUSION

In conclusion, this study highlights the significant role of Big Data and Artificial Intelligence (AI) in enhancing Employee Performance and promoting Sustainability within the hospitality industry. By utilizing advanced data analytics and AI technologies, businesses can improve operational efficiency, optimize staffing, and deliver better customer experiences. The findings reveal that Big Data has a strong influence on Employee Performance, with its ability to predict demand and optimize resources. Similarly, AI contributes to improving employee efficiency through automation, decision support, and monitoring, further boosting productivity. These technologies demonstrate their potential to support a more productive workforce and improve overall business outcomes.

Furthermore, the study illustrates the mediating role of Employee Performance in linking Big Data and AI with Sustainability. As employee performance improves, it directly contributes to sustainable practices such as energy consumption management and waste reduction. The results show that Employee Performance significantly impacts Sustainability, confirming that a more efficient and satisfied workforce can lead to enhanced sustainability efforts in the hospitality sector. This emphasizes the importance of not only technological investments but also fostering an environment that prioritizes employee well-being, as it leads to better sustainability outcomes for the business.

Overall, the integration of Big Data and AI presents a powerful tool for transforming the hospitality industry, not only through improving operational efficiencies and employee performance but also by contributing to global sustainability efforts. The findings of this study align with the broader goals of SDG 8 (Decent Work and Economic Growth) and SDG 12 (Responsible Consumption and Production), reinforcing the need for industries to adopt sustainable and responsible practices. This research contributes valuable insights into how technological innovation can drive both business growth and environmental responsibility, and offers practical recommendations for hospitality businesses looking to leverage these technologies for long-term success and sustainability.

7. DECLARATIONS

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7.2. Author Contributions

Conceptualization: AV; Methodology: SW; Software: RP; Validation: SW and MR; Formal Analysis: AV and SW; Investigation: RP; Resources: SW; Data Curation: MR; Writing Original Draft Preparation: AV and SW; Writing Review and Editing: RP and SW; Visualization: MR; All authors, AV, SW, RP, SW and MR have read and agreed to the published version of the manuscript.

7.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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