

Role of Safety Management System as a Mediator for Safety Culture and Safety Performance in Food and Beverage Manufacturing Industries in Nigeria

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Abstract—Globally, organizations are increasingly showing interest in the health and safety of their employees in the workplace. The quest for good safety outcomes is influenced by the desire to reduce the number of occupational accidents, injuries or deaths to employees. However, there has been an increased rate of accidents in F&B manufacturing firms in Nigeria over the years. According to analysts, the growth rate of workplace mishaps has affected the safety performance of these organisations. Hence, the scenario has motivated the need for safety culture and safety performance of these organisations. Given the deplorable state of safety in the Nigerian F&B manufacturing industries, it is pertinent to explore the overall state of the safety culture, performance, and management systems along with the issues that pose existential threats to the health and wellbeing of manufacturing firms and their personnel in Nigeria. Therefore, this paper examined the mediating role of the safety management system on the safety culture (SC) and safety performance (SP) of the food and beverage (F&B) manufacturing industries in Nigeria. In addition, the potential solutions to the challenges facing the F&B manufacturing firms are discussed in detail. The results showed that the occupational accidents and compensation paid to victims had increased significantly over the years. In addition, the F&B manufacturing firms are hampered by lack of commitment of the management, management systems, culture, initiatives and practices dedicated to safety. However, these can be addressed by effective design, establishment, and implementation of safety policy, planning, and training in the workplace.

Keywords— Safety Management System, Safety Culture, Safety Performance, Nigeria

I. INTRODUCTION

The socio-economic growth and sustainable development of any nation are dependent mainly on the manufacturing sector [1]. This view is corroborated by empirical evidence that suggests manufacturing firms have helped to foster national productivity,

particularly in the developed and some emerging economies of the world [2]. Given this, analysts posit that developing economies such as Nigeria could greatly benefit from establishing a viable manufacturing sector. This notion is based on the premise that such firms serve as a significant economic propeller through the production and export of goods and services for the global market [3].

According to the Nigerian National Bureau of Statistics year 2014 report, the manufacturing sector in Nigeria has contributed about 7% of the total GDP [4]. The manufacturing industry in Nigeria consists of nine sectors, of which the Food and Beverage manufacturing industry has been the dominant in terms of size, population, and contribution to the nations GDP over the years [4]. The food and beverages (F&B) manufacturing industry refers to all companies involved in the processing, packaging, and distribution of raw food materials. This category includes packaged foods and beverages of all types designated for human consumption. The contribution of the F&B sector to the manufacturing industry stood at ₦3.8 Billion or approximately 53% of the total contribution to the manufacturing sector [5]. Moreover, this industry employs a significant number of Nigerians, with over 500,000 people engaged in this sector [6]. According to the report, the F&B sector ranks second only to the Chemical and Pharmaceutical Manufacturing industry, which employs about 1.2 million Nigerians [6]. As such, the manufacturing industry is a significant contributor to the socio-economic growth and sustainable development of Nigeria.

However, the growth, performance, and productivity of the nation's manufacturing firms have deteriorated over the years [1-3]. In the year 2009, the Manufacturers Association of Nigeria (MAN) declared that 820 manufacturing companies were shut down between 2000 and 2008. The massive closure was ascribed to numerous factors, including accidents and injuries in the workplace [7]. This finding indicates that safety is one of the growth propelling resources lacking in manufacturing firms in Nigeria.

According to the report by the African Vanguard [8], lack of safety has contributed to the decline in the growth and performance mechanisms of the nation's manufacturing firms. Bearing in mind the number of

employees in the F&B industry, the Ministry of Labour Report [9], observed that the industry has experienced a comparatively higher number of accidents and injuries over the years. The introduction of high technology equipment and processes of work, means that employees in most Nigerian manufacturing sectors are exposed to a number of occupational hazards such as extreme heat and highly reactive chemicals. This scenario has led to the increasing number of occupational injuries and a deficit in the health status of workers [10]. Hence, work-related accidents suffered by employees in the Nigerian manufacturing industries have increased significantly over the years [11].

The findings of Ezenwa [12] revealed that 3,180 accidents occurred from 1987 to 1996 across various manufacturing industries in Nigeria. Hämäläinen et al., [13] reported that 24 out of every 100,000 employees in Nigeria suffer from manufacturing work-related deaths in Nigeria. Similarly, the Nigerian Institute of Safety Professionals revealed that over the years, 11,000 people died from workplace accidents at manufacturing firms in Nigerian [14]. According to the study, the reported accidents and deaths have significantly affected the health and safety of manufacturing industry workers [15]. Likewise, accidents in manufacturing industries can grievously impact on the socio-economic growth and sustainable development of any nation [16].

The increased rate of accidents highlighted suggests that the safety performance levels of F&B manufacturing firms in Nigeria is not at a desirable state or current safety measures are not being adequately implemented in the best manner. This scenario has motivated the need for this study with a view to highlighting safety performance. Since employees are considered the assets of any organizations [17], organizations are required to cater to their safety and wellbeing. Putting this into perspective and considering the deplorable state of safety in the Nigerian F&B manufacturing industries, it is pertinent to explore the overall state of the safety culture, performance, and management systems along with the issues that pose existential threats to the health and wellbeing of personnel in manufacturing industries in Nigeria.

II. OVERVIEW OF ACCIDENTS IN F&B MANUFACTURING FIRMS IN NIGERIA

The manufacturing industry accounts for one of the highest numbers of workplace accidents in Nigeria. In particular, the food and beverage manufacturing industry had reported an increasing number of workplace accidents between 2012 and 2014. In the year 2012, there were 13 accidents that occurred daily, which amounted to an estimated 1 accident every 2 hours in the sector. This occurrence had degenerated in 2014 when 17 cases happened daily with at least one case reported every hour [18]. Similarly, Bankole and Ibrahim [19] stated that workers in the F&B industries are mostly prone to industrial accidents.

Although there are no regulatory agencies or organizations charged with the responsibility of keeping statistics and data of occupational accidents, newspaper reports exist of occupational accidents occurring in Nigerian manufacturing industries [20]. Based on personal communication with the Director of Occupational Safety and Health Division at the Ministry of Labour and Productivity Nigeria, the F&B industry recorded 6,205 accidents in 2014, of which 80 were fatal work injuries and 576 non-fatal work injuries. Fatal injuries refer to deaths resulting from traumatic injuries or other external causes in the workplace [21]. Meanwhile, non-fatal injuries refer to injuries that result in physical or emotional damage. These injuries can be mitigated by medical aid within a specific time period and do not usually result in death [22]. Table I shows a comparison between the number of occupational accidents in the F&B industry and those in other manufacturing industries in Nigeria from 2012 to 2014.

TABLE I COMPARISON BETWEEN OCCUPATIONAL ACCIDENTS IN THE F&B INDUSTRY AND OTHER MANUFACTURING SECTORS (2012-2014) [23].

Sector	2012	2013	2014
Chemical and pharmaceutical	2,110	2,035	1,893
Food and beverage	4,745	4,886	6,205
Textile and Apparels	1,353	988	1,567
Wood and wood products	3,037	2,378	2,594
Plastic and rubber products	1,456	1,698	1,703
Pulp paper and paper products	1,203	1,324	1,564

The data shows that the F&B industry has almost twice the occupational accidents compared to other manufacturing industry sectors, which justifies the need to examine this phenomenon more critically. The increased rate of accidents recorded by F&B industries in Nigeria has also resulted in a long record of lost time injuries. Lost time injuries refer to production days that are lost due to occupational injuries and accidents sustained by an organization's employee [24].

Based on an interview with the Director of Occupational Safety and Health Division at the Ministry of Labour and Productivity Headquarters in Nigeria, an average of 2.5 days is lost due to work-related injuries by F&B industries in Nigeria. In comparative terms, this is higher than in other manufacturing sectors, which reported less than 1.5 days lost from accidents or injury. As a result, manufacturing companies have had to pay large sums of money to employees in compensation over the years [25]. The employee compensation refers to the amount paid by an organization to employees or their families as a result of workplace accidents, injuries or death. From 1997 to 1998 an estimated sum of ₦ 47.8 Million and ₦ 40.8 Million of claims were paid as workmen's

compensation and employers' liability by insurance companies in Nigeria due to occupational accidents suffered by manufacturing sector employees [25].

Recently, reports from Nigeria National Bureau of Statistics, (2014) revealed that employee compensation paid by Nigerian manufacturing industries rose from ₦ 0.7 Million to ₦ 1.7 Million due to occupational accidents from 2010 to 2012. Furthermore, the Nigerian National Bureau of Statistics (NBS) revealed that about 66.36% of all compensations were paid by employers in the food and beverage manufacturing industries [4]. The NBS reports are corroborated by the Nigerian Voice [7], whose report revealed that several billions in capital losses were recorded in Nigeria daily between April 2009 and April 2010 due to accident compensations paid by F&B manufacturing industries. Table II shows a comparison between employee compensations paid by various manufacturing sectors in Nigeria from 2010 to 2012.

TABLE II EMPLOYEE COMPENSATION AMONG VARIOUS MANUFACTURING SECTORS IN NIGERIA (2010 TO 2012) [6].

Manufacturing Sector	Total Amount Paid (₦)	Percentage (%)
Food and Beverage	1,245,895.75	66.36
Chemical and pharmaceutical	25,112.53	1.34
Textile and Apparels	400,453.70	21.33
Others	52,315.14	13.00

The data shows that the F&B industry paid the most significant amount of employee compensation resulting from occupational accidents in the period from 2010 to 2012. As observed, the F&B accounted for over 66% compared to 21% for textiles and 14.34% for chemical, pharmaceutical, and other sectors of the manufacturing industry in Nigeria. This is ascribed to numerous safety culture, performance, and management system related challenges faced by the manufacturing firms in Nigeria. The next section of the paper will identify and highlight the various challenges that have resulted in severe accidents and injury rates, along with the high compensation rates in the sector.

III. CHALLENGES OF FOOD AND BEVERAGE MANUFACTURING FIRMS IN NIGERIA

The F&B manufacturing industry contributes immensely to the growth and development of the national economy. However, the sector's contribution depends on its safety culture and safety performance due to their effect on the health and wellbeing of employees, who are the citizens of the nation. In general, the F&B manufacturing industries consists of all companies involved in the processing, materials packaging, and distribution of food. This class also includes packaged foods and beverages designated

for human consumption [5]. The term safety culture is defined as the sum product of the individual and group values, attitudes, perceptions, competencies and patterns of behaviour that determine the commitment to the style and proficiency of an organisation health and safety programme [26]. Lastly, safety performance is described as the efforts made by organizations to reduce workplace accidents and injuries with a view to minimizing costs. Ultimately, it refers to how organizations efficiently utilize scarce resources to accomplish safety-related goals [27]. In general, the safety performance of any organization is reduced by occupational accidents [28].

Based on practical and theoretical perspectives, the F&B manufacturing industry in Nigeria has performed poorly in terms of safety. This is evident in the recurring number of occupational accidents that have occurred in the work environments over the years. Recent statistics from NISP [18] revealed that about 6,205 occupational accidents occurred in F&B industries in 2014. This scenario represents about 40% of the total accidents that occur in the manufacturing sector. Furthermore, employee compensation paid due to occupational accidents in the F&B industry is one of the highest in Nigeria [6]. These findings suggest that safety performance and safety culture is either low or non-existent in Nigerian F&B manufacturing firms.

One of the most critical safety challenges of F&B firms is the lack of commitment of the management. According to Hajmohammad & Vachon [29] organizational and safety, performance is positively and significantly influenced by the commitment of the management. Similarly, Vecchio-Sadus & Griffiths [30] posit that the involvement of the employee and management is a requirement for better safety performance in any organization. As evident, from the data on accidents and compensations suggest, the involvement and commitment of employees and management in the Nigerian F&B manufacturing industry are lacking. In addition, this suggests that the industry gravely lacks safety management systems. According to von Thaden & Gibbons [31] and Mitchell et al., [32] a safety management system is a mediator used to address the relationships that exist between the safety culture and safety performance.

Previous researchers have shown that an effective safety management system can ensure the existence of positive safety culture [31-32]. Hence, the safety management system is typically considered a mediator of the SC and SP. More so, current studies suggest that good management practices can be used to mechanistically describe the connection between the safety culture and safety performance of an organization [33]. In addition, an effective safety management system ensures that established management practices can help the organisation achieve its safety goals [34]. However, a positive safety culture is a prerequisite for the implementation of a safety management system [35].

Furthermore, the challenges faced by F&B manufacturing firms in Nigeria could be due to lack of safety initiatives and safety practices based on the

contingency theory (CT). From the perspective of the CT, it can be argued that safety culture-performance relationship is mostly reliant on organizational factors. According to Hajmohammad & Vachon [29] and McFadden et al., [33], an organisation's safety initiatives and practices are crucial mediators for addressing the challenges related to accidents, injuries or deaths in the workplace.

Numerous social, economic and technical issues could also be ascribed to the challenges faced by F&B manufacturing firms in the country. Most notably, social factors such as the low literacy levels, age, and the language barriers of some employees of such firms may be responsible for the safety issues reported in the country. As a result, such workers may either be unable to comprehend and/or obey the safety rules and guidelines prescribed in the workplace. As such, the deliberate disregard or lack of understanding of safety rules and guidelines could lead to accidents, injuries or deaths in the workplace. Due to cost-cutting measures, individual firms have been known to deploy limited health and safety guidelines, equipment, and personnel. As a result of this poor safety culture and technical know-how, numerous firms have reported poor safety performance. Therefore, the F&B manufacturing firms in the country are dire need of socially acceptable, cost-effective, and technologically effective strategies to systematically manage their health and safety culture and performance. The next section will present potential solutions to address the outlined challenges.

IV. PROSPECTIVE SOLUTIONS TO SC AND SP CHALLENGES IN F&B MANUFACTURING FIRMS IN NIGERIA

Over the years, the concept of safety culture has been frequently examined by researchers with a view to reducing work-related accidents, injuries or deaths in organisations. As a result, researchers have hypothesized that organizations with functional safety cultures outperform organizations without [29, 33]. In addition, the field of safety culture has garnered significant attention from scholars over the years. The growing interest can be ascribed to the notion that the activities and beliefs of management with regards to safety can positively result in lowering the likelihood of mishaps in the workplace [36].

However, the concept of safety culture and safety performance in organisations. In Nigeria, the food and beverage industry is an integral part of the national economy. The industry accounts for 52.74% of the manufacturing sector's contribution to the national gross domestic product (GDP) [37]. Hence, the poor safety record and high compensations paid to victims of accidents, injuries or deaths present significant concerns for the industry and the nation at large.

Consequently, various organizations are devising strategies to lessen the occupational accidents in the workplace. The renewed efforts are aimed at ensuring human health, environmental safety and financial

sustainability. Therefore, the F&B manufacturing industry, policymakers, and other stakeholders need to design and deploy essential measures to improve workplace safety urgently. One approach is to explicitly examine the current safety culture of organisations with a view to establishing a safety management system to implement safety interventions effectively. Furthermore, the contingency theory demonstrates that safety performance is dependent on the safety management system employed by the organization.

Typically, the safety management system comprises a group of activities that demonstrate the strategies for attaining the safety objectives of any organisation [38]. These activities can be broadly classified as;

- a. Policy. A health and safety policy is a written statement by an employer stating the company's commitment to the protection of the health and safety of employees and the public. It is a recommended pledge by the management to its employees regarding their health and safety [39].
- b. Safety incentives: is defined as rewards given to the employees for their achievements in reporting injuries, newly detected potential safety hazards, and recommendations or suggestions for safety improvements and procedures at work [40].
- c. Training: involves the use of aids to improve the skill and attitude of workers when embarking on risk prevention [41].
- d. Communication: this involves the use of information transfer about possible risk and how they can be combated within the organization [42].
- e. Planning: safety planning is a practical plan put up by an organization to help avoid dangerous situations and know the best way to react when in danger [43].
- f. Control: this is defined as the analysis of conditions of work as well as events occurring in a firm and subsequent comparison with other firms [43].

Furthermore, the safety management system reportedly mediates the relationship between safety culture and safety performance by providing an empirical understanding of the variables that are reported in the existing literature. Lastly, it stands to reason that the design and implementation of safety policy, planning, and training will help to address the challenges of SC and SP in the Nigerian F&B manufacturing industry.

V. CONCLUSIONS

The paper examined the mediating role of safety management system on the safety culture (SC) and safety performance (SP) of the food and beverage manufacturing industries in Nigeria. First, an overview of mishaps and compensations paid by the F&B manufacturing firms due to accidents, injuries, and

deaths in Nigeria was highlighted. Next, the challenges facing the F&B manufacturing firms, along with potential solutions, were identified and highlighted. The findings showed that occupational accidents in the F&B industry increased from 4,745 to 6,205 over the years from 2012 to 2014. However, compensation increased from ₦0.7 to ₦1.7 Million due to occupational accidents from 2010 to 2012. The study notes that F&B Manufacturing is plagued by numerous challenges notably lack the commitment of the management, safety management systems, positive safety culture, safety initiatives and safety practices. The potential solutions to these challenges include the design, establishment, and implementation of safety policy, planning, and training. It is envisaged that this will help to address the challenges of SC and SP in the Nigerian F&B manufacturing industry.

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