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Effect of Monitoring and Operational Efficiency in Food and Beverage (F&B) Firms Enugu State

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Abstract

This study examined the effect of monitoring on the operational efficiency of food and beverage (F&B) firms in Enugu State, Nigeria. Specifically, it investigated the influence of quality control on spoilage rates and the role of customer feedback in improving product quality. The study adopted a survey research design and focused on selected food and beverage firms in Enugu metropolis with a substantial workforce and years of operational experience. Given the manageable population size, a census approach was employed, covering all 293 employees, out of which 244 valid questionnaires were returned and analyzed. Data were analyzed using descriptive statistics (mean scores), while hypotheses were tested using the Z-test with the aid of SPSS software. The findings revealed that quality control has a significant positive effect on reducing spoilage rates in food and beverage firms ($Z = 9.795$, $p < 0.05$). In addition, customer feedback was found to have a significant positive effect on product improvement ($Z = 11.395$, $p < 0.05$). The study concluded that effective monitoring practices, particularly quality control and customer feedback mechanisms, significantly enhance operational efficiency by minimizing spoilage and improving product quality in F&B firms in Enugu State. It therefore recommended that food and beverage firms strengthen their quality control systems through regular inspections, strict adherence to hygiene standards, and proper equipment maintenance to ensure product safety and operational efficiency.

Keywords: *Quality Control Systems; Operational Efficiency; Spoilage Reduction; Customer Feedback; Food and Beverage Industry.*

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Introduction

The practice of monitoring production to improve efficiency dates back to the Industrial Revolution. Factory owners began measuring output, losses, and workflow in order to reduce waste and increase productivity (Pongrácz & Pohjola, 2004). Over time, these measurement practices evolved into formal quality and process control systems such as Statistical Process Control, Total Quality Management (TQM), and Lean manufacturing. These approaches emphasize that continuous monitoring is essential for reducing variability, minimizing errors, and improving overall operational performance (Womack & Jones, 2003; George, 2002). Fundamentally, monitoring and efficiency have long been interconnected: what is measured can be managed. Monitoring transforms routine activities into structured, repeatable processes that can be evaluated and improved.

Monitoring refers to the systematic and continuous collection, analysis, and use of information to track performance and ensure alignment with organizational objectives. According to Mackay (2021), it involves observing operations in real time to detect deviations from established standards and implementing corrective actions promptly. Monitoring serves as a managerial tool that promotes accountability, transparency, and efficiency in both public and private organizations. Operational efficiency, on the other hand, refers to an organization's ability to deliver products or services at minimal cost while maintaining high quality and optimal resource utilization. Smith and Brown (2021) argue that achieving efficiency requires waste reduction, faster production cycles, and the maximization of inputs through improved processes and technology. Operational efficiency therefore determines an organization's competitiveness and long-term sustainability.

Adebayo and Ojo (2022) describe operational efficiency as the effective balance between inputs and outputs, enabling organizations to achieve more with fewer resources. Ogunleye (2023) notes that organizations can enhance efficiency through close monitoring, innovation, and data-driven decision-making, which ultimately increase productivity and profitability. Similarly, Baines et al. (2021) observe that the adoption of automation, lean production, and quality control practices in manufacturing and service industries significantly improves operational efficiency by reducing costs and operational errors.

In summary, operational efficiency ensures that organizations meet customer expectations and remain sustainable by optimizing resources and processes. Adebayo and Ojo (2022) describe monitoring as a feedback mechanism that enables managers to evaluate the effectiveness of plans, identify deviations, and implement improvements. Baines et al. (2021) further explain that monitoring systems, such as digital dashboards, support efficient resource utilization, waste reduction, and improvements in output quality. Ogunleye (2023) adds that in developing economies such as Nigeria, monitoring helps maintain operational discipline, reduce human error, and enhance business continuity.

Essentially, monitoring extends beyond observation; it is a strategic tool for informed decision-making, efficiency enhancement, and continuous improvement. Globally, manufacturing and service organizations rely on real-time monitoring technologies such as sensors, Internet of Things (IoT) systems and performance dashboards, as well as performance management frameworks like ISO standards and the Balanced Scorecard to improve efficiency, reduce costs, and ensure sustainability (International Organization for Standardization, 2018; Kaplan & Norton, 1996). Empirical studies across various contexts indicate that timely measurement and feedback reduce waste, shorten production cycles, and increase output in food and beverage manufacturing and cold-chain operations (Baines et al., 2019; Chopra & Sodhi, 2020). Furthermore, literature on the circular economy and green manufacturing highlights that monitoring supports both productivity and environmental sustainability by enabling organizations to measure and reduce material, energy, and water waste (Ellen MacArthur Foundation, 2019).

Many countries have institutionalized these principles through regulations and business practices. In Nigeria, policy institutions encourage firms to adopt quality management and environmental management systems that require systematic monitoring of production processes and waste generation (National Bureau of Statistics [NBS], 2022; Federal Ministry of Industry, Trade and Investment, 2021). Studies on Nigerian manufacturing firms indicate that organizations with robust monitoring practices such as process control charts, laboratory testing and key performance indicators (KPIs)—achieve higher equipment utilization and lower waste levels than firms with weaker monitoring systems (Adebayo & Ojo, 2020). However, the literature also identifies challenges such as inadequate funding, skills shortages, and unreliable utilities, which can limit the effectiveness of monitoring unless adequately addressed (Olayinka, 2021).

Food and beverage firms play a critical role in Nigeria's economy and in regions such as Enugu State. Monitoring is particularly crucial in this sector due to the perishable nature of raw materials and finished products. Studies of local food and beverage plants show that quality inspections, production-line monitoring, and timely corrective actions reduce waste, extend shelf life, and lower operational costs (Akpan, 2019; Eze & Nwosu, 2021). Despite these benefits, many small and medium-sized food and beverage firms in the region still rely on manual record-keeping and irregular monitoring, resulting in avoidable losses. Consequently, this study examines the effect of monitoring on the operational efficiency of food and beverage firms in Enugu State, with particular emphasis on identifying monitoring practices such as monitoring frequency, technology use, key performance indicators and feedback mechanisms that most effectively reduce waste, increase output, and lower production costs.

Statement of the Problem

Monitoring is a key managerial function that ensures organizational operations run smoothly and efficiently. It involves the continuous assessment of processes, employee performance, and resource utilization to achieve desired organizational objectives. In the food and beverage industry, effective monitoring enables firms to maintain product quality, minimize errors, and enhance operational performance. When properly implemented, monitoring helps organizations reduce waste, control costs, and deliver high-quality products to customers in a timely manner, thereby improving competitiveness and profitability.

However, many food and beverage firms, particularly in developing economies such as Nigeria, experience significant challenges in implementing effective monitoring systems. Some organizations rely primarily on supervisory oversight of employees, with limited data collection and inadequate performance measurement systems. These shortcomings result in production delays, weak quality control, excessive waste, and operational inefficiencies that reduce overall productivity. The limited adoption of technological monitoring tools further restricts management's ability to detect operational issues promptly and implement timely corrective actions, leading to production bottlenecks and reduced efficiency.

If these challenges remain unaddressed, the consequences can be severe. Ineffective monitoring can lead to persistent inefficiencies, increased production costs, and loss of customer trust due to inconsistent product quality. Over time, affected firms may lose their competitive advantage, experience declining profitability, and face the risk of business failure. Additionally, inadequate monitoring may compromise food safety standards, damage brand reputation, and hinder the long-term sustainability of Nigeria's food and beverage industry. In response to these concerns, this study seeks to examine the effect of monitoring on the operational efficiency of food and beverage firms in Enugu State, with the aim of determining how effective monitoring practices can improve productivity, reduce waste, and enhance overall organizational performance.

Objective of the study

The main objective of this study is to evaluate the effect of monitoring on the operational efficiency of food and beverage (F&B) firms in Enugu State. The specific objectives are to:

i. Examine the effect of quality control on the spoilage rate of food and beverage (F&B) firms in Enugu State.
ii. Evaluate the effect of customer feedback systems on product improvement in food and beverage (F&B) firms in Enugu State.

Research Questions

The following research questions guided the study:

i. What is the relationship between quality control and the spoilage rate of food and beverage firms in Enugu State?
ii. What is the relationship between customer feedback systems and product improvement in food and beverage firms in Enugu State?

Statement of the hypotheses

The following null hypotheses guided the study:

i. H_{01}: Quality control has no significant relationship with the spoilage rate of food and beverage firms in Enugu State.
ii. H_{02}: Customer feedback systems have no significant relationship with product improvement in food and beverage firms in Enugu State.

Review of Related Literature

Conceptual Review

Monitoring

Monitoring involves regularly watching, checking, and judging actions or work to be sure they match planned targets and rules. It's a tool managers can use to follow progress, spot problems, and fix things to work better (Mackay, 2021). Baines, Smith, and Brown (2021) state that monitoring gives managers current data to help them make good choices and do better as a group. Ogunleye (2023) says monitoring is a way to control things so that resources are used well and work stays helpful and cost-wise. Basically, monitoring helps groups mainly in fast-changing businesses like food and drink keep quality high, lower waste, and work very well by watching closely and judging work fairly.

Components of Monitoring

Quality Control

Quality control (QC) means checking carefully that items or help reach set rules and needs before customers get them. It means watching, looking at, and testing jobs and results to find faults and problems, so fixes can keep things steady and trustworthy (Juran & Godfrey, 2021). Baines, Smith, and Brown (2021), quality control helps make work better, cut waste, and please customers, mainly in making and service areas. Likewise, Ogunleye (2023) says good QC helps groups find weak spots, stay within rules, and last well. Basically, quality control is a key tool for managers to keep items safe, lower errors, and grow stronger in markets everywhere.

Customer Feedback Systems

A customer feedback system is a way for groups to get, study, and act on what customers say about items, services, or feelings (Adebayo & Ojo, 2022). It's important for making service better, finding weak spots, and pleasing customers more. Baines, Smith, and Brown (2021) note that good feedback systems help firms find regular issues, work better, and choose wisely based on facts for lasting fixes. Similarly, Ogunleye (2023) points out that these systems build stronger ties with customers, lower complaints, and aid group help and staying power. In short, these systems turn customer views into plans that make things better and grow lead over others.

Operational

The word operational refers to actions, steps, or jobs linked to the daily work of a group to meet its aims well (Mackay, 2021). It includes doing plans, handling resources, and using ways that keep the group running without trouble. Baines, Smith, and Brown (2021) suggest that what's operational is key for keeping output up, lowering mistakes, and getting results quickly. Ogunleye (2023) says that functions connect plans to real things, noting how watching, control, and lasting fixes keep a group strong. In short, "operational" means doing and running jobs that push a group to be helpful and do well.

Efficiency

Efficiency is how well a group or setup gets the most out of the least input, stuff, or work, lifting output and dropping waste (Adebayo & Ojo, 2022). It stresses using stuff, time, work, and tools well to meet goals cheaply. Baines, Smith, and Brown (2021) point out that efficiency decides how well one can beat others, letting firms give good items or

help while dropping losses. Ogunleye (2023) adds that lifting efficiency means keeping watch, fixing jobs, and cutting extra steps to grow help and staying power. Basically, efficiency is doing things right, using stuff fully, and gaining results with little waste.

Operational Efficiency

Operational efficiency means a group gives items or help well while using less stuff, money, and waste (Adebayo & Ojo, 2022). It covers fixing jobs, using work and things well, and keeping items high in quality to meet group aims. Baines, Smith, and Brown (2021) state that operational efficiency grows output, lead, and profit, mainly in changing and careful businesses. Ogunleye (2023) says operational efficiency comes from watching, fixing jobs, and running things well, helping groups drop errors, avoid extras, and get the most for their money. In short, operational efficiency makes sure stuff is used fully to last well and help the group win.

Components of Operational Efficiency

Spoilage Rate

Spoilage rate is the part of items that can't be used or sold because of faults, dirt, or damage in making, keeping, or sending (Smith & Brown, 2021). It's a key sign of how well things are made and checked, mainly in food and drink areas. Baines, Smith, and Brown (2021) find that a high rate means things are badly made, handled poorly, or kept wrong, raising costs and cutting profit. Ogunleye (2023) says that watching and handling spoilage rate is key to using stuff well, lowering waste, and lifting how well things are done in factory and service places. In short, spoilage rate shows how well quality and actions are handled in a group.

Improved Products

Improved products are items or help made better to grow quality, use, efficiency, or customer joy over older kinds (Baines, Smith, & Brown, 2021). These fixes can mean changing how things look, using tools, better stuff, or fixes from customer views and market needs. Ogunleye (2023) notes that fixes let groups stay quick, drop faults, and meet customer needs. Adebayo and Ojo (2022) say lasting fixes help how things are done by cutting waste, fixing actions, and lifting how well a group does. Basically, improved products show a group's drive for quality, new ideas, and customer joy.

Theoretical Framework

The Diagnostic Control Systems Theory, from Beer's (1979) Cybernetic control idea and Simons's (1995) work, says how watching and feedback grow how well things are done. The theory notes that monitoring lets managers match real work with set rules, find faults, and fix things to keep things steady and better. In Food and Drink (F&B) firms, where rightness and clean state matter, controls find early issues like waste or errors, helping keep items steady, lower waste, and cut costs. These systems work as loops that match work with group aims, backing lean work and lasting fixes (George, 2002; Deming, 1986).

Good monitoring not only stops waste but pushes learning, new ideas, and job fixes. In F&B firms, they track waste rates, making times, and stuff use, letting managers act fast on faults. If watching is weak, groups risk losses, poor work, and customer anger. But good controls grow stuff use, keep jobs steady, and lift how well things are done in the long run. So, the Theory calls monitoring the core of how well things are done, noting its role in keeping lead, cutting waste, and keeping work steady in moving factory places (Simons, 1995; Beer, 1979; George, 2002; Deming, 1986).

Empirical Review

Ugwuanyi et al. (2019) examined the microbiological quality of kunu-zaki sold in Gariki, Enugu State, Nigeria. Fresh kunu-zaki prepared from pearl millet was collected from six vendors and analyzed for microbial content. Samples stored at room temperature and under refrigeration were diluted daily over three days using a 10^{-2} dilution. Microbiological analyses were conducted on MacConkey agar, Nutrient agar, Sabouraud Dextrose agar, and CLED agar. Bacillus spp. and *Escherichia coli* were detected in fresh samples, whereas refrigerated kunu-zaki contained *Lactobacillus*, *Pseudomonas* spp., Bacillus spp., and E. coli. Room temperature storage resulted in additional contamination with *Streptococcus* spp. E. coli recorded the highest prevalence (30.8%), while Streptococcus spp. had the lowest (7.7%). Fungal isolates included *Saccharomyces cerevisiae*, *Aspergillus* spp., and *Geotrichum* spp.,

with Torula yeast appearing after two to three days of storage. The study recommended that kunu-zaki be consumed within 24 hours or preserved with chemical preservatives rather than relying solely on refrigeration, highlighting the importance of monitoring storage conditions to reduce spoilage.

Nkere et al. (2020) assessed the bacteriological quality of foods and water sold in Nsukka, Enugu State, Nigeria, using three bacterial enumeration methods. Ten food items—beans, yam, abacha, okpa, moi-moi, pear, cassava fufu, rice, agidi, and garri—along with ten water samples, were analyzed to determine coliform counts. Results indicated significant variation in bacterial counts across food types ($p < 0.05$), though no significant differences were observed among the enumeration methods, confirming their reliability. Predominant coliforms included *Escherichia coli* and *Klebsiella pneumoniae*, with 79.6% likely of human origin. Coliform levels in foods sold by vendors and restaurants exceeded acceptable limits, underscoring the need for strict monitoring, enforcement of food safety regulations, and training for food handlers to ensure product safety and operational efficiency.

Marire et al. (2020) investigated quality control challenges at Nigerian Breweries Plc, Enugu. The study explored issues in quality control, the techniques used, and their effectiveness, as well as organizational expectations from quality systems. Data were collected via questionnaires and secondary sources, with analysis using tables, percentages, and chi-square tests. Findings revealed that constraints such as inadequate knowledge of quality control techniques, limited understanding of customer requirements, cost considerations, and managerial attitudes hindered effective quality management. The study concluded that implementing proper quality control measures enhances corporate image, ensures customer satisfaction, and reduces operational costs.

Ugwu et al. (2023) examined quality control practices and their influence on organizational growth in manufacturing firms in Enugu State. The study focused on inspection techniques, mindset-based practices, and quality-at-the-source approaches. A survey design was used, with 217 respondents sampled from a population of 474 using Taro Yamane's formula. Data analysis involved frequencies and percentages, with hypotheses tested using the Z-test. Results indicated that inspection techniques significantly promoted organizational growth ($Z = 40.33$, $p < 0.05$), mindset-based practices positively influenced business growth ($Z = 37.76$, $p < 0.05$), and quality-at-the-source significantly contributed to business performance ($Z = 37.76$, $p < 0.05$). These findings underscore the importance of monitoring and quality control in enhancing operational efficiency.

Chukwukasi et al. (2024) investigated food safety practices among food handlers in Enugu State. Given the increasing demand for ready-to-eat foods and the proliferation of food vendors, food safety remains a major concern. The study surveyed 400 food handlers, using structured questionnaires analyzed through percentages, means, and regression analysis. Results showed that the respondents' mean age was 31.16 ± 8.24 years, with 66.5% demonstrating good knowledge of food safety. The overall food safety practice score was 80.10 ± 10.25, with 70.5% of respondents exhibiting satisfactory practices. Only 35.0% of respondents maintained good environmental sanitation. Training, prior knowledge, and food safety education were significantly associated with good practices, highlighting the critical role of continuous monitoring and training in ensuring operational efficiency in the F&B sector.

Iheanachor at el. (2021) looked at how making products affects new product results in Nigeria's money firms. This Iheanachor, Umukoro, and Olayinka (2021) investigated the effect of product development practices on new product performance in Nigeria's financial services sector. The study reviewed ten prior studies and assessed how production methods influenced the success of new financial products. Findings indicated that weak production processes negatively affected product performance, resulting in poor outcomes and low customer adoption. The study concluded that the methods used in developing financial products significantly determine their acceptance and effectiveness in the market, emphasizing the need for structured and well-monitored production practices.

Okolo et al. (2021) examined the influence of customer feedback on customer retention in banks located in South-Eastern Nigeria. The study surveyed customers from Access Bank, UBA, and First Bank in Enugu, Awka, and Owerri, using a sample of 384 respondents selected through Freud and William's formula, with 300 valid responses. Data were analyzed using regression in SPSS version 22. Results showed that customer feedback significantly contributed to retaining customers, highlighting that regular monitoring of customer opinions is crucial for improving service delivery and maintaining client loyalty.

Okolo et al. (2024) assessed the impact of customer feedback management on customer satisfaction in South-Eastern Nigerian banks. The study targeted student customers of Access Bank, Ecobank, First Bank, and UBA across

Abia, Enugu, Awka, and Owerri. A sample of 384 respondents was selected using Cochran's formula, with 318 valid responses analyzed via regression in SPSS version 22. Findings revealed that effective management of customer feedback positively influenced customer satisfaction, emphasizing the importance of monitoring customer perceptions as a key factor in service quality and operational efficiency.

Ugwu & Oboko (2024) explored the role of customer relationships and their effect on the performance of SMEs in Enugu State. The study examined how customer support and customer trust influence sales, output, and overall business performance. Surveys were administered to all 143 staff members of selected SMEs, with 133 valid responses. Data were analyzed using Likert scales and t-tests. Results indicated that customer support significantly improved sales ($t(95, n = 133) = 8.964$, $p < 0.05$), and customer trust positively affected SME performance ($t(95, n = 133) = 5.805$, $p < 0.05$). The study concluded that strong customer relationships, supported by Customer Relationship Management (CRM) systems, enhance operational efficiency and profitability, though successful CRM implementation requires proper planning, system customization, and staff training.

Agbo et al. (2025) examined the influence of new product development on organizational performance, focusing on the Nigerian Bottling Company, Enugu. Using 93 staff surveys analyzed with SPSS version 22, the study found that the quality and presentation of new products significantly enhanced organizational performance and profitability. The research highlighted that structured monitoring and evaluation of new product processes from raw material selection to production directly affect operational efficiency and market competitiveness.

Methodology

The area of the study was Enugu Metropolis, on the effect of monitoring and operational efficiency in food and beverage (F&B) firms in Enugu state. Two hundred and ninety three (293) business employees were selected for the study. The study used the descriptive survey design approach. The primary source of data was the administration of questionnaire. Two hundred and forty four (244) employees returned their questionnaire and accurately filled. That gave 83 percent response rate. The validity of the instrument was tested using content analysis and the result was good. The reliability was tested using the Pearson correlation coefficient (r). It gave a reliability co-efficient of 0.81 which was also good. Data was presented and analyzed by mean score and standard deviation using Sprint Likert Scale. The hypotheses were analyzed using Z - test statistic tool.

Data Presentation and Analyses

Effect of quality control on spoilage rate of food and beverage (F&B) firms in Enugu State

Table 1: Responses on the effect of quality control on spoilage rate of food and beverage (F&B) firms in Enugu State

		5 SA	4 A	3 N	2 DA	1 SD	∑FX	- X	SD	Decision
1	Effective quality control significantly reduces the spoilage rate in food and beverage firms across Enugu State by ensuring that production processes meet safety and hygiene standards.	740 148 60.7	248 62 25.4	54 18 7.4	2 1 .4	15 15 6.1	1059 244 100.0	4.34	1.067	Agree
2	Regular monitoring and inspection help detect faults early, minimizing losses due to contamination or improper storage.	735 147 60.2	220 55 22.5	66 22 9.0	12 6 2.5	14 14 5.7	1047 244 100.0	4.29	1.108	Agree
3	The implementation of strict quality assurance measures enhances product shelf life and boosts consumer confidence in locally produced goods.	730 146 59.8	272 68 27.9	54 18 7.4	10 5 2.0	7 7 2.9	1073 244 100.0	4.40	.926	Agree
4	F&B firms in Enugu State that invest in modern quality control systems experience improved operational efficiency and reduced waste.	715 143 58.6	208 52 21.3	90 30 12.3	10 5 2.0	14 14 5.7	1037 244 100.0	4.25	1.118	Agree
5	Consistent adherence to quality standards not only lowers spoilage rates but also promotes profitability and sustainability within the industry.	725 145 59.4	224 56 23.0	69 23 9.4	12 6 2.5	14 14 5.7	1044 244 100.0	4.28	1.109	Agree
	Total Grand mean and standard deviation							**4.312**	**1.0656**	

Source: Field Survey, 2025

Table 1, 210 respondents out of 244 representing 86.1 percent agreed that Effective quality control significantly reduces the spoilage rate in food and beverage firms across Enugu State by ensuring that production processes meet safety and hygiene standards with the mean score of 4.34 and standard deviation of 1.067. 202 respondents representing 82.7 percent agreed that regular monitoring and inspection help detect faults early, minimizing losses due to contamination or improper storage with a mean score of 4.29 and standard deviation of 1.108. 214 respondents representing 87.7 Percent agreed that the implementation of strict quality assurance measures enhances product shelf life and boosts consumer confidence in locally produced goods with mean score of 4.40 and standard deviation of .926. 195 respondents representing 79.9 percent agreed that F&B firms in Enugu State that invest in modern quality control systems experience improved operational efficiency and reduced wastewith mean score of 4.25 and standard deviation of 1.118. 210 respondents representing 82.4 percent agreed Consistent adherence to quality standards not only lowers spoilage rates but also promotes profitability and sustainability within the industry, with a mean score of 4.28 and standard deviation 1.109.

Effect of Customer Feedback Systems on improved products in Enugu State

Table 2: Responses on the effect of Customer Feedback Systems on improved products in Enugu State

		5 SA	4 A	3 N	2 DA	1 SD	∑FX	- X	SD	Decision
1	Customer feedback systems enable firms in Enugu State to gather valuable insights that guide the improvement of product quality and design.	810 162 66.4	240 60 24.6	18 6 2.5	2 1 .4	15 15 6.1	1085 244 100.0	4.45	1.031	Agree
2	By analyzing customer opinions, businesses can identify weaknesses in their products and implement necessary adjustments to meet market demands.	890 178 73.0	180 45 18.4	12 4 1.6	2 1 .4	16 16 6.6	1100 244 100.0	4.51	1.048	Agree
3	Effective use of feedback systems fosters innovation, helping firms develop new products that align with consumer preferences.	860 172 70.5	156 39 16.0	39 13 5.3	12 6 2.5	14 14 5.7	1081 244 100.0	4.43	1.092	Agree
4	Companies that prioritize customer feedback experience higher customer satisfaction and brand loyalty, leading to sustained growth.	860 172 70.5	188 47 19.3	33 11 4.5	2 1 .4	13 13 5.3	1096 244 100.0	4.49	1.004	Agree
5	In Enugu State, firms that actively utilize feedback mechanisms gain a competitive edge through continuous product enhancement and market responsiveness.	440 88 36.1	480 120 49.2	84 28 11.5	2 1 .4	7 7 2.9	1013 244 100.0	4.15	.854	Agree
	Total Grand mean and standard deviation							**4.406**	**1.0058**	

Source: Field Survey, 2025

Table 2, 222 respondents out of 244 representing 91.0 percent agreed that Customer feedback systems enable firms in Enugu State to gather valuable insights that guide the improvement of product quality and design with the mean score of 4.45 and standard deviation of 1.031. 223 respondents representing 91.4 percent agreed that by analyzing customer opinions, businesses can identify weaknesses in their products and implement necessary adjustments to meet market demands with a mean score of 4.51 and standard deviation of 1.048. 211 respondents representing 86.5 Percent agreed that Effective use of feedback systems fosters innovation, helping firms develop new products that align with consumer preferences with mean score of 4.43 and standard deviation of 1.092. 219 respondents representing 89.8 percent agreed that Companies that prioritize customer feedback experience higher customer satisfaction and brand loyalty, leading to sustained growth with mean score of 4.49 and standard deviation of 1.004. 208 respondents representing 85.3 percent agreed in Enugu State, firms that actively utilize feedback mechanisms gain a competitive edge through continuous product enhancement and market responsiveness, with a mean score of 4.15 and standard deviation .854.

Test of Hypotheses

Test of Hypotheses One: **Effect of quality control has no relationship with spoilage rate of food and beverage in Enugu state.**

Table 3: One-Sample Kolmogorov-Smirnov Test

		Effective quality control significantly reduces the spoilage rate in food and beverage firms across Enugu State by ensuring that production processes meet safety and hygiene standards.	Regular monitoring and inspection help detect faults early, minimizing losses due to contamination or improper storage.	The implementation of strict quality assurance measures enhances product shelf life and boosts consumer confidence in locally produced goods.	F&B firms in Enugu State that invest in modern quality control systems experience improved operational efficiency and reduced waste.	Consistent adherence to quality standards not only lowers spoilage rates but also promotes profitability and sustainability within the industry.
N		244	244	244	244	244
Uniform Parameters[a,b]	Minimum	1	1	1	1	1
	Maximum	5	5	5	5	5
Most Extreme Differences	Absolute	.611	.602	.627	.586	.594
	Positive	.061	.057	.029	.057	.057
	Negative	-.611	-.602	-.627	-.586	-.594
Kolmogorov-Smirnov Z		9.539	9.411	9.795	9.155	9.283
Asymp. Sig. (2-tailed)		.000	.000	.000	.000	.000

a. Test distribution is Uniform.

b. Calculated from data.

Source: Researchers' computation from Field Survey Data, 2025

Decision Rule

If the calculated Z-value calculated is greater than the critical Z-value (i.e $Z_{cal} > Z_{critical}$), reject the null hypothesis and accept the alternative hypothesis accordingly.

Result

With Kolmogorov-Smirnon Z – value ranges from 9.155 < 9.795 and on Asymp. Significance of 0.000, the responses from the respondents as display in the table is normally distributed. This affirms the assertion of the most of the respondents that quality control had significant positive relationship with spoilage rate of food and beverage**.**

Decision

Furthermore, comparing the calculated Z- value ranges from 9.155 < 9.795 against the critical Z- value of 0.000 (2-tailed test at 95 percent level of confidence) the null hypothesis was rejected. Thus the alternative hypothesis was not rejected meant that quality control had significant positive relationship with spoilage rate of food and beverage**.**

Test of Hypotheses Two: Effect of customer feedback systems has no relationship with improved product in Enugu State.

One-Sample Kolmogorov-Smirnov Test

		Customer feedback systems enable firms in Enugu State to gather valuable insights that guide the improvement of product quality and design.	By analyzing customer opinions, businesses can identify weaknesses in their products and implement necessary adjustments to meet market demands.	Effective use of feedback systems fosters innovation, helping firms develop new products that align with consumer preferences.	Companies that prioritize customer feedback experience higher customer satisfaction and brand loyalty, leading to sustained growth.	In Enugu State, firms that actively utilize feedback mechanisms gain a competitive edge through continuous product enhancement and market responsiveness.
N		244	244	244	244	244
Uniform Parameters[a,b]	Minimum	1	1	1	1	1
	Maximum	5	5	5	5	5
Most Extreme Differences	Absolute	.664	.730	.705	.705	.602
	Positive	.061	.066	.057	.053	.029
	Negative	-.664	-.730	-.705	-.705	-.602
Kolmogorov-Smirnov Z		10.371	11.395	11.011	11.011	9.411
Asymp. Sig. (2-tailed)		.000	.000	.000	.000	.000

a. Test distribution is Uniform.

b. Calculated from data.

Decision Rule

If the calculated Z-value calculated is greater than the critical Z-value (i.e $Z_{cal} > Z_{critical}$), reject the null hypothesis and accept the alternative hypothesis accordingly.

Result

With Kolmogorov-Smirnon Z – value ranges from 9.411 < 11.395 and on Asymp. Significance of 0.000, the responses from the respondents as display in the table is normally distributed. This affirms the assertion of the most of the respondents that effect of customer feedback systems had significant positive relationship with improved product in Enugu State.

Decision

Furthermore, comparing the calculated Z- value ranges from 9.411 < 11.395 against the critical Z- value of 0.000 (2-tailed test at 95 percent level of confidence) the null hypothesis was rejected. Thus the alternative hypothesis was not rejected meant that Customer feedback systems had significant positive relationship with improved product in Enugu State.

Discussion of Findings

Based on hypothesis one, the Z-value (9.155 < 9.795) compared to a critical Z-value of 0.000 suggests a positive relationship between quality control and spoilage rates in the food and beverage sector. This supports existing research. For example, Nkere et al. (2020) found that food and water sold in Nsukka, Nigeria, had bacteriological issues, and they recommended improved food safety and hygiene practices. Marire et al. (2020) investigated quality control challenges at Nigeria Breweries Plc, finding that inadequate knowledge of quality control techniques, poor understanding of customer needs, cost constraints, and managerial attitudes were key issues. Ugwu et al. (2023) reported that inspection techniques, brainstorming, and quality-at-the-source practices significantly contributed to business growth in manufacturing firms in Enugu State.

Regarding hypothesis two, the Z-value (9.411 < 11.395) compared to a critical Z-value of 0.000 indicates a positive relationship between customer feedback systems and product improvement in Enugu State. Iheanachor et al. (2021) found that poor product development practices negatively affected the performance of new financial products in Nigeria. Similarly, Okolo et al. (2021) observed that customer feedback plays a significant role in retaining customers in banks across South-Eastern Nigeria.

Conclusion

In conclusion, this study indicates that quality control and customer feedback positively influence spoilage rates and product improvement in food and beverage companies in Enugu State. Effective monitoring enables these firms to operate more efficiently by reducing waste, enhancing product quality, streamlining processes, and allowing for prompt responses to operational challenges.

Recommendations

i. Food and beverage firms in Enugu State should strengthen and standardize their quality control procedures, including routine inspections, strict adherence to hygiene standards, and timely maintenance of equipment, to further reduce spoilage rates and enhance overall product safety.
ii. Food and beverage firms in Enugu State should implement structured customer feedback systems, such as digital feedback tools and follow-up surveys, to capture consumer preferences and leverage the insights to consistently improve product quality and drive innovation.

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