Strategic Automation for Revenue Collection Efficiency: Insights from Global Tea Factory, Bushenyi District, Uganda

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ABSTRACT

Effective revenue collection is a critical success factor in the tea manufacturing industry, where it is inextricably linked to strategic automation initiatives that drive operational efficiency and earnings optimization. The synergistic relationship between revenue collection and automation is pivotal in determining financial performance and profitability, as automated systems enhance accuracy, reduce manual errors, and facilitate real-time financial tracking. The purpose of this study was to establish the influence of technology and automation on revenue collection of Global Tea Factory located in Bushenyi district in Uganda. The study was anchored on transaction theory. The study employed a quantitative research approach and was guided by a correlational research design. The target population for this study consisted of 299 staff from the production company from whom a sample size 171 was obtained using Slovin's formula. Quantitative data was collected using self-administered questionnaires. Piloting was done to the test the questionnaires for validity and reliability. Collected data was analyzed using both descriptive and inferential statistics with the help of SPSS version 26. The findings from simple linear regression indicate that there was a significant positive relationship between Technology & Automation on Revenue Collection (t=7.800, p=.000, <0.05). The Pearson's correlation analysis indicated that there is a positive correlation between the technology and automation and revenue collection. (r = 0.515, **p = 0.000, P-value < 0.05). The null hypothesis was rejected and hence alternative hypothesis adopted. The study concluded that technology and automation significantly improve revenue collection efficiency and financial performance in tea manufacturing sector. To improve operational efficiency and financial performance, tea industries are recommended to implement automated inventory management and digital revenue collection solutions. The findings of this study will enable policy makers to develop targeted interventions and incentives to support tea industries in leveraging technology and automation, driving economic development and revenue growth.

Keywords: Technology, Automation, Strategy, Revenue Collection, Tea Industry

INTRODUCTION

The global tea industry's revenue growth significantly depends on regional production levels, market demand, and shifting consumer preferences (FAO, 2023). Leading producers like China, India, and Kenya generate substantial revenue, with their success tied to crop yields and export volumes (Sharma & Gupta, 2022). In 2023, the global tea market reached a notable milestone valued at $55 billion, primarily driven by North America's and Europe's growing demand for specialty teas (Statista, 2023). Within these regions, green and herbal teas have gained popularity, reflecting changing consumer tastes. Climate and market fluctuations pose significant challenges to the industry's growth, underscoring the need for strategic planning and adaptability (Jones & Liu, 2022).

The UK tea sector has gained momentum, with British-grown tea becoming synonymous with high-quality, sustainable production (Stewart, 2021). Although the UK's contribution to the global tea supply is modest, its focus on premium products allows local tea to command higher prices, particularly in European and North American markets (Gardiner, 2022). British tea producers have capitalized on consumer interest in sustainability and ethical sourcing, further enhancing market appeal (Brown, 2023). The UK tea industry's strategic focus on sustainable practices, technological innovation, and high-quality production has driven significant growth (Jones, 2023). As a small-scale producer, the UK has carved out a niche in the international market by emphasizing premium, eco-friendly tea products. The rising demand for ethical and locally produced goods positions UK-grown tea for further expansion, enhancing both domestic presence and export potential (Gardiner, 2022).

Brazil, traditionally known for coffee production, has seen remarkable growth in its tea industry. Once a niche sector, tea has gained prominence due to rising domestic and global interest in health-conscious products (de Souza, 2021). Brazil's diverse climate supports the cultivation of traditional tea varieties like Camellia sinensis and native herbal teas such as yerba mate, prized for their health benefits (Gomes & Carvalho, 2022). The global demand for organic and functional teas has spurred Brazilian investment in these varieties, distinguishing the country in the international tea market. Technological innovations and sustainable practices have driven tea manufacturing expansion in Brazil. Organic farming techniques are increasingly prevalent, aligning with the demand for environmentally sustainable products (Lima & Santos, 2023). Modern processing technologies have improved production efficiency and preserved tea freshness, enhancing appeal in domestic and export markets (FAO, 2022). This integration of technology positions Brazil as a competitive force in the global tea industry.

India, a leading tea-producing nation, boasts a rich legacy of tea cultivation. Its diverse varieties, including Assam, Darjeeling, and Nilgiri, offer distinct flavors that cater to both domestic and international markets. Recently, the Indian tea industry has transformed due to innovations in cultivation techniques, a growing emphasis on sustainability, and rising global demand for premium teas (Chatterjee, 2021). The market has shifted toward specialty teas, reflecting evolving consumer preferences focused on health and wellness, positioning India as a key player in the global tea landscape. Technological advancements and research have improved tea production quality and yield. Enhanced processing technologies have increased production efficiency, enabling the offering of organic and specialty teas that are popular locally and internationally (Sharma & Singh, 2023). In 2023, India produced approximately 1.4 million metric tons of tea, maintaining its status as the second-largest global producer (International Tea Committee, 2023). Tea exports reached around $900 million, driven by robust demand in the Middle East, Europe, and North America (Sharma & Singh, 2023). Domestic consumption is also rising, fueled by increased awareness of tea's health benefits and the popularity of premium blends among urban consumers (Bose, 2022).

India's tea industry shows resilience amidst challenges like climate change and market fluctuations. Its focus on innovation, sustainability, and high-quality production positions the industry for sustained growth. As global interest in premium and health-oriented teas rises, India is poised to capitalize on this trend, strengthening its exports and enhancing domestic consumption (Chatterjee, 2021).

Malawi's stunning landscapes are complemented by its thriving tea industry, a crucial pillar of the national economy (Chambers, 2021). As a leading African tea producer, Malawi has developed expertise in high-quality teas, particularly black varieties (Food and Agriculture Organization, 2017). In recent years, Malawi's tea sector has made significant strides, fueled by government support and private sector investment (World Bank, 2018). The industry is now embracing sustainable and organic practices, aligning with global consumer preferences for eco-friendly and health-conscious products (International Organization for Standardization, 2018). Malawi's tea manufacturing has experienced substantial growth through investments in modern agricultural practices and processing technologies. Tea estates have adopted precision farming and integrated pest management, improving productivity and reducing environmental impact (Daka, 2022). The industry's sustained growth is expected to continue, driven by technology and sustainability investments, positively impacting Malawi's economic development (Kabango, 2024).

Malawi's tea industry has demonstrated resilience and growth amid challenges from fluctuating climate conditions and global market dynamics. In 2022, the country produced approximately 60,000 metric tons of tea, with a substantial portion exported to markets such as the United Kingdom and South Africa (International Tea Committee, 2023). The export value of Malawian tea has steadily increased, driven by rising global demand for specialty and organic teas (Daka, 2022). Domestic consumption has also grown as more Malawians recognize tea's health benefits and cultural significance, further stimulating industry growth (Kabango, 2024). Malawi's tea manufacturing sector has thrived in the competitive global landscape by focusing on sustainability, technological innovation, and quality production. This strategic approach enhances Malawi's position as a leading African tea producer while catering to the growing international demand for premium, responsibly sourced products. As the industry evolves, it holds significant potential for contributing to Malawi's economic development and social welfare (Chambers, 2021). Studies indicate that the tea industry's growth positively impacts local communities through job creation and improved livelihoods (Mwakilama, 2023).

Kenya's tea industry stands as a global powerhouse, renowned for its high-quality black teas. This sector is vital to Kenya's agricultural economy and the well-being of millions of citizens (Mwangi, 2022). Recent growth has been propelled by advancements in agricultural techniques, investment in modern processing technology, and increasing global demand for exceptional tea (Owino, 2021). Collaborative efforts between the Kenyan government and industry stakeholders prioritize productivity and sustainability, reinforcing Kenya's leadership in the global tea export market (Kiptoo, 2023). Significant advancements in tea manufacturing have emerged, particularly in agricultural practices. The adoption of precision farming and climate-smart techniques has enabled farmers to optimize tea yields and improve leaf quality (Kibera & Njuguna, 2022). Comprehensive training programs have empowered farmers with knowledge on best practices and sustainable methods to ensure the long-term viability of tea cultivation amidst climate change. Additionally, research and development institutions have developed high-yield and disease-resistant tea varieties, bolstering Kenyan tea's competitiveness in global markets (Muthoni et al., 2024).

Kenya's tea industry has demonstrated exceptional performance, consistently positioning the country among the world's leading tea exporters. The sector achieved remarkable production levels in 2022, with approximately 500,000 metric tons of tea generated, translating to an impressive export revenue of around $1.3 billion (Tea Board of Kenya, 2023). Key export markets, including the United Kingdom, the United States, and Pakistan, drive demand for Kenyan black tea, which is prized for its unique flavor profile and exceptional quality (Owino, 2021). Growing domestic consumption, fueled by increasing awareness of tea's health benefits, has also boosted industry growth, striking a balance between local and international demand (Kibera & Njuguna, 2022). Kenya's tea manufacturing sector exemplifies a dynamic industry embracing innovation and sustainability. By prioritizing improved agricultural practices, such as precision farming and climate-smart agriculture, Kenya is poised to retain its leadership in the tea industry (Kibera & Njuguna, 2022). As the sector continues to advance, driven by research and development in tea technology, it is expected to make substantial contributions to Kenya's economic growth and the well-being of its citizens (Mwangi, 2022).

Uganda, renowned for its lush biodiversity and fertile landscapes, has emerged as a significant contributor to the global tea industry. The country's tea sector has experienced remarkable growth in recent years, fueled by favorable climate conditions and substantial investments in tea production and processing (Kakuru, 2022). Uganda's primary focus on black tea has yielded success, with its distinct flavor profile and high quality earning international recognition from markets such as the United Kingdom and Pakistan (Mugerwa, 2020). To boost productivity and sustainability, strategic initiatives have positioned Uganda as an attractive hub for tea cultivation and export, driving economic development (Mwonda, 2022). Uganda's tea manufacturing has witnessed significant advancements, driven by improved agricultural practices and a commitment to sustainability. The Ugandan government and stakeholders have introduced initiatives promoting modern farming techniques, including high-yield tea varieties and enhanced pest management practices (Muwanga & Muwanga, 2022). Furthermore, investments in processing infrastructure have substantially elevated the quality of Ugandan tea, enabling producers to meet stringent international standards and capitalize on the growing

global demand for premium teas (Kaggwa, 2022). These developments have enhanced Uganda's tea competitiveness in international markets, particularly in Europe and the Middle East, where demand for high-quality tea is increasing (Tumwebaze, 2024).

The Ugandan tea industry's growth is hindered by several challenges that impede its full potential. Climate change poses a significant threat, altering rainfall patterns and temperature fluctuations that can compromise tea yields and quality (Ogena, 2021). Insufficient infrastructure, limited access to credit, and the aging of tea estates further constrain sector growth and sustainability (Muwanga & Muwanga, 2022). The industry also faces stiff competition from established tea-producing nations like Kenya and India, which boast extensive marketing networks and global brand recognition (Mugisha, 2023). Furthermore, these competitors' economies of scale and research investments exacerbate the challenges faced by Ugandan tea producers (Kakuru, 2022; Tumwebaze, 2024).

Uganda's tea manufacturing sector exhibits resilience and growth, navigating challenges and opportunities. Embracing modern agricultural practices, sustainability, and quality enhancement strategies positions Uganda to bolster its presence in the global tea market. However, mitigating climate change impacts, bridging infrastructure gaps, and addressing competitive pressures will be pivotal for the industry's sustained success and contribution to Uganda's economic expansion (Ogena, 2021; Kakuru, 2022). Tackling these challenges will unlock Uganda's tea sector potential, driving economic growth and improving livelihoods for rural communities (Mugisha, 2023).

Western Uganda's Global Tea Factory faces revenue collection challenges, primarily driven by climate change. Rising temperatures and erratic rainfall patterns compromise tea production and quality, as noted by Kakuru (2022). Ugandan tea farmers struggle to sustain their livelihoods due to low global tea prices, a concern highlighted by Mugisha (2023). Manual revenue collection processes hinder efficiency, leading to revenue leakages and inadequate resources (Tumwebaze, 2024). To boost transparency and revenue collection, Uganda's government has implemented the Integrated Revenue Administration System (IRAS), building on Ogena's recommendations (2021). Despite these measures, limited staffing, insufficient resources, and tax exemptions for specific groups, such as boda-boda cyclists and military personnel, persist as challenges (Namuyiga, 2022). The COVID-19 pandemic has further strained local government finances, exacerbating revenue collection difficulties (Mwonda, 2020). This research investigated the impact of technology and automation on revenue collection at Uganda's Global Tea Factory, aiming to identify key drivers of financial success.

Statement of the Problem

Revenue collection in the tea industry increasingly aligns with advancements in technology and automation, significantly enhancing operational efficiency and financial performance. The integration of automated inventory management systems enables producers to monitor stock levels in real time, reducing wastage and optimizing supply chain operations (Moyo, 2023). Furthermore, technologies such as IoT and data analytics facilitate better forecasting and demand planning, crucial for maximizing revenue potential (Kilonzo, 2024). Studies have shown that e-commerce platforms also play a vital role in expanding market reach and streamlining sales processes, allowing tea producers to capitalize on online sales opportunities (Singh, 2024). As a result, the convergence of technology and automation not only enhances revenue collection mechanisms but also fosters a more sustainable and competitive tea industry (Hussein, 2020).

The Ugandan government has implemented several measures to promote the tea manufacturing industry in the country, addressing challenges affecting the sector and enhancing its overall growth and competitiveness. These measures include policy interventions, infrastructure development, capacity building, and market access initiatives (Twongyirwe et al., 2020). Despite these stringent measures, the Tea Factory's economic performance is unsatisfactory.

Global Tea Factory confronts myriad challenges detrimental to its financial performance, especially regarding revenue collection. The factory struggles with low tea prices due to global market fluctuations, impacting

revenue generation (Uganda Tea Association, 2020). High production costs, including labor and input expenses, further erode profit margins (Daily Monitor, 2022). Climate change also affects tea yields and quality, leading to reduced revenue (National Environment Management Authority of Uganda, 2021). Aging machinery and infrastructure hinder efficiency, increasing maintenance costs and reducing competitiveness (New Vision, 2020). These interconnected challenges culminate in diminished financial sustainability, underscoring the need for strategic interventions to revitalize the factory's revenue collection and overall financial viability.

If measures are not taken to address the financial challenges facing Global Tea Factory in Bushenyi District, the consequences will likely include reduced production capacity, layoffs, decreased economic benefits to local communities, and potential factory closure, ultimately affecting over 5,000 smallholder tea farmers and 2,000 employees (Uganda Tea Association, 2020). It is hypothesized that there is a direct relationship between technology and automation and revenue collection. This study was carried out to establish the impact of technology and automation strategy on the revenue collection of Global Tea Factory in Uganda.

Objective of the Study

The study was carried out to establish the extent to which technology and automation influence revenue collection in Global Tea Factory in Uganda.

Research Hypothesis

The study was based on the following null hypothesis:

H01: The is no significant relationship between technology and automation and revenue collection in Global Tea Factory in Uganda.

UNDERPINNING THEORY

This study was anchored on Transaction Cost Theory (TCT), introduced by Coase (1937). The theory posits that firms aim to minimize transaction costs, including search, negotiation, monitoring, and enforcement costs, to maximize efficiency. According to Oliver Williamson (1975), TCT explains why firms choose to internalize or outsource activities based on transaction costs, opportunism, and asset specificity. By understanding TCT, organizations can optimize governance structures, contract design, and make-or-buy decisions to reduce transaction costs (Williamson, 1985).

TCT provides a valuable basis for evaluating revenue collection efficiency in tea manufacturing companies, especially with the adoption of automation in financial and operational workflows. Originating from Coase (1937), TCT promotes reducing transaction costs to improve operational efficiency. In tea factories, where revenue collection is often complex due to decentralised activities and diverse payment methods, minimising these transaction costs can streamline processes. Automated systems and digital payment platforms allow tea companies to standardise and simplify transactions, reducing the high costs of extensive manual processing and monitoring (Williamson, 1975). TCT enables these companies to decide which transactions to handle in-house versus outsource, based on factors like opportunism and asset specificity, ensuring that automation is both secure and cost-effective (Brynjolfsson & McAfee, 2014).

TCT identifies ways to minimise costs in transaction-intensive industries like tea manufacturing; however, its application to automation strategies has limitations. The theory traditionally focuses on reducing costs within existing transaction structures without addressing the technological shifts required by modern automation. Implementing digital payment platforms or automated record-keeping systems, for instance, requires initial investments that may not yield immediate reductions in transaction costs. Kumar et al. (2017) suggests that while TCT provides valuable insights for cost savings, it may not fully account for the complexities introduced by digital transformation, such as data integration and employee training, both critical for successful

automation. Although TCT supports decision-making on automation's financial viability, it must adapt to accommodate the costs of technology adoption and system upgrades that are essential for tea factories to achieve sustainable automated revenue collection.

A focus on opportunism and asset specificity within TCT can benefit tea companies when designing contracts and payment structures. Standardised contracts with specific automated billing or payment terms reduce negotiation and enforcement costs. Williamson (1985) notes that TCT assumes stable and predictable transaction environments; however, tea factories face challenges from fluctuating market demands and variable crop yields, which impact revenue collection strategies. While TCT establishes a solid foundation for identifying cost-reduction opportunities, its application to automation in tea manufacturing must adapt to the dynamic nature of production cycles and the need for flexibility within digital systems. Integrating the framework with adaptive strategies enables tea companies to address both predictable and unforeseen challenges, ensuring efficiency in revenue collection.

By leveraging automated systems, digital payment platforms, outsourcing, effective contract design, and standardized payment processes, companies can reduce search, negotiation, monitoring, and enforcement costs (Coase, 1937; Williamson, 1975). This, in turn, enhances revenue collection efficiency and decreases transaction costs (Brynjolfsson & McAfee, 2014). Implementing such strategies is crucial for improving cash flow and ensuring the long-term sustainability of tea manufacturing operations (Srivastava et al., 2018).

Influence of Technology and Automation on Revenue Collection of Tea Industries

Hussein (2020) examined the effects of precision agriculture on revenue collection in the Kenyan tea industry. This study utilized the Technology Acceptance Model (TAM) and the Diffusion of Innovations Theory as theoretical frameworks. Adopting a quantitative research approach, Hussein implemented a cross-sectional survey design to collect data from 200 tea farmers in Kericho County. A structured questionnaire served as the primary instrument for data collection. Descriptive statistics and regression analysis were applied to analyze the data. The findings indicated that precision agriculture significantly improved crop yields and lowered input costs, resulting in increased revenue collection. Hussein concluded that the integration of such technological innovations is essential for enhancing profitability within the tea sector.

Perera (2021) explored the impact of automation on revenue generation in tea processing in Sri Lanka. Anchored in the Resource-Based View (RBV) theory, this research adopted a mixed-methods approach that incorporated both qualitative and quantitative data. A case study design focused on several major tea processing factories. The target population consisted of factory managers and workers, with a sample size of 50 participants. Data collection methods included interviews and structured questionnaires. The analysis comprised thematic analysis for qualitative data and ANOVA for quantitative results. Perera discovered that automation significantly enhanced operational efficiency and reduced labor costs, ultimately leading to increased revenue. The study emphasized the necessity of investing in automation to sustain a competitive advantage within the tea industry.

Sharma (2022) investigated the influence of e-commerce platforms on revenue collection for tea producers in India. Framed by the Technology-Organization-Environment (TOE) framework, the study adopted a quantitative research approach. Researchers employed a survey design targeting small and medium-sized tea producers in Assam, with a sample size of 150 respondents. An online questionnaire served as the primary instrument for data collection. Researchers conducted various statistical analyses, including descriptive statistics and correlation analysis. Findings revealed a positive relationship between e-commerce adoption and revenue growth, highlighting the potential of digital platforms to broaden market reach. Sharma concluded that embracing technology is essential for improving revenue collection among tea producers.

Nuwagaba (2021) explored the effect of mobile technology on the efficiency of revenue collection within Uganda's tea sector. This study utilized the Technology Acceptance Model (TAM) as its theoretical framework and employed a qualitative research approach with a phenomenological design. The target population

consisted of tea farmers who actively use mobile technology, and the sample included 30 participants selected through purposive sampling. Researchers gathered data through in-depth interviews, and thematic analysis was utilized for data interpretation. The results indicated that mobile technology facilitated timely payments and improved the overall revenue collection process, thereby enhancing the financial stability of the farmers. Nuwagaba concluded that integrating mobile technology into revenue collection systems is crucial for operational efficiency.

Zhang (2022) investigated the role of blockchain technology in enhancing revenue transparency within the Chinese tea industry. Grounded in Institutional Theory, this study adopted a case study approach. The target population included managers from tea companies that implement blockchain technology, with a sample size of 25 participants. Data collection methods included semi-structured interviews and document analysis. Researchers applied content analysis to interpret interview transcripts and relevant documents. The findings revealed that blockchain technology significantly enhances transparency and builds trust among stakeholders, thereby improving revenue collection processes. Zhang concluded that the adoption of blockchain technology can transform financial practices in the tea sector, promoting enhanced governance and accountability.

Mwale (2023) focused on the utilization of data analytics for revenue forecasting in Kenya's tea industry. The study employed the Data-Information-Knowledge-Wisdom (DIKW) framework and adopted a quantitative research approach with a longitudinal design. The target population consisted of large tea estates, and the sample size included 10 estates. Data collection involved analyzing historical revenue data and analytics reports. Researchers conducted regression analysis to assess the impact of data analytics on revenue forecasting. The findings demonstrated that data analytics significantly improved the accuracy of revenue forecasts, enabling better financial planning. Mwale concluded that leveraging data analytics is essential for refining revenue collection strategies in the tea sector.

Moyo (2023) examined the relationship between technology adoption and financial performance in Malawi's tea sector. This study utilized the Unified Theory of Acceptance and Use of Technology (UTAUT) as its theoretical framework and employed a quantitative research approach. Researchers implemented a descriptive survey design, targeting tea farmers with a sample size of 120 respondents. A structured questionnaire served as the primary data collection instrument. Descriptive and inferential statistics were employed for data analysis. The findings indicated a positive correlation between technology adoption and financial performance, with farmers reporting increased revenues attributable to improved agricultural practices. Moyo concluded that promoting technology adoption is vital for enhancing financial outcomes in the tea sector.

Reddy (2023) investigated the effects of automation on labor productivity and revenue within India's tea industry. Grounded in Human Capital Theory, this study adopted a mixed-methods approach, utilizing a case study design focused on automated tea processing facilities. The target population comprised workers and management in these facilities, with a sample size of 60 participants. Data collection involved interviews and observation checklists. The qualitative data were analyzed thematically, while quantitative data were assessed using productivity metrics. The study found that automation significantly enhanced labor productivity, leading to improved revenue collection. Reddy concluded that finding a balance between technology and human labor is essential for optimizing revenue generation.

Singh (2024) explored the impact of e-commerce adoption on market reach and revenue generation for tea producers in Sri Lanka. Utilizing the Technology Acceptance Model (TAM), this study employed a quantitative research approach with a survey design. The target population consisted of tea producers with online sales capabilities, and the sample size included 100 respondents. Researchers collected data through a structured online questionnaire. They performed descriptive statistics and regression analysis for data interpretation. Findings revealed that e-commerce adoption significantly expanded market reach and boosted revenue for tea producers. Singh concluded that enhancing online presence is crucial for sustaining growth in the competitive tea market.

Kilonzo (2024) explored the impact of the Internet of Things (IoT) on revenue collection within Kenya's tea sector. The study employed the Technology-Organization-Environment (TOE) framework as its theoretical

basis and adopted a quantitative research approach. Researchers implemented a survey design that targeted tea estate managers, resulting in a sample size of 80 respondents. Data collection was conducted using a structured questionnaire, which enabled systematic data gathering. Statistical analysis included both descriptive and inferential statistics to interpret the results. Findings indicated that IoT applications, such as smart irrigation and monitoring systems, significantly enhanced operational efficiency and revenue collection. Kilonzo concluded that adopting IoT technology can be transformative for improving financial performance in the tea industry.

METHODOLOGY

The study applied a quantitative research approach to collect and examine primary data, presenting the findings in numerical form. This approach focused on generating numeric data to support the thorough analysis essential for testing hypotheses and ensuring statistical validity. Using structured questions allowed for consistent data collection across participants, promoting reliable comparisons and enhancing the study's replicability. The quantitative approach enabled the study to produce measurable, statistically testable results that provide clear evidence on the impact of strategic automation on revenue collection efficiency.

The study used correlational research design to assess the extent to which technology and automation influences revenue collection in Global Tea Factory. This design effectively suited this study as it facilitated the exploration of the relationship between technology, automation, and revenue collection at Global Tea Factory. This design permitted the researcher to evaluate how technology and automation influenced revenue collection without the need for variable manipulation. Measuring the strength and direction of the association between these variables allowed the study to determine if higher levels of technology and automation corresponded with enhanced revenue collection efficiency. Such an approach offered meaningful insights into the naturally occurring relationships within the factory's operations, making it valuable for identifying patterns and potential impacts of automation practices on revenue outcomes.

The target population consisted composed 299 permanent staff who have been working for the last five years. These were derived from five different departments of the company as shown in Table 1. They were selected purposively because the workers in these departments were presumed to have the necessary knowledge and experience to provide reliable opinions on the research questions.

Table 1: Target Population

Selected Departments	Staff
Production	145
Sales and marketing	72
Accounts department	28
Purchase department	40
Human resource	14
Total	**299**

Source: Global Tea Factory Human Resource Manual (2024)

Using Slovin's 1960 formula, a sample size of 171 respondents was obtained from a target population of 299, as indicated in Table 2.

$$n = \frac{N}{1 + Ne^2}$$

Where:

n = Sample size

N = Target Population

e = Standard Error

n = $\quad$ 299

$1+299(0.05)^2$

n = 171 respondents

Table 2: Sample Size

Departments	Target Population	Sample Size
Production	145	83
Sales and marketing	72	41
Accounts	28	16
Purchasing	40	23
Human resource	14	8
Total	**299**	**171**

Source: Researcher (2024)

Stratified random sampling was employed to select from the study population. This sampling technique proved effective for this study as it enabled the selection of proportionate samples from various departments within the target population. Dividing the population into strata based on departmental affiliation ensured adequate representation of each group in the sample, which enhanced the reliability and validity of the findings. This approach provided a comprehensive understanding of perspectives across different departments, capturing the diversity of experiences and knowledge among staff members. As a result, stratified random sampling supported a more detailed analysis of how technology and automation impact revenue collection in the various operational contexts of the Global Tea Factory. Subsequently, simple random sampling was used to choose individual respondents at random, utilizing random numbers and basic random sampling. These individuals served as the study's analytical unit.

To collect primary data, the researcher used a combination of self-administered and researcher-administered structured questionnaires, accommodating participants' varying literacy levels. A 4-point Likert scale-based questionnaire was designed to facilitate quantitative data collection, with closed-ended questions ensuring accuracy. The researcher computed the content validity index to ensure the questionnaire's questions yielded reliable results, achieving a construct validity index (CVI) of 0.78, exceeding the recommended threshold of 0.7. To assess the research instrument's reliability, Cronbach alpha was used, yielding a coefficient of 0.82, confirming the instrument's reliability.

Quantitative data was analyzed using descriptive statistics to ascertain respondents' opinions concerning on the research questions. Central tendency measurements and percentages were employed to present the responses. Simple linear regression analysis was utilized in inferential statistics to test hypotheses and determine the relationship between technology and automation and revenue collection. The resulted were further subjected to Pearson's Product correlation index analysis to establish the strength and direction of the relationship between technology and automation and revenue collection. The null hypothesis was tested at a significance level of 0.05. Relevant tables were used to display the findings. Throughout the research period, the study adhered to ethical norms, ensuring confidentiality, anonymity, and voluntary participation of respondents. This ensured that the study was conducted with integrity and respect for participants' rights.

FINDINGS

From the analysis the following findings were obtained**:**

Response Rate

The response rate was at 100% as all the 171 questionnaires were returned by the respondents.

Descriptive Statistics

The study sought to find out the influence of technology & automation on revenue collection as shown in the Table 3.

Table 3: Descriptive Statistics on Technology & Automation

Statements	SA	A	D	SD	Mean	S.D
Implementation of technology and automation on inventory management is positively impacting the factory's revenue.	85 49.7%	64 37.4%	13 7.6%	9 5.3%	1.68	.829
Technology and automation have reduced order processing time of inventory	83 48.5%	67 39.2%	12 7.0%	9 5.3%	1.69	.821
Use of technology and automation reduced excess inventory in the factory	82 48.0%	65 38.0%	14 8.2%	10 5.8%	1.72	.849
Technology and automation have reduced errors in billing, invoicing and order fulfillment on inventory	109 63.7%	39 22.8%	10 5.8%	13 7.6%	1.57	.907
Technology and automation have reduced lead- time on managing inventory	84 49.1%	60 35.1%	14 8.2%	13 7.6%	1.74	.903
Technology and automation have reduced the cost of production of the factory inventory	98 57.3%	53 31.0%	9 5.3%	11 6.4%	1.61	.857
MOT (Mean of Technology and Automation)					**1.6696**	**.57322**

Source: Field Data (2024)

1= Strongly Agree   2= Agree   3= Disagree 4= Strongly Disagree

Several questions were posed on respondents to establish the influence of technology & automation on revenue collection of Global Tea Factory. The study sought to inquire whether the implementation of technology and automation on inventory management is positively impacted the factory's revenue. 49.7% of the respondents strongly agreed, 37.4% greed, 7.6% disagreed and 5.3% strongly disagreed. With a mean of 1.68 it indicates that the majority of the respondents agreed with the statements.

The findings also indicate that 48.5% strongly agreed that technology and automation has reduced order processing time of inventory; while 39.2% agreed, 7.0% disagreed and 5.3% strongly disagreed. With a mean of 1.69 it implies that the majority of the participants agreed with the statements.

The results also show that 48.0% strongly agreed that use of technology and automation has reduced excess inventory in the factory; while 38.0% agreed, 8.2% and 7.6% strongly disagreed. With a mean of 1.72 the results indicate that majority of the participants agreed with the questions.

The findings also indicate that 63.7% strongly agreed that technology and automation has reduced errors on billing and order fulfillment on inventory; while 22.8% agreed, 5.8% disagreed and 7.6% strongly disagreed. With a mean of 1.57 it shows that the majority of the participants agreed with the statements.

The findings on the table further show that 49.1 of the participants strongly agreed that technology and automation has reduced lead-time on managing inventory; while 35.1% agreed, 8.2% disagreed and 7.6% strongly disagreed. With a mean of 1.74 the findings indicate that majority of the respondents agreed with the questions.

The findings finally show that 57.3% strongly agreed that technology and automation has reduced that cost of production of the factory inventory; while 31.0% agreed, 5.3% disagreed and 6.4% disagreed. With a mean of 1.61 it shows that the majority of the respondents agreed on the statements.

Revenue Collection

The study sought to establish the opinions of the respondents on revenue collection of the tea factory. The results are shown in Table 4

Table 4: Descriptive Statistics on Revenue collection

	SA	A	D	SD	Mean	S.D
There is rising gross profit margin due to effective inventory management practices at Global tea factory	97 56.7%	48 28.1%	15 8.8%	11 6.4%	1.65	.891
There is a higher inventory turnover ratio in global tea factory leading to increased revenue	101 59.1%	48 28.1%	12 7.0%	10 5.8%	1.60	.858
There is a lower stock out rate at global tea factory due to better inventory management.	112 65.5%	42 24.6%	8 4.7%	9 5.3%	1.50	.814
There is continuous flow of revenue growth at Global tea factory	102 59.6%	46 26.9%	17 9.9%	6 3.5%	1.57	.811
Better inventory management has resulted to improved sales and revenue growth at Global tea factory	111 64.9%	44 25.7%	12 7.0%	4 2.3%	1.47	.730
MRC (Mean of revenue collection)					1.5567	.42592

Source: Field Data (2024)

The study sought the opinions of the respondents on revenue collection of Global Tea Factory. The findings show that 56.7% strongly agreed that there is rising gross profit margin due to effective inventory management practices at Global tea factory; while 28.1% agreed, 8.8% disagreed and 6.4% strongly disagreed. With a mean of 1.65, it indicates that the majority of respondents strongly agreed.

The findings further show that 59.1% strongly agreed that there is a higher inventory turnover ratio in global tea factory leading to increased revenue; while 28.1% agreed, 7.0% disagreed and 5.8% strongly disagreed. With a mean 0f 1.60 it means that the majority of the participants agreed.

The findings also show that 65.5% strongly agreed that there is a lower stock out rate at global tea factory due to better inventory management; while 24.6% agreed, 4.7% disagreed and 5.3% strongly disagreed. With a mean of 1.50, this implies that the majority of the respondents strongly agreed.

The results also indicate that 59.6% strongly agreed that there is a lower stock out rate at global tea factory due to better inventory management; while 26.9% agreed, 9.9% disagreed and 3.5% strongly disagreed. With a mean of 1.57, this shows that the majority of the participants strongly agreed. The results also show that 64.9% strongly agreed that better inventory management has resulted to improved sales and revenue growth at Global tea factory, 25.7% agreed, 7.0% disagreed and 2.3% strongly disagreed. With a mean of 1.47, this indicates that majority of the respondents strongly agreed.

Simple Linear Regression

Simple linear regression analysis was conducted to establish the extent to which technology & automation affects revenue collection as shown in the Table 5.

Table 5: The Relationship Between Technology & Automation on Revenue Collection

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.515a	0.265	0.26	0.3663

a. Predictors: (Constant), MOT

b. Dependent Variable: MRC

(MOT= Technology and Automation; MOT=Revenue Collection)

Source: Field Data (2024)

A value of ($R^{2}= 0.265$) indicates that Technology and Automation explains approximately 26.5% of the variance on revenue collection. This implies that the remaining 73.5% is explained by other variables.

Table 6: ANOVA on Technology & Automation on Revenue Collection

ANOVAa					
Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	8.164	1	8.164	60.845	.000b
Residual	22.676	169	.134		
Total	30.840	170			

a. Dependent Variable: MRC

b. Predictors: (Constant), MOT

(MRC= Revenue Collection; MOT= Technology and Automation)

Source: Field Data (2024)

The findings indicate that the model was a good fit for the data (F= 60.845, p=.000, p<0.05) implying that the model significantly and linearly predicted revenue collection.

Table 7: Coefficients on Technology and Automation on Revenue Collection

Coefficientsa					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	.918	.086		10.619	.000
MOT	.382	.049	.515	7.800	.000

a. Dependent Variable: MRC

b. Predictors: (Constant), MOT

(MRC= Revenue Collection; MOT= Technology and Automation)

Source: Field Data (2024)

The coefficient table above, indicate that there was significant positive relationship between technology and automation on revenue collection (t=7.800, p=.000, p<0.05). The null hypothesis was rejected and hence alternative hypothesis stating that there is significant relationship between technology and automation and revenue collection was upheld.

Correlation Analysis

The researcher conducted Pearson's Product Correlation Index analysis to establish the strength and direction of the relationship between technology and automation and revenue collection as shown in Table 8.

Table 8: Correlations

		MOT	MRC
MOT	Pearson Correlation	1	.515[**]
	Sig. (2-tailed)		.000
	N	171	171
MRC	Pearson Correlation	.515[**]	1
	Sig. (2-tailed)	.000	
	N	171	171

Source: Field Data (2024)

Results from the above table indicates that there is a positive correlation between the technology and automation and revenue collection. (r = 0.515**, p = 0.000, P-value < 0.05), this shows that technology and automation contribute to the revenue collection

DISCUSSION OF FINDINGS

The current study's findings show a statistically significant positive relationship between technology/automation and revenue collection (t=7.800, p=.000, p<0.05), supporting the alternative hypothesis. This outcome is consistent with previous research by Bai et al. (2020), which illustrated the financial advantages of integrating Industry 4.0 technologies in Sri Lanka's tea industry, resulting in enhanced productivity, quality, and revenue.

This study's results align with existing research on technology's impact on the tea industry. Kamalakkannan et al.'s (2020) analysis of Sri Lanka's tea industry revealed that automation and technology adoption significantly enhanced profitability through improved supply chain efficiency. Similarly, Jayaraman et al. (2016) demonstrated the benefits of IoT platforms in smart farming, leading to optimized production processes and substantial revenue growth.

The findings also corroborate Schöggl et al.'s (2016) assessment of supply chain sustainability, highlighting advanced technologies' role in boosting revenue through enhanced supply chain performance. These finds comply with Frank et al.'s (2019) whose review of Industry 4.0 technologies in manufacturing, including tea processing, further supports the positive relationship between technological advancements and revenue growth.

CONCLUSION

This study demonstrates a positive correlation between technology/automation strategies and revenue collection, underscoring the benefits of integrating advanced technologies into manufacturing processes to enhance productivity and revenue growth. The findings indicate that adopting outsourced technology and automation in production processes significantly contributes to revenue collection by maximizing production

turnover and efficiency. To foster a conducive environment, the Ugandan government can play a crucial role by reducing taxes associated with purchasing and assembling production plants, decreasing production costs, stimulating consumption, and ultimately leading to increased revenue. Leveraging technology and supportive policies, businesses can drive growth, improve competitiveness, and boost revenue in Uganda's manufacturing sector.

RECOMMENDATIONS

The study's findings highlight the importance of technology and automation in driving revenue growth in the production sector. Key stakeholders, including production companies and policymakers, should consider strategic recommendations to leverage this potential.

Subsidizing the acquisition and assembly of production plants is essential to lower costs, allowing companies to purchase advanced machinery at more affordable prices. This initiative would enhance productivity and increase production quantities, enabling businesses to capture market share with competitive pricing while maintaining revenue.

Newly acquired production plants must be adaptable to rapid technological changes. Consistent training for employees is vital to ensure efficient operation of advanced machinery. Investing in human capital allows for seamless integration of new technologies, accelerating production and helping companies achieve their objectives.

Implementing these measures will enhance productivity, revenue, and competitiveness in the production sector. Embracing technological advancements and workforce development will be critical for sustained growth. By prioritizing these strategies, production companies can optimize revenue collection, remain market-relevant, and promote long-term prosperity.

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