

Workplace Hazards and Safety Compliance in Nigerian Breweries in South East, Nigeria

Okpara, Ifeyinwa Patience¹, Prof. Fred O. Eze, Ph.D.² & Mbah, Paulinus Chigozie, Ph.D.³

Abstract

The study examined workplace hazards and safety compliance in Nigerian Breweries in south East, Nigeria. The specific objectives were to: Ascertain the effect of workplace training on accident prevention; and examine the relationship between economic Early Warning Systems and Operational Disruptions in Nigerian Breweries in south East, Nigeria. The study used the descriptive survey design approach. The primary source of data was the administration of questionnaire. The population of the study consisted of one thousand, three hundred and one (1301) management and senior staff. The adequate sample size of two hundred and ninety-seven (297) using Freund and William's statistic formula at 5 percent margin of error. Two hundred and fourth seven (247) staff returned the 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 0.810 which was also good. Data was presented and analyzed by mean score and standard deviation. The hypotheses were analyzed using Z - test statistic tool. The findings indicated that Workplace training had significant positive effect on accident prevention $Z(11.644, P. < . = 0.05)$ and Economic Early Warning Systems had significant positive relationship with Operational Disruptions in Nigerian Breweries in south East, Nigeria. $Z(10.006, P < . = 0.05)$. The study concluded that Workplace training and Economic Early Warning Systems had significant positive effect on accident prevention and Operational Disruptions in Nigerian Breweries in south East, Nigeria. The study recommended among others that Nigerian Breweries should adopt and consistently monitor Economic Early Warning Systems to detect operational or environmental risks early, allowing management to take preventive actions before hazards impact workers' safety.

Keywords: Workplace Hazards, Safety Compliance, workplace training, accident prevention, Early Warning Systems, Operational Disruptions.

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Authors	Affiliation
1	ESUT Business School, Department of Business Administration and Management, Enugu State University of Science and Technology (ESUT), Enugu State, Nigeria
2	Department of Business Administration, Faculty of Management Sciences, Enugu State University of Science and Technology (ESUT), Enugu State, Nigeria
3	Department of Business Administration, Faculty of Management Sciences, Enugu State University of Science and Technology (ESUT), Enugu State, Nigeria

Introduction

The historical evolution of workplace hazards and safety compliance in Nigeria reflects a gradual shift from reactive accident management to proactive occupational safety systems, especially from 2020 onward as regulatory frameworks and organisational practices faced increasing scrutiny. Early industrial operations in Nigeria were marked by minimal safety structures, but the renewed national emphasis on occupational health around 2020 led to evidence-based evaluations of hazard exposure across manufacturing sectors, including beverage and brewery operations in the South-East (Ezeoke et al., 2020). During this period, empirical studies began documenting a rise in mechanical, ergonomic and chemical hazards linked to ageing equipment, production pressure and insufficient worker training, prompting organisations to revisit their internal safety protocols (Mgbemena, 2022).

Globally, workplace hazards and safety compliance have become major priorities as industries confront rising technological complexity and evolving occupational risks, especially from 2020 onward when international bodies intensified calls for stronger safety governance. Studies show that across Europe, Asia and the Americas, organisations are increasingly exposed to chemical, ergonomic, biological and mechanical hazards due to automation, high production speed and emerging industrial processes, necessitating proactive risk-management systems (Larsson & Nilsson, 2020). Research further indicates that despite global advancements in occupational health and safety standards, many developing and developed nations still struggle with gaps in compliance arising from inadequate training, inconsistent enforcement and limited integration of modern safety technologies (Hernandez & Park, 2021).

Nationally, workplace hazards and safety compliance in Nigeria have continued to attract scholarly and policy attention since 2020 as industries struggle to align increasing production demands with safe working conditions. Research shows that Nigerian workers across manufacturing and processing sectors face recurring risks such as mechanical injuries, noise exposure, chemical spills and ergonomic strain due to weak enforcement of occupational safety regulations and inconsistent organisational safety culture (Ojoro & Idowu, 2021). Evidence from nationwide assessments further indicates that although Nigeria has strengthened its occupational safety policies, many firms still experience low compliance arising from inadequate training, poor hazard communication and limited investment in safety equipment (Adebiyi et al., 2022).

Locally, workplace hazards and safety compliance in South-East Nigeria have become a critical concern as industrial activities, especially in breweries and food-processing plants, continue to expand and expose workers to multiple occupational risks. Studies within Enugu, Anambra and Abia States show that employees frequently encounter hazards such as slips, bottling-line injuries, machinery entrapment, noise exposure and ergonomic strain due to ageing equipment and insufficient safety training (Nwosu & Ezenwa, 2021). Research conducted in Enugu breweries further reveals that although companies often maintain documented safety policies, actual compliance at the shop-floor level is weakened by irregular supervision, inconsistent use of personal protective equipment and poor reporting of near-miss incidents (Okafor, 2022).

Workplace hazards in Nigerian Breweries in South-East Nigeria remain a critical issue for occupational safety and employee wellbeing. Brewery operations inherently expose workers to multiple risks, including mechanical hazards from bottling lines and conveyor belts, chemical hazards from cleaning agents and carbon dioxide, ergonomic strain due to repetitive tasks, and noise-induced hearing loss from machinery (Okafor, 2022). Studies conducted in Enugu and surrounding South-East industrial clusters indicate that these hazards are exacerbated by ageing equipment, inadequate maintenance, and insufficient safety training for employees, which increases the likelihood of accidents and work-related injuries (Nwosu & Ezenwa, 2021). Additionally, local investigations reveal that while Nigerian Breweries maintains formal safety policies and procedural manuals, compliance at the operational level is often

inconsistent due to irregular supervision, poor adherence to personal protective equipment protocols, and underreporting of minor incidents or near-misses (Umeadi & Chukwura, 2023).

Safety compliance in Nigerian Breweries in South-East Nigeria is a critical factor in reducing workplace hazards and ensuring employee well-being. Recent studies indicate that although formal safety policies and procedures exist within the brewery, actual adherence to these protocols varies significantly across departments and shifts, often influenced by management commitment, training frequency, and employee awareness (Afolabi, 2021). Compliance with safety measures such as proper use of personal protective equipment (PPE), routine hazard reporting, machine guarding, and emergency preparedness has been shown to directly affect the incidence of workplace accidents and near-miss events (Chukwuemeka & Onyekachi, 2022). Empirical evidence from local brewery operations further highlights that gaps in supervision, inadequate reinforcement of safety rules, and limited participation of employees in safety decision-making reduce the effectiveness of safety programmes, even when they are well documented (Ezeh & Nnamdi, 2023). Based this, the study examined workplace hazards and safety compliance in Nigerian Breweries in south East, Nigeria.

Statement of Problem

Workplace hazards and safety compliance in Nigerian Breweries in South-East Nigeria are critical to ensuring employee well-being, productivity, and sustainable industrial operations. Breweries, as highly mechanised manufacturing environments, expose workers to mechanical, chemical, ergonomic, and noise-related hazards, making effective safety compliance essential. Ensuring adherence to safety protocols not only protects employees from injury but also contributes to organisational efficiency, reduces downtime, and enhances the company's reputation as a responsible employer. Understanding and addressing these hazards is therefore vital to maintain operational continuity and foster a safe working culture within the South-East Nigerian industrial context.

Despite the presence of formal safety policies and frameworks, Nigerian Breweries in the South-East face persistent challenges in achieving effective safety compliance. Studies show that gaps exist in employee adherence to personal protective equipment protocols, hazard reporting, and emergency preparedness, often due to irregular supervision, limited training, and low employee engagement in safety management. Additionally, ergonomic strains, repetitive operations, and exposure to chemicals and carbon dioxide continue to pose risks to employees, suggesting that the organisation's safety measures are insufficiently implemented at the operational level. These persistent challenges highlight a gap between policy and practice that threatens both worker safety and organisational effectiveness.

The failure to adequately address workplace hazards and safety compliance in Nigerian Breweries has far-reaching consequences. Employees are exposed to a higher risk of accidents, injuries, and long-term health issues such as musculoskeletal disorders and hearing impairment, which can reduce workforce productivity and increase absenteeism. Moreover, non-compliance with safety standards can result in regulatory sanctions, financial losses due to accidents, and reputational damage that undermines stakeholder confidence. If these problems remain unresolved, the organisation may struggle to achieve sustainable operations, and the broader South-East industrial sector could face setbacks in establishing effective occupational health and safety practices. Based this, the study examined workplace hazards and safety compliance in Nigerian Breweries in south East, Nigeria.

Objectives of the Study

The main objective was to examine workplace hazards and safety compliance in Nigerian Breweries in south East, Nigeria. The specific objectives were to:

- i. Ascertain the effect of workplace training on accident prevention in Nigerian Breweries in south East, Nigeria.
- ii. Examine the relationship between economic Early Warning Systems and Operational Disruptions in Nigerian Breweries in south East, Nigeria.

Research Questions

The following research questions guided the study.

- i. What is the effect of workplace training on accident prevention in Nigerian Breweries in south East, Nigeria?
- ii. What is the relationship between economic Early Warning Systems and Operational Disruptions in Nigerian Breweries in south East, Nigeria?

Statement of Hypotheses

The following hypotheses guided the study.

- i. Workplace training has effect on accident prevention in Nigerian Breweries in south East, Nigeria.
- ii. Economic Early Warning Systems has relationship with Operational Disruptions in Nigerian Breweries in south East, Nigeria.

Scope of Study

The study focuses on workplace hazards and safety compliance in Nigerian Breweries located in the South-East region of Nigeria, particularly the Enugu plant. It examines the types of hazards employees are exposed to, including mechanical, chemical, ergonomic, and noise-related risks, as well as the effectiveness of safety measures and employees' adherence to safety protocols. The study is limited to the brewery workforce, including permanent staff and contractors, and considers operational and management practices that influence safety behaviour. Geographically, the research is confined to the South-East region, while conceptually it explores the relationship between workplace hazards and compliance with safety policies. The study aims to provide insights into current practices, challenges, and strategies to improve occupational safety in Nigerian Breweries, with implications for policy, training, and hazard mitigation.

Review of Related Literature

Conceptual review

Workplace hazards

Workplace hazards refer to any condition, process, or activity within the work environment that has the potential to cause harm to employees, equipment, or organizational operations. These hazards commonly arise from physical, chemical, biological, ergonomic, and psychosocial sources, each contributing differently to risks that affect worker health and organizational productivity (Chauhan, 2019). Physical hazards, such as noise, vibration, unsafe machinery, and poor ventilation, often pose immediate threats and are among the most common forms of occupational risks. They typically emerge from inadequate facility design, outdated equipment, or a lack of safety controls, making continuous monitoring essential for prevention (Othman & Soieb, 2018). Chemical hazards result from exposure to harmful substances like solvents, fumes, dusts, or industrial chemicals used in various work processes, and long-term exposure can lead to respiratory complications or chronic illnesses, especially in poorly

regulated environments (Hughes & Ferrett, 2020). Biological hazards arise from contact with infectious agents, which frequently affect workers in healthcare, laboratory, agricultural, and waste management settings; these hazards highlight the importance of hygiene protocols and the use of personal protective equipment in minimizing exposure (Viego et al., 2021).

Components of workplace hazards

Components of workplace hazards include: physical hazards, chemical hazards, biological hazards, ergonomic hazards, psychosocial hazards, mechanical hazards, electrical hazards, fire and explosion hazards, environmental hazards, organizational hazards, technological hazards, radiation hazards, noise and vibration hazards, confined space hazards, and manual handling hazards. Chauhan & Idris (2019), Okeke & Nwosu (2020), Ibrahim & Olorunfemi (2021), Adeyemi & Sani (2018), Ugwoke & Eze (2021), Bala & Mohammed (2019), Onyekwere & Uduak (2020), Olawale & Adegoke (2021), Patrick & Ndubuisi (2022), Ojo & Falade (2019), Dominic & Chidera (2021), Akintola & Yusuf (2020), Ezenwa & Okafor (2022), Ifeanacho & Bello (2021), and Hassan & Jimoh (2022).

Components of workplace hazards

Workplace training

Workplace training refers to the systematic process through which organizations equip employees with the knowledge, technical skills, behavioral competencies, and professional attitudes needed to perform their job roles effectively and contribute meaningfully to organizational goals. It enhances employees' capacity to adapt to new technologies, evolving work methods, and organizational changes, thereby strengthening both individual and corporate performance (Adebayo & Lawal, 2019). Effective workplace training also promotes continuous learning by ensuring that employees remain updated with industry trends, safety procedures, quality standards, and regulatory requirements, which in turn improves efficiency and reduces operational risks across the organization (Okorie & Nnamdi, 2020). Training further boosts employee confidence, competence, and creativity, enabling them to handle complex tasks, solve problems quickly, and maintain high levels of productivity while improving service delivery and customer satisfaction (Uche & Ibrahim, 2021).

Economic Early Warning Systems

Economic Early Warning Systems refer to analytical frameworks and monitoring mechanisms designed to detect emerging risks, vulnerabilities, and potential crises within an economy before they fully materialize. These systems rely on timely economic indicators—such as inflation trends, exchange rate movements, fiscal imbalances, debt levels, and financial sector stability—to provide predictive insights that support proactive decision-making and policy intervention (Okafor & Eze, 2019). Economic Early Warning Systems enhance macroeconomic stability by helping governments, central banks, and financial institutions anticipate downturns, identify structural weaknesses, and implement preventive measures aimed at minimizing economic shocks and safeguarding national financial health (Adewuyi & Ogunleye, 2020). Moreover, they improve resilience by integrating data analytics, forecasting models, and risk-assessment tools that assist policymakers in evaluating potential scenarios and crafting timely responses to mitigate unemployment spikes, currency crises, or investment collapses (Obi & Mohammed, 2021).

Safety compliance

Safety compliance refers to the degree to which employees and organizations adhere to established safety standards, rules, and regulatory guidelines designed to prevent workplace accidents and promote a secure working environment. It involves implementing safety policies, using protective equipment, following operational procedures, and ensuring that all work activities align with statutory safety requirements to minimize risks and

occupational hazards (Adekunle & Hassan, 2019). Safety compliance enhances organizational performance by reducing injury rates, promoting a culture of responsibility, and ensuring that workers actively participate in safety practices that protect their health and well-being (Omeje & Adebisi, 2020). It also strengthens organizational reputation and reduces legal liabilities by ensuring conformity with government regulations, industry norms, and internal safety audits, which collectively support operational continuity and workforce confidence (Olawuyi & John, 2021). Furthermore, safety compliance contributes to improved productivity and operational efficiency, as employees who feel protected and valued are more likely to be engaged, committed, and attentive to safe work practices (Nwankwo & Chidiebere, 2019). Ultimately, safety compliance functions as a critical organizational strategy that integrates leadership commitment, worker awareness, and regular monitoring to achieve a safe, healthy, and legally compliant workplace (Ibrahim & Okafor, 2022).

Components of Safety compliance

Components of safety compliance include: adherence to organizational safety rules and procedures, consistent use of personal protective equipment, active participation in safety training programs, proper reporting of hazards and unsafe conditions, compliance with regulatory and industry safety standards, correct handling and operation of tools and machinery, prompt reporting and documentation of incidents, effective emergency preparedness and response practices, regular involvement in safety inspections and audits, and management enforcement of safety expectations across all levels of the organization. **Adekunle & Hassan (2019), Omeje & Adebisi (2020), Olawuyi & John (2021), Nwankwo & Chidiebere (2019), Ibrahim & Okafor (2022), and Udeh & Salami (2021).**

Components of Safety compliance

Accident prevention

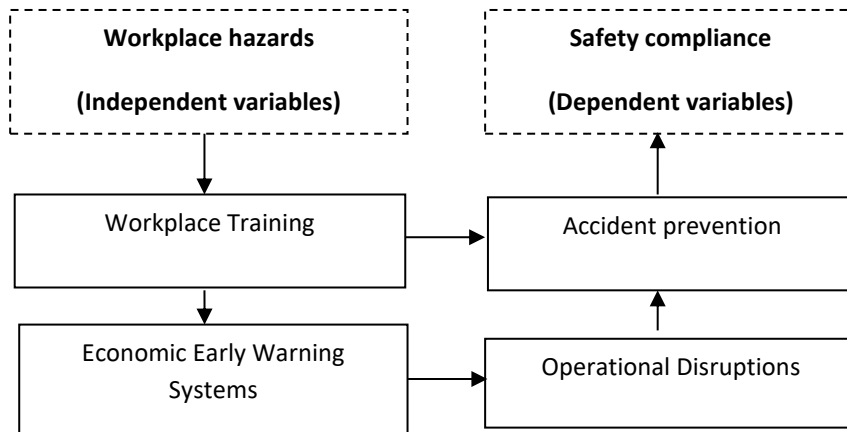
Accident prevention refers to the systematic strategies, policies, and proactive measures adopted by organizations to identify potential sources of harm and eliminate conditions that may lead to workplace incidents, injuries, or operational disruptions. It involves creating a safe work environment through hazard identification, risk assessment, and effective implementation of safety controls that minimize exposure to unsafe conditions and risky behaviors (Okoro & Adeyemi, 2019). Accident prevention also emphasizes employee training and awareness, ensuring that workers understand safety procedures, recognize early warning signs of danger, and consistently adhere to standard operating guidelines designed to protect their health and well-being (Ibrahim & Sani, 2020). In addition, accident prevention requires management commitment through regular inspections, safety audits, provision of proper equipment, and enforcement of safety policies, which collectively strengthen organizational resilience and reduce the likelihood of accidents (Olawuyi & Patrick, 2021).

Operational Disruptions

Operational disruptions refer to unforeseen events or process interruptions that negatively affect the smooth functioning of business activities, particularly in service-oriented industries like hospitality. These disruptions may stem from supply chain failures, equipment breakdowns, policy shifts, or environmental incidents, all of which hinder the enterprise's ability to meet customer expectations and maintain service quality (Okafor & Nwachukwu, 2018). Managing such disruptions effectively is essential for maintaining operational resilience, minimizing downtime, and sustaining overall performance in a competitive environment (Eze & Uzoho, 2021). Operational disruptions also impact decision-making speed, customer satisfaction, and revenue generation, especially when organizations lack contingency plans or flexible systems. In the hospitality industry, where service delivery is time-sensitive and guest experience is critical, even minor disruptions can lead to significant performance setbacks.

Proactive strategies, such as risk assessment and crisis management planning, are vital in reducing the impact of such disruptions and ensuring business continuity (Nwankwo & Chukwu, 2020).

Conceptual Framework.



Source: Researchers' Model, 2025

Fig. 2.1: Researchers' Model, 2025

The diagram above shows the linkages between the various components of workplace hazards and safety compliance in Nigerian Breweries in south East, Nigeria. Workplace hazards has Workplace Training and Accident prevention as the components of the independent variable while safety compliance has Economic Early Warning Systems and Operational Disruptions as the components of dependent variables of Nigerian Breweries in south East, Nigeria.

Theoretical Review

The following theories guided the study:

- i. Domino Theory of Accident Causation
- ii. Theory of Planned Behavior (TPB)

The study is anchored on the Theory of Planned Behavior because it explains how employees' intentions to comply with safety measures are shaped by their attitudes, perceived control, and social expectations. This theory helps to understand why workers may choose to follow or ignore safety protocols in hazardous brewery environments, making it a strong foundation for analyzing safety compliance behavior.

Domino Theory of Accident Causation

This theory suggests that workplace accidents result from a chain of events, starting with environmental and human factors. It emphasizes that removing one "domino" in the sequence, such as unsafe practices, can prevent accidents. It aligns with the idea that safety compliance can break the chain leading to hazards.

Theory of Planned Behavior (TPB)

TPB explains how employees' attitudes, perceived control, and social norms influence their intention to comply with safety rules. It supports the study by highlighting how behavioral intention affects actual safety practices in the workplace.

Empirical Review

Workplace training on accident prevention

Otitolaiye et al (2019) Effect of Safety Culture, Safety Performance and Management System on the Food and Beverage Manufacturing Industries in Nigeria. This paper examines the influence of safety culture and safety management system on the safety performance of food and beverage (F&B) manufacturing industries in Lagos state, Nigeria. A survey involving 178 questionnaires from safety managers from the F&B manufacturing industries was conducted. The statistical tool SmartPLS was used for analysis due to its ability and flexibility for examining complex models. The results indicated that the safety culture and safety management system were statistically positively related to safety performance. Besides showing the suitability of SmartPLS in statistical analysis, the results also indicated that the firms that intend to achieve their outlined goals regarding safety could greatly benefit from a positive safety management system and safety culture. Alaba (2024) "Systematic Review of Occupational Injuries and Illnesses in the Nigerian Mining Industry. Nigerian mining sector (NMS) has been ranked as second industrial sector with numbers of occupational injuries and illnesses (OII) that pose serious social and economic impacts on workers and society. Meanwhile, little is known about the specific aspects of OII in the mining sector that have been studied in the literature. As a result, this study seeks to review the existing research on workers' OII with the intention of identifying the primary causes, symptoms, and influencing factors that may relate to a persistent rise of injuries and illnesses in the NMS. This is to determine the sector dynamic in relation to OII and provide stakeholders in the sector with lack data that are required for planning, implementation, and monitoring sustainable OII. The study employed widely accessible electronic databases (Science Direct, PubMed, Scopus, Google Scholar, and Web of Science) to perform a systematic review of peer-reviewed articles from 2010 to 2023. The causes, symptoms, and influencing factors of OII in the mining industry were highlighted in the compilation of pertinent data. The study search yielded 210 peer-reviewed publications with 70 publications retained after systematic screening and 20 were retained for final analysis. The study identified eight major causes, four body parts that are most harmed, and five primary symptoms of OII in the NMS. Also, the factors that influencing OII in NMS were classified as socio-demographic, behavioural and organizational/management factors. The study concluded that the use of personal protective equipment, provision of first aid and medical facilities, enactment of safety laws and policies and adequate safety training and supervision are the most common ways that can reduce the high rate of OII in the Nigerian mining sector.

Agboola et al (2020). Perceived Effect of Occupational Safety Measures on Workers' Performance in Warri Refining and Petrochemical Company, Delta State, Nigeria. Occupational safety measures when put in place in organizations are expected to increase the productivity of employees and drive organizations to better performance. This study was aimed at assessing the perception of workers at the Warri Refining and Petrochemical Company (WRPC) on the effect of implemented occupational safety measures on their individual and organizational performance. Materials and Methods: The study was cross-sectional in design conducted at the WRPC, Delta state, Nigeria, among 236 workers of the WRPC selected via a simple random sampling technique across different job cadres (junior, senior, and management) in the organization. Data were collected using a semi-structured self-administered questionnaire and analyzed using the descriptive and inferential statistical tests of the SPSS version 20 with statistical significance set at $P < 0.05$. Results: The mean age of respondents was 43 ± 2.26 years with a male-to-female ratio of 1.8:1. More

than 50% of the respondents attested that occupational safety measures had been well implemented at the WPRC. Almost all the respondents, 219 (92.8%) and 224 (94.9%), agreed that occupational safety measures in place and trainings on safety measures had improved individual worker's performance, respectively. Respondents' length of service and job cadres were significantly associated with their perceived effect of the existing occupational safety measures at the WPRC on individual worker and organizational performance ($P < 0.001$). They were also significantly associated with their perceived effect of the neglect of these safety measures on high labor turnover rate ($P < 0.001$).

Afamdi (2021) A study of fatal injuries in Nigerian factories. A study of the pattern of occupational injury mortality rates by industry and cause of death was undertaken to indicate the high risk types of industry and the major causes of death, which could subsequently be used in developing cost effective strategies for prevention. This is the first such study of accidental mortality factors in Nigerian factories. This paper reports the outcome of the study of mortality in Nigerian factories over a 10-year period (1987–1996). Between 1987 and 1996, a total of 3183 injuries were reported, of which 71 (2.2%) were fatal. The annual case fatality rate ranged from 0.94 per 100 injured workers in 1990 to 5.41 in 1994, with an overall fatality rate of 2.23 per 100 injured workers. Of the 71 deaths, 12 (16.9%) were associated with power driven machinery. Ten (14.1%) deaths were associated with explosions, while people falling accounted for nine (12.6%) of the deaths. Eleven deaths (15.4%) occurred in the chemical/pharmaceuticals industry, nine (12.6%) occurred in the basic metal industry and seven (9.8%) occurred in the food, beverage and tobacco industry. There were seven (9.8%) deaths in the textile manufacturing industry. The highest case fatality rate per injured worker (16.6%) occurred in the coal–petroleum industry, followed by 5.9% in the wood and wood products industry. A rate of 5.8% occurred in the non-metallic manufacturing industry. The case fatality rates in Nigerian factories are compared with those of other predominantly African countries. Accident prevention programmes tailored to the work activities and specific causal factors in the high-risk types of industries are recommended following a detailed study of work situations and risk factors in these types of industries. Accident prevention programmes, including the use of protective equipment, safety education, machine guarding, a work permit system, effective supervision at work sites and the enforcement of factory laws and regulations, are recommended to improve accidental injury and death in the factories.

Ayodele & Olubayo-Fatiregun (2023) Workability of Safety Education and Training for Workers' Strategy in Accident Reduction in Selected Manufacturing Industries in Lagos State. This study determined the workability of Safety Education and Training for Workers' strategy in reducing accidents. A descriptive survey research design was used. A total of 20 Managerial staff with mean work experience of 13.5 years was selected from 10 manufacturing industries in Lagos State, using intact group method. They were 100% males. Data gathering tools were validated, self-developed questionnaire and accident data recorded in the industries, 12 months before and 12 months after the implementation of safety education and training for workers' programme. Data were treated using percentage and correlation analysis. Results indicated that the obtained $r = 0.692$ is less than r table (.707); df_6 at .05 significance level, meaning that there is no significant positive relationship between pre-post intervention accident data in the industries. It was concluded that Safety Education and Training for Workers' strategy is not effective in reducing accidents in the industries. More researches and use of multiple safety programmes were suggested.

Isaac et al (2025). Workplace Safety: A Conceptual Review. This study presents a comprehensive empirical review of workplace safety, with discourse centered on examining the evolution of workplace safety practices, factors influencing workplace safety, emerging trends in workplace safety, and dimensions of workplace safety. The review deployed the Resource-Based View (RBV) theory perspective on workplace safety to examine how organisations can optimally align their safety engagements with the environmental dynamics of the contemporary workplace to attain a sustained competitive advantage. The narrative literature review methodology engaged for the study significantly provides relevant discourse to the topical interest in workplace safety by providing a synthesized narrative of

relevant hindsight, insight, and forecast, highlighting the strategic essence for organizations to evolve safety practices to strategically fit with the changing workplace environment. Furthermore, the study unveiled the strategic significance of integrating safety as a core organisational priority and key success measure, which enhances employee performance and operational efficiency. The study positively enhances relevant knowledge on workplace safety by providing various thematic discourses on the variables influencing the workplace safety field and offering recommendations for future studies.

Akpan et al (2025) Impact of exposure to hazardous substances on occupational disease risk across industries. Occupational exposure to hazardous substances refers to the contact workers have with potentially harmful chemicals, biological agents, or physical hazards in their workplace, leading to various health effects and diseases. This review aimed to evaluate the impact of exposure to hazardous substances on occupational disease risks across various industries. A detailed literature search was conducted using Google Scholar, PubMed, Scopus, and Web of Science, applying Boolean operators to refine search terms. The inclusion criteria for the study were articles published within 15 years, which had specific findings on the direct link between exposure to these occupational hazardous substances and the development of occupational diseases. 10 peer-reviewed articles were used for the study. The findings from the study present major occupational health risks across various industries, ranging from the manufacturing industry, the steel and power industry, the healthcare industry, and other industries analyzed. The highest occupational risks were observed in the steel and power industry, as their experiences at the workplace can lead to severe physical strain, high injury rates, heat stress, electric shocks, and exposure to airborne pollutants. However, the occupation with the least occupational risk from these findings would be the health care industry. While healthcare workers face chemical exposures, respiratory issues, and skin disorders, they generally work in controlled environments with better regulatory oversight and access to protective measures. Therefore, this review emphasizes the need for workplace interventions, occupational safety and health management systems workplace interventions, and stringent regulations to safeguard worker health and prevent disease.

Economic Early Warning Systems and Operational Disruptions

Boonman et al. (2017) conducted a study on Early Warning Systems with Real-Time Data. This paper investigates the performance of early warning systems in real-time, using forecasts of indicators that were available at the moment predictions are to be made. The study analyzes currency crises in eight Latin American and Central and Eastern European countries, distinguishing an estimation period 1990-2009 and a prediction period 2010-2014. We apply two varieties of early warning systems: the signal approach and the logit models. For both methods we find that using forecasts of the indicators worsens the predictive ability of early warning systems compared to using the most recently available information (ex post).

Klobucnik, Miersch & Sievers (2017) conducted a study on Predicting Early Warning Signals of Financial Distress: Theory and Empirical Evidence. This study proposes a simple theoretical framework that allows for assessing financial distress up to five years in advance. We jointly model financial distress by using two of its key driving factors: declining cash-generating ability and insufficient liquidity reserves. The model is based on stochastic processes and incorporates firm-level and industry-sector developments. A large-scale empirical implementation for US-listed firms over the period of 1980-2010 shows important improvements in the discriminatory accuracy and demonstrates incremental information content beyond state-of-the-art accounting and market-based prediction models. Consequently, this study might provide important ex ante warning signals for investors, regulators and practitioners.

Miguel, Jorge & Carlos (2017) conducted a study on "An early warning indicator system to Fmonitor the unsecured interbank funds market A core goal of regulators and financial authorities is to understand how market prices convey

information on the financial health of its participants. From this viewpoint we build an Early-Warning Indicators System (EWIS) that allows for identifying those financial institutions perceived as risky counterparts by the participants of the interbank market. We use micro-level data from bilateral overnight unsecured loans performed in the interbank market between January 2011 and December 2014. The EWIS identifies those participants that systematically pay high prices for liquidity in this market. We employ coverage tests to estimate EWIS' robustness and consistency. We find that financial institutions with an elevated frequency of signals tend to exhibit a net borrower liquidity position in the interbank market, hence suggesting they are facing recurrent liquidity needs. Those institutions also exhibit higher probability of insolvency measured by the Z-score indicator. Thus, our results support the existence of market discipline based on peer-monitoring. Overall, the EWIS may assist financial authorities in focusing their attention and resources on those financial institutions perceived by the market as those closer to distress.

Qi, Zhang, Zhuo & Ma (2020) conducted a study on Early Warning for Manufacturing Supply Chain Resilience Based on Improved Grey Prediction Model. In a dynamic, uncertain environment, increased supply chain resilience can improve business quality. Predicting changes in enterprise supply chain resilience can help enterprises adjust their operational strategy timeously and reduce the risk of supply and demand interruption. First, a comprehensive resilience assessment framework for manufacturing enterprises was constructed from the perspective of the supply chain, and an improved technique for order of preference by similarity to the ideal solution (TOPSIS) method was used to quantify the resilience level. Considering that the resilience index is easily affected by uncertain factors, and this produces large fluctuations, the buffer operator and metabolism idea are introduced to improve the grey prediction model. This improvement can realize dynamic tracking of the enterprise resilience index and evaluate changes in the enterprise resilience level. Finally, through the analysis of the supply chain data of a famous electronic manufacturing enterprise in China over a two-and-a-half-year period, the results show that the improved TOPSIS method and the improved grey prediction model are effective in improving the supply chain resilience of manufacturing enterprises. This study provides a reference method for manufacturing enterprises to improve their supply chain resilience.

Summary of Empirical Review

The empirical studies reviewed generally indicate that workplace hazards significantly influence safety compliance in manufacturing organizations, including breweries. Most studies found that effective hazard identification, risk assessment, safety training, use of personal protective equipment, and management commitment positively enhance employees' compliance with safety regulations, thereby reducing workplace accidents and improving organizational performance. However, the reviewed studies were largely conducted outside the South East Nigerian brewery industry or focused on other sectors, creating a contextual gap. Consequently, this study seeks to examine the relationship between workplace hazards and safety compliance in Nigerian Breweries in South East, Nigeria.

Methodology

The area of the study was South East, Nigeria. The 5 selected breweries were in operation at the time of the study and was used in Study. The choice of these firms was due to high number of staff. The study used the descriptive survey design approach. The primary source of data was the administration of questionnaire. The population of the study consisted of one thousand, three hundred and one (1301) management and senior staff. The adequate sample size of two hundred and ninety-seven (297) using Freund and William's statistic formula at 5 percent margin of error. Two hundred and forty-seven (247) staff returned the 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 0.810 which was

also good. Data was presented and analyzed by mean score and standard deviation using Sprint Likert Scale. The hypotheses were analyzed using Pearson correlation coefficient (r) test statistic tool.

Data Presentation and Analyses

Data Presentation

The effect of workplace training on accident prevention in Nigerian Breweries in South East, Nigeria.

Table 4.1.1.1: Responses on the effect of workplace training on accident prevention in Nigerian Breweries in South East, Nigeria.

		5	4	3	2	1	ΣFX	-	SD	Decisi
		SA	A	N	DA	SD		X		on
1	Staff training serves not only to improve performance and compliance with standard operating procedures but also to reduce the incidence of workplace injuries and accidents	835	260	18	4	7	1124			Agree
		167	65	6	2	7	247	4.55	.829	
		67.6	26.3	2.4	.8	2.8	100.0			
2	Beyond compliance, firms that prioritize staff development also tend to foster a sense of responsibility and ownership among employees, which encourages reporting of unsafe conditions and proactive risk mitigation	915	188	12	10	8	1133			Agree
		183	47	4	5	8	247			
		74.1	19.0	1.6	2.0	3.2	100.0	4.59	.888	
3	Regular safety drills and job-specific training significantly lowered accident rates in Nigerian Food, Beverage & Tobacco Manufacturing Firms.	885	180	39	2	11	1117			Agree
		177	45	13	1	11	247	4.52	.958	
		71.7	18.2	5.3	.4	4.5	100.0			
4	Trained workers are more likely to adhere to workplace safety standards and demonstrate situational awareness, thereby contributing to a safer work culture.	885	204	33	6	5	1133			Agree
		177	51	11	3	5	247	4.59	.806	
		71.7	20.6	4.5	1.2	2.0	100.0			
5	Staff training plays a preventive role in minimizing exposure to hazards and preparing workers to respond effectively to emergencies	450	452	96	10	7	1015			Agree
		90	113	32	5	7	247	4.11	.906	
		36.4	45.7	13.0	2.0	2.8	100.0			
Total Grand mean and standard deviation								4.472	0.8774	

Source: Field Survey, 2025

Table 4.1.1.1, 232 respondents out of 247 representing 93.9 percent agreed that Staff training serves not only to improve performance and compliance with standard operating procedures but also to reduce the incidence of workplace injuries and accidents with the mean score of 4.55 and standard deviation of .829. 230 respondents representing 93.1 percent agreed that Beyond compliance, firms that prioritize staff development also tend to foster a sense of responsibility and ownership among employees, which encourages reporting of unsafe conditions and proactive risk mitigation with a mean score of 4.59 and standard deviation of .888. 222 respondents representing 89.9 Percent agreed that Regular safety drills and job-specific training significantly lowered accident rates in Nigerian Food, Beverage & Tobacco Manufacturing Firms with mean score of 4.52 and standard deviation of .958. 228 respondents representing 92.3 percent agreed that Trained workers are more likely to adhere to workplace safety standards and demonstrate situational awareness, thereby contributing to a safer work culture with mean score of 4.59 and standard deviation of .806. 203 respondents representing 82.1 percent Staff training plays a preventive role in minimizing exposure to hazards and preparing workers to respond effectively to emergencies, with a mean score of 4.11 and standard deviation .906.

The relationship between economic Early Warning Systems and Operational Disruptions in Nigerian Breweries in south East, Nigeria.

Table 4.2.1: Responses on the relationship between economic Early Warning Systems and Operational Disruptions in Nigerian Breweries in south East, Nigeria.

		5	4	3	2	1	ΣFX	-	SD	Decision
		SA	A	N	DA	SD		X		
1	In Nigerian Breweries firms strict adherence to quality control, enhances trust and brand loyalty.	765	256	54	10	7	1092	4.42	.924	Agree
		153	64	18	5	7	247			
		61.9	25.9	7.3	2.0	2.8	100.0			
2	When customers perceive that an organization's leadership is genuinely committed to meeting their expectations, it enhances repeat patronage	760	228	66	10	11	1075	4.35	1.033	Agree
		152	57	22	5	11	247			
		61.5	23.1	8.9	2.0	4.5	100.0			
3	Firms that demonstrate leadership accountability and enforce clear operational policies are more likely to earn and retain customer trust.	760	268	54	10	5	1097	4.44	.872	Agree
		152	67	18	5	5	247			
		61.5	27.1	7.3	2.0	2.0	100.0			
4	When of Nigerian Breweries firms are known for ethical practices, high-quality products, and responsive customer service, they not only attract new customers but also enjoy positive word-of-mouth marketing	740	232	75	10	11	1068	4.34	1.004	Agree
		148	58	25	5	11	247			
		59.9	13.5	10.0	12.1	4.5	100.0			
5	Consistent quality, governed by strict internal policies and driven by management	750	232	69	10	11	1072	4.34	1.035	Agree
		150	58	23	5	11	247			

oversight, significantly affects consumer buying behavior 60.7 23.5 9.3 2.0 4.5 100.0

Total Grand mean and standard deviation	4.378	0.9736
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Source: Field Survey, 2025

Table 4.2.1, 217 respondents out of 247 representing 87.8 percent agreed that in Nigerian Breweries firms strict adherence to quality control, enhances trust and brand loyalty with the mean score of 4.42 and standard deviation of .924. 209 respondents representing 84.6 percent agreed that When customers perceive that an organization's leadership is genuinely committed to meeting their expectations, it enhances repeat patronage with a mean score of 4.35 and standard deviation of 1.033. 219 respondents representing 88.6 Percent agreed that Firms that demonstrate leadership accountability and enforce clear operational policies are more likely to earn and retain customer trust with mean score of 4.44 and standard deviation of .872. 206 respondents representing 73.4 percent agreed that When of Nigerian Breweries firms are known for ethical practices, high-quality products, and responsive customer service, they not only attract new customers but also enjoy positive word-of-mouth marketing with mean score of 4.34 and standard deviation of 1.004. 208 respondents representing 84.2 percent Consistent quality, governed by strict internal policies and driven by management oversight, significantly affects consumer buying behavior, with a mean score of 4.34 and standard deviation 1.035.

Test of Hypotheses

Hypothesis one: Workplace training has effect on accident prevention in Nigerian Breweries in south East, Nigeria.

One-Sample Kolmogorov-Smirnov Test

	Staff training serves not only to improve performance and compliance with standard operating procedures but also to reduce the incidence of workplace injuries and accidents	Beyond compliance, firms that prioritize staff development also tend to foster a sense of responsibility and ownership among employees, which encourages reporting of unsafe conditions and proactive risk mitigation	Regular safety drills and job-specific training significantly lowered accident rates in Nigerian Food, Beverage & Tobacco Manufacturing Firms.	Trained workers are more likely to adhere to workplace safety standards and demonstrate situational awareness, thereby contributing to a safer work culture.	Staff training plays a preventive role in minimizing exposure to hazards and preparing workers to respond effectively to emergencies
N	247	247	247	247	247
Uniform Parameters a,b	Minimum	1	1	1	1
	Maximum	5	5	5	5
	Absolute	.689	.741	.717	.572

Most Positive	.028	.032	.045	.020	.028
Extreme Differences Negative	-.689	-.741	-.717	-.717	-.572
Kolmogorov-Smirnov Z	10.833	11.644	11.262	11.262	8.988
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 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 $8.988 < 11.644$ and on Asymp. Significance of 0.000, the responses from the respondents as displayed in the table was normally distributed. This affirmed the assertion of most of the respondents that workplace training had significant positive effect on accident prevention in Nigerian Breweries in south East, Nigeria.

Decision

Furthermore, comparing the calculated Z- value ranges from $8.988 < 11.644$ against the critical Z- value of .000(2-tailed test at 95percent level of confidence) the null hypothesis was rejected. Thus, the alternative hypothesis was accepted which states that workplace training had significant positive effect on accident prevention in Nigerian Breweries in south East, Nigeria.

Hypothesis two: Economic Early Warning Systems has relationship with Operational Disruptions in Nigerian Breweries in south East, Nigeria.

One-Sample Kolmogorov-Smirnov Test

	In Nigerian Breweries Firms, strict adherence to quality control, enhances trust and brand loyalty	When customers perceive that an organization's leadership is genuinely committed to meeting their expectations, it enhances repeat patronage	Firms that demonstrate leadership accountability and enforce clear operational policies are more likely to earn and retain 30 trust.	When of Food, Beverage & Tobacco Manufacturing Firms are known for ethical practices, high-quality products, and responsive customer service, they not only attract new customers but also enjoy positive word-of-mouth marketing	Consistent quality, governed by strict internal policies and driven by management oversight, significantly affects consumer buying behavior
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N		247	247	247	247	247
Uniform Parameters ^{a,b}	Minimum	1	1	1	1	1
	Maximum	5	5	5	5	5
Most Extreme Differences	Absolute	.629	.615	.637	.599	.607
	Positive	.028	.045	.020	.045	.045
	Negative	-.629	-.615	-.637	-.599	-.607
Kolmogorov-Smirnov Z		9.878	9.672	10.006	9.417	9.544
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 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 $9.417 < 10.006$ and on Asymp. Significance of 0.000, the responses from the respondents as displayed in the table was normally distributed. This affirmed the assertion of most of the respondents that Economic Early Warning Systems had significant positive relationship with Operational Disruptions in Nigerian Breweries in south East, Nigeria.

Decision

Furthermore, comparing the calculated Z- value ranges from $9.417 < 10.006$ against the critical Z- value of .000(2-tailed test at 95percent level of confidence) the null hypothesis was rejected. Thus, the alternative hypothesis was accepted which states that Economic Early Warning Systems had significant positive relationship with Operational Disruptions in Nigerian Breweries in south East, Nigeria.

Discussion of findings

Workplace training has effect on accident prevention in Nigerian Breweries in south East, Nigeria.

From the result of hypothesis one, the calculated Z- value ranges from $8.988 < 11.644$ against the critical Z- value of .000 which implies that workplace training had significant positive effect on accident prevention in Nigerian Breweries in south East, Nigeria. In the support of the result in literature review, Ayodele & Olubayo-Fatiregun (2023) Workability of Safety Education and Training for Workers' Strategy in Accident Reduction in Selected Manufacturing Industries in Lagos State. Results indicated that the obtained $r = 0.692$ is less than r table (.707); df_6 at .05 significance level, meaning that there is no significant positive relationship between pre-post intervention accident data in the industries. Akpan et al (2025) Impact of exposure to hazardous substances on occupational disease risk across industries. The findings from the study present major occupational health risks across various industries, ranging from the manufacturing industry, the steel and power industry, the healthcare industry, and other industries analyzed. The highest occupational risks were observed in the steel and power industry, as their

experiences at the workplace can lead to severe physical strain, high injury rates, heat stress, electric shocks, and exposure to airborne pollutants.

Economic Early Warning Systems has relationship with Operational Disruptions in Nigerian Breweries in south East, Nigeria.

From the result of hypothesis two, comparing the calculated Z- value ranges from $9.417 < 10.006$ against the critical Z- value of .000 which implies that Economic Early Warning Systems had significant positive relationship with Operational Disruptions in Nigerian Breweries in south East, Nigeria. In the support of the result in literature review, Klobucnik, Miersch & Sievers (2017) conducted a study on Predicting Early Warning Signals of Financial Distress: Theory and Empirical Evidence. A large-scale empirical implementation for US-listed firms over the period of 1980-2010 shows important improvements in the discriminatory accuracy and demonstrates incremental information content beyond state-of-the-art accounting and market-based prediction models. Qi, Zhang, Zhuo & Ma (2020) conducted a study on Early Warning for Manufacturing Supply Chain Resilience Based on Improved Grey Prediction Model. Through the analysis of the supply chain data of a famous electronic manufacturing enterprise in China over a two-and-a-half-year period, the results show that the improved TOPSIS method and the improved grey prediction model are effective in improving the supply chain resilience of manufacturing enterprises. This study provides a reference method for manufacturing enterprises to improve their supply chain resilience.

Summary of Findings, Conclusion, Recommendation and Contribution to Knowledge

Summary of Findings

- i. Workplace training had significant positive effect on accident prevention in Nigerian Breweries in south East, Nigeria. Z (11.644, P. < . 0.05)
- ii. Economic Early Warning Systems had significant positive relationship with Operational Disruptions in Nigerian Breweries in south East, Nigeria. Z (10.006, P < . 0.05).

Conclusion

The study concluded that Workplace training and Economic Early Warning Systems had significant positive effect on accident prevention and Operational Disruptions in Nigerian Breweries in south East, Nigeria. Workplace hazards and safety compliance in Nigerian Breweries in South East Nigeria shows that while employees are generally aware of major occupational risks, consistent compliance with safety procedures remains essential for preventing accidents and sustaining productivity. The findings indicate that effective safety training, proper use of protective equipment, and management's commitment to enforcing safety policies significantly reduce workplace incidents. Strengthening monitoring mechanisms and promoting a strong safety culture among workers are crucial for long-term improvement. Overall, maintaining high safety standards not only protects employees but also enhances operational efficiency and supports organizational performance.

Recommendations

- i. Nigerian Breweries should adopt and consistently monitor Economic Early Warning Systems to detect operational or environmental risks early, allowing management to take preventive actions before hazards impact workers' safety.
- ii. The company should provide regular, practical workplace safety training to ensure employees clearly understand hazard-prevention procedures and maintain high compliance levels across all units.

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