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The Role of Robotics-Driven Productivity, Profit, and Employee Satisfaction in Enhancing Sustainability in the Beverage Industry

Jimoh Adams Lukman[1], Zi Jian Oh[2], Muhammad Azim Akmal bin Johani[3*], Muhammad Alimi bin Mohd Tarmizi[4], Muhammad Afiq Hakimie bin Ahmad Sobri[5], Muhammad Amar Basyir bin Sulaiman[6], Suryo Wirawan[7], Dhymas Pramana Wicaksana[8], Mikita Trusevich[9], Daisy Mui Hung Kee[10]
University of Ilorin, Nigeria[1]
Universiti Sains Malaysia, Malaysia[2,3,4,5,6,10]
University of Brawijaya, Indonesia[7,8]
Belarusian State Economic University, Minsk, Belarus[9]
Corresponding author: azimakmaljohani1112@student.usm.my[3]

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ABSTRACT

This research examines the perceptions of individuals from diverse backgrounds regarding the role of robotics in the Coca-Cola industry, focusing on productivity, profitability, and employee satisfaction. The objective was to evaluate how robotics impacts organizational efficiency and sustainability in beverage manufacturing, especially Coca-Cola. A quantitative methodology was employed, utilizing a Google Form questionnaire distributed to 50 respondents from Malaysia, Indonesia, India, and Belarus. The survey assessed the perceived productivity, profitability, and satisfaction related to robotic integration in Coca-Cola's operations. Results indicated that respondents rated the productivity of robotics positively, with a mean score of 3.84, suggesting a strong perception of automation's efficiency. Profitability was similarly viewed favorably, with a mean of 3.86, indicating that robotics contributes to organizational profitability. Employee satisfaction with robotics had a slightly lower mean score of 3.82, reflecting a neutral to positive outlook. In conclusion, robotics significantly enhances productivity and profitability in the beverage industry, while employee satisfaction, though important, has a secondary impact on sustainability outcomes.

Keywords: Employee Satisfaction; Productivity; Profitability; Robotic Workforce; Sustainability

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INTRODUCTION

In today's global economy, the adoption of robotic process automation (RPA) in industry is increasingly common, particularly among large transnational corporations. The rapid pace of technological progress and globalization has prompted companies to integrate RPA as a strategy to optimize production and reduce reliance on manual labor (Kedziora et al., 2021). The primary motivation for implementing RPA is to simplify and streamline production processes, enabling companies to enhance operational efficiency and meet evolving market demands. By leveraging automation, businesses can remain competitive, adapt to customer needs, and drive sustainable growth.

RPA is a methodology that enables robots to follow structured workflows and perform repetitive tasks without human intervention (Mohamed et al., 2022). These robots can execute processes with speed and precision, allowing human workers to focus on more complex, value-added tasks. The integration of RPA provides numerous benefits, including reduced labor costs, improved accuracy, and higher productivity (Madakam et al., 2019). As a result, companies are increasingly adopting RPA across various functions, such as finance, human resources, and supply chain management, to optimize performance and allocate human resources more effectively.

Coca-Cola is one prominent example of a company that has embraced RPA to streamline operations. To implement RPA effectively, Coca-Cola began by identifying specific processes suitable for automation and assessing factors such as process volume, frequency, and workforce requirements. The company collaborated with Blue Prism, a leading RPA provider, to automate over 150 processes, initially focusing on its finance department before expanding RPA into other areas, including human resources (Blue Prism, n.d.). Through RPA, Coca-Cola has been able to enhance efficiency, reduce operational costs, and improve accuracy in routine tasks, allowing the organization to allocate resources toward strategic initiatives.

Despite the significant advantages of RPA, there is potential for further expansion and optimization within Coca-Cola's production processes. The application of RPA in additional stages of production could lead to even greater efficiencies and support Coca-Cola’s commitment to innovation and sustainability. The automation of additional production processes, such as quality control, logistics, and inventory management, would allow Coca-Cola to further reduce operational costs, increase productivity, and enhance product quality.

Research on the integration of RPA in production environments highlights its transformative impact on industry, yet there are also challenges to consider. Implementing RPA requires a substantial initial investment, and maintaining the technology involves ongoing costs related to equipment, infrastructure integration, and employee training (Flechsig et al., 2022; Marciniak & Stanisławski, 2021). Furthermore, adaptability remains a limitation, as robots are typically designed for specific tasks and may struggle to respond to unanticipated changes or complex decision-making situations (Enayati et al., 2022). Nonetheless, as RPA technology continues to evolve, its flexibility and functionality are expected to improve, making it increasingly suitable for a broader range of applications in complex production settings.

The integration of RPA in industries worldwide, especially among transnational corporations, has transformed production processes by enhancing operational efficiency, reducing labor costs, and allowing businesses to meet evolving market demands. As companies continue to adopt RPA to remain competitive, there is a growing

interest in understanding how these automated systems impact various organizational outcomes, including productivity, profitability, and employee satisfaction.

The objective of this research is to investigate the extent to which a robotics workforce has been implemented within the Coca-Cola industry, specifically examining how RPA affects productivity, profitability, and employee satisfaction. These three dimensions are crucial for assessing the sustainability of RPA adoption, as each one directly influences Coca-Cola's ability to maintain long-term operational success and resilience in a highly competitive global market. By exploring how RPA contributes to productivity and profit, this research aims to understand the tangible benefits of automation in enhancing Coca-Cola's performance. Additionally, analyzing the impact of RPA on employee satisfaction provides insights into the potential challenges and limitations of automation, particularly in terms of workforce adaptation and engagement.

Through this investigation, the study seeks to offer a comprehensive evaluation of RPA's role in Coca-Cola's production processes and its implications for sustainable development. This research aligns with the broader industry context of RPA adoption, contributing valuable insights into the effectiveness of robotic workforces in sustaining operational success and addressing the economic and social dimensions of technological integration. Ultimately, the findings aim to inform both Coca-Cola and similar organizations about the advantages and limitations of RPA in promoting productivity, profitability, and employee well-being as part of a sustainable business strategy.

LITERATURE REVIEW

The Role of Robotics in Enhancing Productivity and Sustainability

Productivity is a core driver of sustainability in modern business operations (Ziolo et al., 2017), particularly in resource-intensive industries like beverage manufacturing. As companies prioritize environmental responsibility, efficiency improvements that reduce resource consumption, waste, and energy use become central to sustainability goals. Robotics plays a crucial role in enhancing productivity by automating tasks that are labor-intensive or prone to human error, leading to consistent quality and optimized production processes. For large-scale companies like Coca-Cola, robotics enables high output levels while minimizing variability, production downtime, and waste, which directly aligns with sustainability objectives (Addula & Tyagi, 2024; Liberty et al., 2024).

The research underscores that robotics-driven productivity improvements can have measurable positive impacts on sustainability (Haidegger et al., 2023). Studies indicate that automation, specifically through robotics, enhances resource utilization efficiency, which, in turn, lowers the environmental footprint of production (Javaid et al., 2022; Jin, 2024). Automated systems allow for precision in resource use, reducing the waste associated with human error, and contributing to sustainable practices by optimizing resource allocation (Olawade et al., 2024). For instance, robotics reduces the resource footprint per unit produced, and by minimizing production errors and variances, these systems help companies like Coca-Cola achieve consistently high-quality output with reduced waste.

Empirical studies confirm the connection between robotics-enhanced productivity and sustainability outcomes. Literature reveals that a unit increase in productivity—when enhanced through robotic automation—can substantially improve sustainability by minimizing energy consumption and resource waste (Javaid et al., 2021; Soori et al., 2023). Research suggests that productivity gains achieved through automation are highly scalable, leading to a reduction in the carbon footprint per unit produced, further

aligning production processes with sustainability targets (Javaid et al., 2022). Robotics thus bolsters operational performance and supports long-term environmental goals by both enhancing efficiency and lowering costs associated with energy and resource use, reinforcing sustainability as a critical outcome of robotics-enhanced productivity.

Based on the provided theoretical review above, the following hypothesis is formulated:

H1: Higher productivity, driven by robotics, significantly contributes to increased sustainability within the Coca-Cola industry.

The Role of Robotics in Enhancing Profitability and Sustainability

Profitability is a cornerstone of sustainability in contemporary business practices (Pradana et al., 2023), especially for large-scale manufacturers like Coca-Cola, where financial performance directly impacts the ability to fund and implement sustainable practices. Robotics plays a critical role in improving profitability by reducing labor costs, speeding up production cycles, and enhancing process accuracy, which in turn increases operational efficiency. By automating labor-intensive and error-prone tasks, robotics reduces the need for manual intervention and minimizes operational disruptions, leading to significant cost savings (Pramod, 2022). These cost efficiencies enable companies to reinvest in sustainable technologies and practices, creating a positive feedback loop between profitability and sustainability (Pachuau et al., 2024).

Research consistently highlights that firms with robust profit margins are better positioned to adopt environmentally responsible initiatives. When organizations streamline their operations through automation, they can reallocate savings toward investments in green technologies, resource-efficient practices, and sustainable supply chains (Abdullah & Lim, 2023; Hayyat, 2024). Robotics is particularly effective in reducing operational costs by optimizing resource usage, cutting down on waste, and enhancing throughput. These financial benefits are crucial for companies striving to balance economic performance with environmental responsibility. Specifically, by automating processes such as production, packaging, and logistics, robotics significantly lowers direct labor costs and enhances overall throughput, contributing to higher profit margins.

In the case of Coca-Cola, the application of robotics in high-cost processes such as bottling and packaging offers significant cost-saving potential. The introduction of robotic systems in these areas reduces labor dependency and minimizes errors, leading to higher output at lower operational costs. The savings generated from these efficiencies provide Coca-Cola with the financial capacity to fund sustainability initiatives, such as reducing water usage, energy consumption, and waste production—critical elements in achieving the company's sustainability objectives. This linkage between robotics-driven profitability and sustainability is supported by empirical studies that demonstrate how robotics allows firms to maintain or increase profitability while simultaneously improving environmental performance through reduced waste and resource consumption (Javaid et al., 2022; Younis et al., 2024).

The relationship between profitability and sustainability has been extensively studied, with evidence suggesting that financially healthy firms are better equipped to prioritize and implement sustainable practices (Epstein, 2018). By reducing operational costs and increasing production efficiency, robotics empowers companies to invest in environmental technologies that not only enhance profitability but also contribute to long-term sustainability goals. In the context of Coca-Cola, robotics helps streamline operations, increase profit margins, and create a foundation for further sustainability investments, reinforcing the hypothesis that higher profit margins, facilitated by robotics-

driven efficiency, contribute significantly to sustainability outcomes.

H2: Increased profit, facilitated by robotics-driven efficiency, significantly enhances sustainability within the Coca-Cola industry.

Employee Satisfaction and Its Indirect Role in Sustainability

Employee satisfaction has long been recognized as a critical factor in improving organizational outcomes, particularly in terms of workforce retention, morale, and overall performance (Jufrizen & Hutasuhut, 2022; Trisnayani et al., 2024). Positive work environments, which foster job satisfaction, have been associated with reduced turnover, higher levels of engagement, and enhanced productivity (Wan et al., 2018). While employee satisfaction is an essential element for fostering a productive and stable workforce, its direct impact on sustainability, particularly in robotics-intensive environments, may be more nuanced. In industries where robotics and automation drive the majority of operational efficiency, the influence of employee satisfaction on sustainability outcomes tends to be indirect, rather than direct.

Robotics in production settings, especially in large-scale operations like Coca-Cola, plays a crucial role in driving efficiency and output. In such settings, the bulk of the production processes are handled by automated systems, reducing the need for manual labor in tasks such as assembly, packaging, and quality control (Caldwell, 2023; Viswanadham & Narahari, 2018). As a result, the direct link between employee satisfaction and sustainability outcomes is weaker, because sustainability metrics—such as resource conservation, waste reduction, and energy efficiency—are more heavily influenced by robotic systems than by human labor. Studies have shown that while satisfied employees are more likely to support organizational changes, including the adoption of automation, their role in directly driving sustainability may be limited when automation handles the core processes (Chen & Li, 2024).

However, in an environment where robotics predominates, the direct impact of employee satisfaction on sustainability outcomes is minimal. Although employee satisfaction is undoubtedly important for maintaining a motivated and engaged workforce, its direct effect on resource efficiency or sustainability in automation-heavy industries is less pronounced compared to the effects of productivity and profitability driven by automation.

This notion is particularly relevant in the context of Coca-Cola, where robotic systems handle most of the operational tasks that directly contribute to sustainability, such as reducing waste, improving energy efficiency, and minimizing environmental impact. Therefore, while employee satisfaction undoubtedly contributes to overall organizational health—by fostering a positive work culture, reducing turnover, and increasing engagement—the extent to which it influences sustainability outcomes in this context is limited. Given that robotic systems are responsible for the bulk of the operational efficiency that drives sustainability, the direct influence of employee satisfaction on sustainability in this setting is minimal (Leesakul et al., 2022). This study thus hypothesizes that while employee satisfaction is valuable for organizational health, it does not significantly affect sustainability outcomes in a robotics-intensive environment like that of Coca-Cola.

H3: Employee satisfaction does not have a significant direct impact on sustainability in the Coca-Cola industry, where robotic systems primarily drive operational efficiency.

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Comparative Influence of Robotics-Driven Productivity, Profit, and Satisfaction on Sustainability

The comparative influence of productivity, profit, and employee satisfaction on sustainability outcomes has been a focal point of research, particularly in industries that heavily rely on robotics and automation. In highly automated environments, such as the beverage industry, studies consistently demonstrate that productivity and profitability—driven by robotics—are more significant contributors to sustainability than employee satisfaction. Robotics enhances productivity by optimizing processes, reducing human error, and minimizing resource wastage. These improvements directly contribute to sustainability by lowering energy consumption, reducing waste, and increasing operational efficiency (Javaid et al., 2022; Lo et al., 2024). The efficient use of resources, resulting from robotic integration, supports sustainability goals such as reducing carbon footprints and conserving resources, making productivity a critical factor in achieving sustainability targets.

Robotics-driven productivity, particularly in large-scale operations like Coca-Cola's, allows companies to operate more efficiently with minimal waste and environmental impact. The automation of manufacturing processes, such as bottling and packaging, enhances throughput while decreasing energy consumption, directly benefiting environmental sustainability (Javaid et al., 2021). By automating repetitive, resource-intensive tasks, companies achieve higher output with fewer inputs, thereby reducing the per-unit environmental footprint. Research has shown that companies prioritizing robotics-driven productivity see substantial reductions in waste, energy consumption, and water usage, aligning closely with sustainability objectives (Addula & Tyagi, 2024; Javaid et al., 2022). Thus, productivity improvements in robotics-driven contexts measurably enhance the sustainability of operations.

Profit, another key determinant of sustainability, is closely linked to the efficiencies gained through robotics. The reduction in operational costs due to automation—such as labor and material waste—boosts profitability, enabling companies to reinvest in sustainable practices, research, and green technologies (Abdullah & Lim, 2023; Hayyat, 2024). This positive feedback loop is particularly important in industries like beverage manufacturing, where substantial capital investment is needed to meet sustainability goals, such as energy efficiency or adopting renewable energy. Research suggests that companies with higher profit margins, driven by robotic automation, are better positioned to fund and prioritize sustainability initiatives, achieving a balance between economic and environmental goals (Epstein, 2018).

In contrast, while employee satisfaction is crucial for organizational performance and morale, its direct role in driving sustainability outcomes in highly automated environments is more limited. Although a satisfied workforce may facilitate the adoption of new technologies, the influence of employee satisfaction on sustainability is less significant compared to the impacts of productivity and profitability in robotic-driven contexts (Leesakul et al., 2022). As manual labor is replaced by automation, especially in routine tasks, employee satisfaction plays a more indirect role in sustainability, supporting a smoother transition to automation and fostering a culture conducive to innovation and sustainable practices.

Overall, the comparative roles of productivity, profit, and employee satisfaction in sustainability highlight the importance of robotics in enhancing operational efficiency and supporting long-term environmental and financial objectives. Research consistently shows that productivity and profitability, particularly when driven by robotics, are the primary drivers of sustainability in automation-intensive industries. Employee satisfaction, while important for organizational well-being, has a more limited effect on

sustainability outcomes in these contexts. Consequently, the hypothesis is formed that productivity, enhanced by robotics, will have a stronger influence on sustainability than profit or employee satisfaction in a robotics-driven environment like Coca-Cola.

H4: Productivity, enhanced by robotics integration, has a stronger impact on sustainability compared to profit and employee satisfaction in the Coca-Cola industry.

RESEARCH METHOD

The research aimed to investigate the opinions and perceptions of individuals from diverse backgrounds regarding Coca-Cola and robotic-related issues. The focus was on assessing attitudes toward the robotic workforce in terms of productivity, contribution to organizational profitability, and overall satisfaction. The study targeted respondents from four different countries: Malaysia, Indonesia, India, and Belarus. To collect the data, a quantitative methodology was employed, utilizing a Google Form questionnaire. This type of methodology is commonly used to measure and analyze relationships between variables in a systematic and objective manner. By using a standardized questionnaire, consistency in data collection was ensured, allowing for statistical analysis.

The sample size for the research consisted of 50 consumers, distributed among the four countries mentioned earlier. This relatively small sample size may limit the generalizability of the findings to a larger population, but it can still provide valuable insights and trends among the selected participants.

From the survey conducted, a total of 50 respondents from various ages, genders, nationalities, and levels of education participated. The survey was distributed to the respondents via social media platforms such as WhatsApp, Instagram, Twitter, and others. Additionally, an email was sent to invite respondents to complete the survey. Based on the 50 respondents, 100% were students, with the majority being 18 to 24 years old, while others were between 25 and 34 years old.

Productivity: The respondents fully answered the question regarding the productivity of the robotic workforce in this survey. The statement provided was, "Robotic workforce in the industry is very productive," and respondents were asked to rate the statement on a scale from 1 to 5 (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree). From the analysis using SPSS, the mean was 3.84, and the standard deviation was 1.131.

Profit: The respondents were then asked to rank their opinion on the contribution of the robotic workforce to organizational profitability. The statement provided was, "Robotic workforce contributes to the profitability of your organization," and respondents rated the statement on the same 1 to 5 scale. From the analysis using SPSS, the mean was 3.86, and the standard deviation was 1.195.

Satisfaction: Finally, the respondents answered the question regarding their satisfaction with working alongside robotics. The statement provided was, "People are very satisfied with the robotic workforce," and respondents rated the statement on the same 1 to 5 scale. From the analysis using SPSS, the mean was 3.82, and the standard deviation was 1.119. For further details, please refer to the data table in the results section.

RESULTS

Descriptive, Correlation, and Cronbach's Coefficients Alpha Analysis

Table 1. Descriptive, Correlation, and Cronbach's Coefficients Alpha Results

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Variables		1	2	3	4
Independent Variable					
1	Profit	0.902			
2	Productivity	0.873	0.895		
3	Satisfaction	0.728	0.75	0.941	
Dependent Variable					
4	Sustainability	0.831	0.849	0.685	0.916
Mean		3.86	3.84	3.82	3.73
Standard Deviation		1.195	1.131	1.119	0.956
Min		1	1	1	1
Max		5	5	5	5

Note: 50 *p < 0.05, p < 0.001, *p < 0.001

Table 1 indicates high reliability for each variable, as evidenced by Cronbach's alpha values, all of which exceed the acceptable threshold of 0.7. Notably, the alpha values for profit (0.902), productivity (0.895), satisfaction (0.941), and sustainability (0.916) demonstrate strong internal consistency, suggesting that these metrics are reliable indicators within the context of this study. These high-reliability scores are essential for accurately capturing the effects of robotics on workforce metrics in a large organization like Coca-Cola.

The correlation matrix reveals statistically significant positive correlations among all variables, with varying strengths. The strongest correlations are observed between productivity and sustainability (0.849) and profit and sustainability (0.831), both significant at the $p < 0.001$ level. These relationships suggest that productivity and profitability, possibly driven by robotics-enhanced processes, play a critical role in advancing sustainability objectives. Furthermore, satisfaction shows a positive correlation with sustainability (0.685), also significant at $p < 0.001$, implying that employee satisfaction, likely influenced by a robotics workforce, may contribute positively to sustainability efforts.

The descriptive statistics include the mean, standard deviation, minimum, and maximum values for each variable. The mean scores for profit (3.86), productivity (3.84), satisfaction (3.82), and sustainability (3.73) indicate generally positive perceptions of these factors. The relatively consistent standard deviations across the variables suggest a moderate level of variability, indicating that responses are neither overly dispersed nor tightly clustered. The range of 1 to 5 for each variable confirms that a Likert scale was likely used in measuring these constructs, providing a straightforward interpretation of respondents' perceptions.

In summary, the findings provide robust evidence of positive associations between profit, productivity, and satisfaction with sustainability, underscoring that these factors may play significant roles in supporting sustainability in the Coca-Cola industry when robotics are integrated into the workforce. The findings align with the study's objective, as they suggest that the utilization of robotics may enhance productivity, profitability, and employee satisfaction, which are key contributors to sustainable practices in large-scale manufacturing environments.

Regression Analysis

Table 2. Model Summary

Model Summary[b]										
Model	R	R Square	Adj. R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change	Durbin-Watson
						F Change	Df1	Df2		

1	0.870a	0.756	0.740	0.48724	0.756	47.583	3	46	0.000	1.920
a. Predictors: (Constant), Satisfaction, Profit, Productivity										
b. Dependent Variable: Sustainability										

Table 2 provides statistical insights into the relationship between key predictor variables—Satisfaction, Profit, and Productivity—and the dependent variable, Sustainability, within the Coca-Cola industry. This analysis aims to explore the extent to which these predictors impact sustainability, a critical factor for evaluating the implementation of robotics in workforce operations.

The model displays an R-value of 0.870, indicating a strong positive correlation between the predictors and sustainability. The R^2 value of 0.756 suggests that 75.6% of the variability in sustainability is explained by satisfaction, profit, and productivity. The adjusted R^2, which corrects for any potential overestimation due to multiple predictors, is slightly lower at 0.740, implying a reliable model fit.

The standard error of the estimate (0.48724) represents the average distance between observed and predicted sustainability values, highlighting the model's precision. An R-square change of 0.756 signifies the model's improvement when adding these predictors, confirmed by an F change of 47.583 with a significance level of 0.000. This result demonstrates that the predictors collectively have a statistically significant impact on sustainability.

The Durbin-Watson value of 1.920 is close to the ideal value of 2, indicating no substantial autocorrelation in residuals, which supports the model's validity.

Overall, these findings highlight that satisfaction, profit, and productivity significantly explain sustainability in Coca-Cola's operations. This suggests that improvements in these factors—possibly influenced by robotics in workforce processes—can enhance sustainability outcomes in the industry, aligning with the study's objective to assess robotics' effectiveness in contributing to sustainable industrial practices.

Table 3. Regression Analysis Results

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.841	0.263		3.199	0.002
	Productivity	0.419	0.134	0.496	3.116	0.003
	Profit	0.290	0.123	0.362	2.362	0.022
	Satisfaction	0.042	0.097	0.049	0.436	0.665
Dependent Variable: Sustainability						

The results of the regression analysis in Table 3 align closely with the formulated hypotheses regarding the impact of robotics-driven productivity, profitability, and employee satisfaction on sustainability within the Coca-Cola industry. The findings confirm that productivity, likely enhanced through robotics, significantly contributes to sustainability outcomes, supporting Hypothesis 1. With an unstandardized coefficient of 0.419 and a high level of significance ($p = 0.003$), the results indicate that each unit increase in productivity leads to a notable improvement in sustainability scores. This strong relationship underscores the potential of robotics in driving operational efficiencies that directly support sustainable practices. The high standardized Beta coefficient for productivity (0.496) further reinforces this finding, highlighting productivity as the most influential predictor of sustainability in this context.

Hypothesis 2, which proposed that profitability would positively impact sustainability, is also substantiated by the results. The regression analysis shows a significant positive relationship between profit and sustainability, with an unstandardized coefficient of 0.290 and a p-value of 0.022, indicating a meaningful and reliable effect. This finding suggests that increased profitability enables Coca-Cola to fund sustainability initiatives, likely made possible through the operational efficiencies that robotics provides. The Beta coefficient for profit (0.362) positions it as the second strongest predictor of sustainability, supporting the hypothesis that profitability derived from robotics-driven efficiency enables reinvestment in sustainable practices.

The analysis also supports Hypothesis 3, which posited that employee satisfaction would have a limited direct impact on sustainability within a robotics-intensive setting. Satisfaction yielded an unstandardized coefficient of only 0.042, with a non-significant p-value of 0.665, indicating that satisfaction does not significantly contribute to sustainability outcomes. This suggests that while satisfaction may be beneficial for broader organizational performance, it does not directly drive sustainability in Coca-Cola's highly automated production environment. The minimal Beta value for satisfaction (0.049) further emphasizes its limited influence on sustainability when compared to productivity and profit, which are more directly tied to robotic efficiencies and sustainable outcomes.

Lastly, the relative importance of the predictors, as shown by the standardized Beta values, corroborates Hypothesis 4, which suggested that productivity would be the strongest driver of sustainability, followed by profit, with satisfaction exerting minimal influence. The results confirm that productivity, with the highest Beta coefficient, has the greatest impact on sustainability, underscoring the role of robotics in optimizing operations to support environmental goals. Profit ranks next in importance, reinforcing that financial gains from robotics-enabled efficiencies provide resources for sustainable investments. Satisfaction's limited role in this context aligns with the hypothesis, as its impact on sustainability remains indirect.

DISCUSSION

The post-COVID-19 landscape presents Coca-Cola with distinct challenges and opportunities, as well as insights into the role of robotics and automation in its operational strategy. The findings confirm that productivity, supported by robotics, significantly contributes to sustainability outcomes, supporting H1. The research findings align closely with the work of Zhang et al. (2022), particularly regarding the role of robotics in driving productivity and sustainability. In the post-COVID-19 landscape, Coca-Cola has faced challenges such as supply chain disruptions, shifts in market demand, and concerns over employee well-being—issues also observed in industries globally during the pandemic. Zhang et al. (2022) emphasize that robotics can significantly improve energy efficiency and enable a shift toward cleaner, more sustainable production practices, even in sectors historically associated with high pollution levels. Similarly, the research highlights that Coca-Cola's use of robotics has been instrumental in optimizing productivity, which is crucial for maintaining competitiveness in a rapidly changing global market.

The pandemic also underscored the importance of profitability in fostering sustainability, with the analysis affirming H2—that profitability has a positive impact on sustainability. This finding is in line with the study by Rinaldi et al. (2023). Through RPA and artificial intelligence (AI), Coca-Cola enhances profitability by streamlining production, reducing operational costs, and optimizing resource use. These gains from automation allow Coca-Cola to reinvest in sustainable practices, reinforcing the connection between

financial performance and environmental responsibility. For instance, robotics supports more efficient packaging and material handling processes, reducing waste and minimizing Coca-Cola's environmental footprint.

In contrast, H3, which posited that employee satisfaction would have a limited direct impact on sustainability within a robotics-intensive setting, was also validated by the findings. While employee satisfaction is often a critical factor in traditional workforce models, it appears to have a minimal direct effect on sustainability outcomes when robotics and automation dominate the operational environment (Syed et al., 2020). Although satisfaction may contribute to operational efficiency or morale, the data suggest that Coca-Cola's sustainability outcomes are more strongly influenced by productivity and profitability than by employee satisfaction in this automated context. This finding reflects the evolving role of satisfaction in workplaces increasingly characterized by automated processes, where tangible productivity and profitability gains may overshadow morale-related considerations.

Finally, H4 which suggested that productivity would be the strongest driver of sustainability, followed by profitability, with satisfaction exerting minimal influence, is corroborated by the relative importance of these predictors. The standardized Beta values reveal productivity as the most significant predictor, indicating that Coca-Cola's sustainability strategy is primarily anchored in automation-driven productivity enhancements. This strategic emphasis on productivity is evident in Coca-Cola's focus on innovation in marketing, enhanced customer engagement, and new product development, all of which are bolstered by efficient, robotics-supported operations.

In response to these findings, Coca-Cola has identified opportunities to invest in targeted training programs. Digital marketing training, supply chain management training, and employee wellness and mental health training align with the company's goals to bolster resilience and foster innovation. These initiatives not only address pandemic-induced challenges but also support Coca-Cola's broader automation strategy by equipping employees with the skills necessary to adapt to an increasingly automated workplace. Moreover, the findings on the limited impact of satisfaction suggest that Coca-Cola might enhance employee morale by focusing on upskilling and creating opportunities for continuous learning, rather than relying on satisfaction alone as a sustainability driver.

In summary, Coca-Cola's post-pandemic strategy, shaped by robotics and automation, demonstrates the critical role of productivity and profitability in driving sustainability. By confirming H1, H2, H3, and H4, the study underscores Coca-Cola's effective alignment of automation with its operational and sustainability goals. Although challenges related to scalability, sourcing, and stakeholder engagement remain, careful planning and a strong emphasis on productivity can help Coca-Cola maximize the benefits of robotics. This strategy not only ensures operational resilience but also positions Coca-Cola as a leader in sustainable practices, providing a model for other multinational corporations navigating the complexities of globalization and technological advancement.

CONCLUSION

The conclusion drawn from the analysis affirms that robotics-driven productivity and profitability significantly contribute to sustainability within the Coca-Cola industry. Consistent with the study's hypotheses, productivity emerges as a primary driver of sustainable outcomes, emphasizing the role of robotics in enhancing efficiency and reducing resource waste. The analysis suggests that increased productivity, facilitated by automation, supports sustainability goals by optimizing production processes and minimizing environmental impact.

Profitability also shows a meaningful positive relationship with sustainability, indicating that financial gains—achieved through robotics-enhanced efficiency—provide Coca-Cola with the resources to invest in sustainable practices. This aligns with the hypothesis that profit enables reinvestment into environmentally responsible initiatives, reinforcing the synergy between financial performance and sustainability.

Employee satisfaction, however, does not show a significant direct effect on sustainability within this robotics-driven model. Although satisfaction contributes to workforce morale and stability, it does not appear to directly impact sustainability outcomes in highly automated contexts. This finding suggests that while employee well-being is important, productivity and profitability are the main drivers of sustainability when robotics is central to operations.

The research underscores the powerful role robotics plays in enhancing productivity and profit, reinforcing Coca-Cola's competitive advantage. RPA is instrumental in streamlining operations and reducing costs, which is reflected in the positive impact on sustainability. The increased efficiency provided by robotics validates the study's findings, as productivity gains through automation not only improve financial performance but also support sustainability goals by minimizing waste and resource consumption.

However, certain risks and limitations are inherent in robotic workforce integration. While RPA contributes to significant productivity gains, the research findings align with the notion that high initial costs, including technology acquisition and integration, remain a barrier. Additionally, the lack of flexibility in robotic systems to handle non-routine or dynamic tasks could potentially disrupt productivity, supporting the findings that increased productivity via robotics has a statistically significant impact on sustainability, provided systems remain adaptable. Given that productivity and profitability are essential in supporting sustainability, careful management of these limitations will ensure that Coca-Cola can maximize the benefits of robotics while minimizing potential inefficiencies.

Adaptability is particularly relevant for Coca-Cola, where robotic systems perform specialized tasks within a complex production environment. The limited flexibility of robotics compared to human labor suggests that while robots can achieve higher output in routine functions, human oversight remains necessary in tasks requiring complex decision-making and adaptability. This aligns with the study's finding that employee satisfaction, although beneficial in some areas, does not directly drive sustainability. This reinforces the idea that, in the case of Coca-Cola, robotic systems serve best in roles focused on productivity rather than in tasks requiring frequent adjustments or qualitative judgment, which supports overall workforce synergy.

The workforce transition to robotics has significant social implications, particularly around job displacement and employee morale. While robotics enhances productivity, managing the workforce transition equitably through reskilling and redeployment efforts will be essential in balancing technological advancement with social responsibility. For Coca-Cola, a balanced human-robot workforce requires careful planning to meet regulatory and safety standards while ensuring that employees working alongside robotics are protected. This approach supports sustainability by aligning corporate goals with ethical labor practices, a critical factor in Coca-Cola's operational strategy as it seeks to maintain both employee well-being and productivity.

Public perception and consumer acceptance are critical to the success of robotics adoption. Concerns about job losses and ethical considerations are valid, and

addressing these through transparent communication can foster a favorable view of Coca-Cola's automation strategies. Emphasizing how robotics contributes to sustainability, product quality, and efficiency can help Coca-Cola build consumer trust, which is essential for long-term success. By aligning automation benefits with consumer values, Coca-Cola can strengthen its brand image and public support, creating a sustainable pathway for robotics integration in a way that resonates with community expectations.

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DECLARATION OF CONFLICTING INTERESTS
The authors declare that there is no conflict of interest.

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ABOUT THE AUTHOR(S)

1st Author
Jimoh Adams Lukman is a lecturer and researcher at the Department of Industrial Relations and Personnel Management, University of Ilorin, Ilorin, Nigeria, where he has been a faculty member since 2018. He earned his bachelor's degree in industrial relations and personnel management at the Faculty of Business Administration, University of Lagos, Nigeria. He did his master's degree in business administration at the University of Ilorin, Nigeria. He also received his Ph.D. from Universiti Sains Malaysia (USM) in Malaysia. He is an associate member of various professional bodies, such as the chartered institute of personnel management (CIPM), the Nigerian Institute of Management (NIM), and the Institute of Strategic Management of Nigeria (ISMN). Additionally, his research interests lie in the areas of talent management, human resource management, wage and salary administration, and succession planning. Furthermore, he has participated in over twelve international professional workshops, especially on research methodology, and attended various local and international conferences. He has actively researched and collaborated with other researchers from various fields on many research projects. He successfully published many articles in different top-tier international journals. Conclusively, he has won many academic awards of excellence and been blessed with wives and lovable children.
Email: jimoh.al@unilorin.edu.ng

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Orcid ID: 0000-0003-0568-8986

2nd Author
Zi Jian Oh obtained his Doctor of Philoshophy at Universiti Pendidikan Sultan Idris on 2023 for Educational Management. He is dedicated and passionate in his teaching for Diploma in Business Management for 6 years. His research interest is mobile leadership, blue ocean leadership, motivation, employee engagement, team performance.
Email: ohzijian@gmail.com
ORCID ID: 0000-0001-6152-7437

3rd Author
Muhammad Azim Akmal bin Johani is currently undergraduate student of Business Management at Universiti Sains Malaysia.

4th Author
Muhammad Alimi bin Mohd Tarmizi. is currently undergraduate student of Business Management at Universiti Sains Malaysia.

5th Author
Muhammad Afiq Hakimie bin Ahmad Sobri is currently undergraduate student of Business Management at Universiti Sains Malaysia.

6th Author
Muhammad Amar Basyir bin Sulaiman is currently undergraduate student of Business Management at Universiti Sains Malaysia.

7th Author
Suryo Wirawan is currently undergraduate student of Business Management at Universitas Brawijaya, Indonesia

8th Author
Dhymas Pramana Wicaksana is currently undergraduate student of Business Management at Universitas Brawijaya, Indonesia

9th Author
Mikita Trusevich is currently undergraduate student of Business Management at Belarusian State Economic University

10th Author
Daisy Mui Hung Kee is an Associate Professor at the School of Management, Universiti Sains Malaysia. Her areas of interests are in Human Resource Management, Organizational Behavior, Work Values, Leadership, Entrepreneurship, and Psychosocial safety climate. Her current program of research focuses on Leadership and Psychosocial safety climate. She holds a PhD in Business and Management from International Graduate School of Business, University of South Australia. She was the secretary of Management Case Study Journal, Australia (2004-2006). She was award recipient of Merdeka Award 2006 from the Australia Malaysia Business Council of South Australia (AMBCSA) by former South Australia Governor Sir Eric Neal (2006). The award recognizes the Most Outstanding Malaysian University students in South Australia.She earned her MBA from School of Management, Universiti Sains Malaysia. She was awarded Dean's List for being one of the top MBA students (2003). Presently, she is an active academician and researcher supervising a numbers of MBA, MA and PhD candidates with working experience across diverse industries. She has published a good

numbers of journal papers during the course of her career. She has conducted series of training related to motivation and research in USM under Professional and Personal Development (PPD) workshop.
Email: daisy@usm.my
ORCID ID: 0000-0002-7748-8230