







# “The mediating effect of job satisfaction on health and safety policy management and employee productivity in manufacturing firms”

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# THE MEDIATING EFFECT OF JOB SATISFACTION ON HEALTH AND SAFETY POLICY MANAGEMENT AND EMPLOYEE PRODUCTIVITY IN MANUFACTURING FIRMS

## Abstract

The study investigated the mediating effect of job satisfaction on health and safety policy management and employee productivity in manufacturing firms in Nigeria. For the study, a quantitative analytical method was adopted, including a descriptive survey. To obtain data for the study, a questionnaire instrument was constructed and distributed among 950 sampled respondents in selected manufacturing firms in Nigeria. The descriptive statistics was deployed in the data analysis, while the multiple regression analysis was used to test the study hypotheses at the 0.05 level of significance. The mediating effect of job satisfaction on health and safety policy management and employee productivity relationship was confirmed using the Sobel test with the aid of MedGraph. The results showed that hazard prevention and control policy have a significant positive effect on employee productivity. Risk assessment policy have a significant positive effect on employee productivity. Also, job satisfaction has a significant positive mediating effect on the health and safety policy management and employee productivity relationship. Therefore, manufacturing firms should take appropriate measures to prevent and control hazards and provide effective risk assessments to improve health and safety policy management.

## Keywords

job satisfaction, health, safety policy management,  
employee productivity, risk assessment, hazard  
prevention

## JEL Classification

I12, J24, J28

## INTRODUCTION

Increasing the productivity of manufacturing firms lies within the milieu of the human element. There is no doubt that the human element in organizations, particularly manufacturing firms, is the most useful asset (Nnadozie & Ugwu, 2016). Therefore, its efficient utilization will expectedly lead to improved performance and productivity. While many manufacturing firms admit this fact, some still do not understand that, as a vital component in managing a firm's human element, it is essential for managers to ensure that staff performs their duties in a healthy and safe milieu that can stimulate their optimal performance, job satisfaction, and productivity.

Globally, in almost all manufacturing companies, the work environment is susceptible to health and safety hazards due to the high utilization of machines, tools, chemicals, and other dangerous materials in the production processes, which increases health and safety hazards and, as a consequence, affects the employee productivity. These machines, tools, and chemicals, coupled with the highly susceptible

work environment of most manufacturing firms, oblige employees to perform their duties with cautions, avert accidents and achieve envisaged productivity (Mwangi & Waiganjo, 2017). The work environment provided by organizations in the manufacturing sector is anticipated to follow the guidelines on health and safety, as well as the emerging global pattern of a safe workplace. Conversely, in the African continent, the increasing figures of fatal accidents, injuries, and other kinds of casualties in manufacturing firms, annually resulting in rising damages to property, lives, and other assets, indicates that the work environment is still unsafe. This situation underscores the relevance of proper health and safety policy management to reduce or eliminate accidents, and to improve employee's welfare and productivity in manufacturing firms in the African continent and in Nigeria in particular. It should be emphasized that accidents are detrimental to workers' job satisfaction and productivity, which influences both workers and a firm. Thus, when workers are contented with the safety in the work organization, accidents can be evaded, thereby guaranteeing workers' safety needs, job satisfaction, and improved productivity (Wachter & Yorio, 2014).

Although the relevance of adequate safety practices has been well documented (Katsuro et al., 2010), some manufacturing firms' actions and inactions, particularly those in developing nations like Nigeria, still focus mainly on profitability, with little or no attention on the proper management of health and safety policy towards guaranteeing workers safety and enhanced productivity. With the rising economic activities and the resultant upsurge in work-related accidents and exposure to hazardous substances, the relevance of safety and health policy management has continued to be an obvious issue of debate. Furthermore, in Southern region of Nigeria, employees in manufacturing firms are frequently exposed to work-related threats such as dust, chemicals, noise, poor ventilation, high temperature and a host of other inclement conditions, which impaired workers' health and influence their job satisfaction and productivity. An ideal manufacturing facility is an environment where the fundamental safety canons or ideologies are upheld in safeguarding workers from potentially detrimental behaviors or risk in the discharge of their duties.

However, despite the apparent need to manage health and safety policy proactively, manufacturing firms in Nigeria are yet to address the issues of employee health and safety adequately, thereby, resulting in frequent accidents, injuries, illnesses and absenteeism; leading to loss of production time, reduction in product quality, decreased workers job satisfaction and production inefficiency. Also, apart from the willful circumvention and poor attitude towards health and safety, some employees are not aware of the implications of non-adherence to safety and health precautions due to inadequate knowledge. Indeed, any safety and health policy management requires a financial obligation, however, where management of firms view the safety of staff as insignificance and fails to budget adequately for the execution of hazard prevention and control, as well as risk assessment, it could be detrimental to the accomplishment of safety goals (Nnadozie & Ugwu, 2016). Employee job satisfaction is also an essential ingredient towards the success of any business. Thus, keeping employee satisfied should be a major priority for every employer. While this sounds as a known fact in management practices, most employers fail to provide workers with safe working environment that could guarantee their safety needs and, hence, job satisfaction. Therefore, this study focuses on the mediating effect of job satisfaction on health and safety policy management and employee productivity in manufacturing firms.

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## 1. LITERATURE REVIEW

### 1.1. Safety and health policy management

Safety and health policy management aims to minimize the hazard to workers' health from dangerous substances in occupational settings

and to avert work-related sicknesses and mishaps. Gbadago et al. (2017) described workers' safety and health as an area that focuses on securing the health of employees and visitors who may be influenced by hazards in the work setting. An organization's health and safety policy management system contains several components such as hazard prevention and control, risk assessment, safety

training, safety monitoring, and enforcement and accident reporting and investigation, etc. However, management of an organization must be committed to implementing all the elements of a firm's health and safety policy, to achieve health and safety goals of protecting workers from accidents and injuries, as well as satisfied workers' safety needs (Agbola, 2012). Safety and health policy is concerned with protecting employees in the work environment against hazards, illness, and diseases (Akanji & Lawal, 2012). It is important to have clearly stated safety regulations in manufacturing firms to exhibit administration concern to the safety of staff from risks at occupational milieu. Occupational safety policy specifies a firm safety goal, objective, and duties of personnel to ensure the accomplishment of the firm's safety objectives (Aswathappa, 2005).

As indicated by the International Labour Organization (2019), health and safety focus on the advancement of explicit measures and plans targeted at ensuring workers' safety in the workplace. Work-related health and safety is a procedure for guaranteeing that employees remain protected in the work environment while ensuring their ability to perform assigned duties effectively (Agwu, 2012). An organization's health and safety policy is a written declaration that usually comprises elements of safety programs, detailing how safety will be managed, procedure directed towards preventing or eliminating hazards in the workplace, and a demonstration of organizations' management commitment to employee wellbeing (Armstrong, 2010). Health and safety hazard must be evaluated and managed in a work setting to accomplish the aims of protecting workers (Nnadozie & Ugwu, 2016).

Similarly, a healthy and secure occupational setting is fundamental in enhancing job satisfaction and improved workers' productivity in an organization (Aswathappa, 2005). The protection of workers is an indispensable component of manufacturing, since the staff of such corporations can only perform optimally when they are healthier and have a safe condition of work (Apeksha, 2016). Safety is essential in any organization to enhance workers' confidence in their working milieu (Badekale, 2012). In manufacturing firms where huge tool is utilized for production, it is anticipated that the

rate of health-related hazards will be higher. This is because of the extreme temperature, noise, dust, and gases, etc., generated by this equipment during manufacturing, which exposes staff to accidents and other health-related hazards. Improving employee health and safety is directly linked to their job satisfaction and productivity (Goetzel et al., 2001). It is a general belief that workers carry out their duties optimally when they are healthier and have a conducive environment to work, which in turn leads to high performance and productivity (Lucchini & Landrigan, 2015).

## 1.2. Hazard prevention and control policy

Hazard prevention and control policy is a major component of an organization's health and safety policy management, which stipulates procedures for preventing and controlling hazards, minimizing or eliminating accidents, reducing adverse health effect and controlling damage to plant and equipment (Ali, 2016). Jonathan and Mbogo (2016) described hazard as something that can be identified and managed as a potential source of danger, for instance, a rotating machine, naked electric cables, an uncovered petrol tank or chain, and a leaking dust extractor, etc.

According to Armstrong (2010), hazard inhibition and management schemes are planned in line with the prevalent safety conditions at an enterprise. Similarly, Jonathan and Mbogo (2016) indicated that hazards could lead to mishaps as a result of dangerous substances or equipment in the workplace. Lucchini and Landrigan (2015) classified hazard into four kinds to include physical hazards, such as noise, radiation, high temperature or poor illumination, etc.; biological hazards, such as infectious waste, viruses, bacteria, etc.; chemical hazards, such as dust, fumes, gasses, etc., and ergonomic hazards such as repetitive motion, poorly designed machinery and tools, poorly designed work practices, or poorly designed equipment and furniture. Furthermore, hazard has to do with situations or actions that, whenever left uncontrolled, may lead to injury or sickness. Recognizing threats and averting or managing them could avoid mishaps (Ali, 2016). As Manduku and Munjuri (2017) indicate, hazard prevention and control policy stipulate safety guidelines for firms in manag-

ing identified dangers. This includes attempting a hazard-free or fewer dangerous alternative. Employers can manage identified hazards in the work environment by taking measures to prevent and control the hazards (Boyle, 2012).

### 1.3. Risk assessment policy

Risk assessment policy is a vital aspect of safety and health policy management, which enhances proper identification and evaluation of risk factors in the work environment (Karakhan & Gambatee, 2018). Risk assessment policy stipulates the rate in which assessment of risk is carried out in the organization. It describes the overall process where an organization identifies dangers and protects staff. It is the management of the identification, evaluation, and estimation of the levels of risks involved in a work environment (Boyle, 2012). As indicated by Karakhan and Gambatee (2018), risk evaluation comprises an independent appraisal of dangers in the workplace for effective management. The evaluation process covers the identification of threats, frequency of accidents, and approaches to relieve or diminish the likelihood of the hazard. It additionally includes the documentation of hazard appraisal, its discoveries, and the formulation of strategies to manage the identified threat. Karakhan and Gambatee (2018) indicated that risk assessment policy management is a process of evaluating, recognizing and managing dangers in the workplace in a timely manner.

Furthermore, an adequate risk evaluation technique depends on a progression of stages, including recognizing dangers, appraising the degree of the threat, deciding the technique to adapt in decreasing the threat and accessing the effectiveness of the entire stages of risk assessment (Bankole & Ibrahim, 2012). The two kinds of risk assessment are quantitative and qualitative (Odeku, 2014). Quantitative evaluation is a direct risk evaluation based on data obtained from the workplace, while qualitative is based on the judgment of the efficacy of the risk. Risk assessment helps to identify hazards and activities where hazards occur. Firm's management are expected to evaluate occupational milieu to identify threats before the commencement of duties to guarantee personnel safety (Perera, 2019).

### 1.4. Job satisfaction

Job satisfaction is fundamental to the accomplishment of enterprise aims. Workers' contentment is associated with higher productivity (Fassoulis & Alexopoulos, 2015). Therefore, ensuring workers' job satisfaction is significant for business success and performance. While this sounds like a well-established truth, most employers fail to give staff a protected workplace that could ensure their safety needs and hence job satisfaction (Kaynak et al., 2016). Job satisfaction is a frame of mind that the staff has about their work and depends on various components in the work setting. It is also seen as the affective inner feelings workers have about their job (Sembe & Ayuo, 2017).

Accordingly, Yusuf et al. (2012) see job satisfaction as a positive mind-set of staff towards their work and working conditions. Armstrong (2010) portrays job satisfaction as the frame of mind and emotions individuals have about their occupation. Workers' job satisfaction is the feeling, attitude, and importance workers attach to their occupation (Gyekye, 2005). As indicated by Aiken et al. (2001) adequate health and safety policy management guarantees workers safety needs, job satisfaction, and improved productivity. Also, Fassoulis and Alexopoulos (2015) emphasized that health and safety increase employee job satisfaction and lead to increased productivity.

### 1.5. Employee productivity

Employee productivity is the total factor productivity of employees within a specific time in an organization. It is a measure of quality, quantity, time, and efficiency of employees, machines, and the factory system, etc., in converting inputs into useful outputs (Shannon et al., 2001). Employee productivity is considered a principal source of business growth and competitiveness. Productivity growth constitutes an essential element for measuring the total factor of the productive capacity of an organization.

In most organizations, productivity serves as an appraisal of the proficiency of personnel; also, the efficiency of the enterprise relies on the performance of individual workers. As indicated by Mihiravi and Perera (2017), staff productivity is

significant for enhancing the achievement of enterprise objectives. A firm's efficiency is the capacity to produce or manufacture a product that meets the customer's desire. Employee productivity influences a firm's profitability, as well as its survival and growth (Lamm et al., 2007). However, safe and healthy working condition could enhance employee's job satisfaction and improve productivity (Faragher et al., 2005).

### 1.6. Theoretical background

As postulated by the human behavior theorist, Maslow, safety is an essential human need. He utilized the themes of physiological, safety, social, esteem, and self-actualization needs to illustrate the paradigm of human motivations (Wehrich & Koontz, 2005). Maslow postulates that the rudimentary desires of people are structured in a pyramid of prepotency and probability of disappearances ascending from the lowest to the highest. However, safety needs include actual safety at work, emotional injuries, illness, accident, hazards, disease, personal security, and dangers in the work environment (Wachter & Yorio, 2014). The sense of harmless working condition is a significant element in improving job satisfaction and increase employee productivity (Eric, 2015). Under occupational milieu, employee safety and health can be described as the non-existence of accidents or infection from employees' work environment (Akpan, 2011). Occupational safety and health focus on the formulation and implementation of a specific policy intended to keep workers away from getting hurt or harm in the cause of carrying out their assigned responsibilities, thereby enhancing their productivity (Bertera, 1990).

Similarly, in an attempt to satisfy workers' safety needs, most organizations, especially manufacturing firms, formulate health and safety policies to guarantee their employees' safe work environment capable of ensuring the absence of accidents, injuries, and disease, as well as improving the wellbeing of employees to carry out the assigned task efficiently and improve productivity in organizations (Akpan, 2011). Therefore, the relevance of Maslow's hierarchy of needs theory in the study was that providing adequate health and safety policy and programs and effectively managing their implementation process could guarantee the safety needs of

employees, ensure safe and conducive work environment, reduce the number of accidents and boost workers morale for improved productivity.

## 2. AIMS AND HYPOTHESES

The aim of the study is to examine the job satisfaction mediating effect on health and safety policy management and employee productivity in Nigerian manufacturing firms. Specifically, the study hypothesizes that:

- 1) hazard prevention and control policy have a significant effect on employee productivity;
- 2) risk assessment policy has a significant effect on employee productivity; and
- 3) job satisfaction has a significant mediating effect on the relationship between health and safety policy management and employee productivity.

### 2.1. Hypothesis formulation

Based on the reviewed literature, the following hypotheses were put forward:

- $H_1$ : *Hazard prevention and control policy has a significant effect on employee productivity.*
- $H_2$ : *Risk assessment policy has a significant effect on employee productivity.*
- $H_3$ : *Job satisfaction has a significant mediating effect on the relationship between health and safety policy management and employee productivity.*

## 3. METHOD

The study used the ex-post facto design, including a descriptive survey. The study was carried out in registered manufacturing firms by the Manufacturers Association of Nigeria (MAN) in Southern Nigeria. The population of the study consisted of all 1,173 employees spread across 18 selected manufacturing firms that operated in all six states of Southern Nigeria.

A stratified sampling technique was employed. To ensure equal representation of manufacturing firms in the Six South-South States, the study area was subdivided into six strata based on the six states in the area. The random sampling technique was adopted to select three manufacturing firms, each from the six States in the Southern region of Nigeria, making a total of 18 manufacturing firms for the study. Taro Yamane formula was applied to the population of each of the 18 selected manufacturing firms in the six states to determine the sample size of 950 for the study. This was necessary to ensure adequate representation of the staff population in each of the selected manufacturing companies without being biased. Data for the research were collected from primary sources through a questionnaire instrument.

The scope of health and safety policy management was measured by two constructs, hazard prevention and control policy, and risk assessment policy. Employee productivity was the dependent variable, while job satisfaction was the mediating variable. A questionnaire measurement instrument was used. The exploratory factor analysis, in particular Principal component analysis (PCA), was used to validate the constructs in the measurement instrument, and descriptive statistics was deployed in the data analysis. Multiple regression analysis was used to test hypotheses formulated for the study at the 0.05 significance level, and the mediating effect of job satisfaction on health and safety policy management and employee productivity relationship was confirmed using the Sobel test. The analysis was aided by SPSS software version 23 and MedGraph version 3.0. However, before testing hypotheses, preliminary data cleaning and multivariate assumption tests were performed to ensure that the assumptions of the regression analysis were satisfactorily met. The necessary preliminary analysis performed includes descriptive statistics, a test for outliers and normality, a test of homoscedasticity, a linearity test, and a multicollinearity test, respectively.

## 4. RESULTS

Table 1 presents descriptive statistics for the constructs of the study. The report covered data obtained from 950 respondents. The minimum response to the items for each variable was one (strongly disagree), while the maximum was five (strongly agree). The mean of all the variables was well above 2.5, indicating a positive answer to questions. Standard deviations that were all below one meant that the responses were clustered around the mean. The variances of the distributions indicated that the spread of data was adequate.

### 4.1. Results of outliers and normality test

Outliers can have a disproportionate influence on the regression results. However, as part of the data cleansing procedures, data gathered for analysis in the study were checked for likely multivariate outliers. Hair et al. (2010) propose the use of Mahalanobis Distance ( $D^2$ ) to identify whether there were possible outliers in the data set. The Mahalanobis Distance value was compared with the Chi-square distribution for the same degree of freedom. The result showed that only one case had a Mahalanobis Distance probability value above 0.001. This indicates an outlier and was deleted accordingly. The remaining 949 cases had values lower than 0.001 and were retained. Hence, the dataset was free of outliers.

To determine whether the properties of the dataset were normal, a normality test was carried out. As indicated by Hair et al. (2010), data for regression analysis should be normally distributed. According to Davcik (2014), the rule of thumb for normality of data is that the skewness and kurtosis should not exceed +2.58 and +7, respectively. Table 2 presents the normality test for the distribution. Skewness and Kurtosis were

**Table 1.** Descriptive statistics of variables

Variables	N	Minimum	Maximum	Mean	Std. deviation	Variance
Hazard prevention and control policy	950	1	5	4.3538	.32551	.106
Risk assessment policy	950	1	5	4.3785	.26641	.071
Job satisfaction	950	1	5	4.3967	.38383	.147
Employee productivity	950	1	5	4.4038	.38672	.150
Valid N	950					

**Table 2.** Summary of normality test results

Variables	N statistic	Skewness statistic	Std. error	Kurtosis statistic	Std. error
Hazard prevention and control policy	949	-.626	.079	-.602	.159
Risk assessment policy	949	-.201	.079	-1.071	.159
Job satisfaction	949	-.692	.079	-1.089	.159
Employee productivity	949	-.781	.079	-.928	.159
Valid N	949				
KMO	.921				
BTS Approx. Chi-Sq	17559.843	Df	55	Sig	.000

established for all the constructs in the study. The result shows that all the variables satisfied the condition for normality as all the skewness and kurtosis of the variables did not exceed +2.58 and +7. To further confirm the normality of the dataset, the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity (BTS) were executed. The rule of thumb for these tests is that the KMO should be greater than 0.6, and the probability value (p-value) should be below 0.05. The results in Table 2 confirmed that the dataset had normal properties.

#### 4.2. Results of homoscedasticity and multicollinearity test

In conducting the homoscedasticity test, Levene's test of equality of variances was conducted to determine if the variables were homoscedastic. The results of Levene's test in Table 3 were not significant across all the variables ( $p > 0.05$ ), indicating that there was homogeneity of variance among the variables. Also, multicollinearity test was executed using tolerance value and Variance Inflation Factor (VIF) to see whether there were very high intercorrelations or inter-association among the predictor constructs. The rule of thumb is that tolerance should not be lower than 0.10 and VIF should not be above 10 (Hair et al., 2010). The results in Table 3 revealed that there were no multicollinearity issues as the tolerance values were all above .10 and VIF were far less than the cut-off value of 10.

**Table 3.** Homoscedasticity and multicollinearity test

Variables	Levene statistic	Df1	Df2	Sig.	Collinearity statistics	
					Tolerance	VIF
Hazard prevention and control policy	1.531	1	947	.216	.525	1.906
Risk assessment policy	.461	1	947	.498	.404	2.474
Job satisfaction	.290	1	947	.590	.555	1.801
Employee productivity	1.916	1	947	.237	.511	1.778

#### 4.3. Results of exploratory factor analysis and reliability test

Exploratory factor analysis describes the procedure for evaluating the structure of variables in a study and data reduction technique necessary to streamline variables to a manageable number (Hair et al., 2010). It is a data streamlining technique that streamlines multiple variables into fewer ones that adequately represent the constructs. According to Hair et al. (2010), the purpose of exploratory factor analysis is the reduction and summarization of data using either factor analysis or principal component analysis. However, to ascertain the content validity of the questionnaire constructs, the exploratory factor analysis, in particular Principal Component Analysis (PCA), was performed. This was necessary because PCA focuses on the minimum quantity of factors that accounts for variance in variables and whose specific variance represents a small fraction of the variance in the variable.

In terms of factor rotation, the Orthogonal Varimax rotation was utilized, since it offers a better delineation of factors. However, the number of factors to retain in the model was determined by the criteria for assessing validity according to Hair et al. (2010) as follows: Intercorrelations  $>.30$ ; Kaiser-Meyer-Olkin (KMO)  $>.50$ ; Bartlett's test of sphericity  $<.05$ ; Measure of sample adequacy  $>.50$ ; Factor loading (Component Matrix)  $>.50$ ; Total variance explained  $>60$  percent; and Eigenvalues  $>1$ . The PCA analysis satisfactorily meets all the set



**Table 4.** Summary of exploratory factor analysis and reliability test results

Variables	No. of items	KMO	Bartlett's test	Variance explained	Cronbach's coefficient
Hazard prevention and control policy	5	0.681	Significant	73.291	0.725
Risk assessment policy	6	0.503	Significant	72.988	0.741
Job satisfaction	5	0.714	Significant	73.746	0.730
Employee productivity	6	0.582	Significant	63.866	0.744

criteria. Table 4 presents a summary of the factor analysis and Cronbach alpha coefficient reliability test, which indicated that all the variables met reliability criterion and were valid and reliable for the use in the analysis.

#### 4.4. Hypothesis results

Multiple regression analysis was used to determine the relationship between health and safety policy management and employee productivity, and to validate hypotheses  $H_1$  and  $H_2$  of the study. Health and safety policy management was measured by hazard prevention and control policy and risk assessment policy. The two variables of health and safety policy management were regressed against employee productivity. The results in Table 5 indicate a strong and significant positive relationship between safety and health policy management variables and employee productivity ( $p = 0.000$ ). The coefficient of multiple determination as indicated by the Adjusted  $R^2$  in Table 5 showed that the regressands were able to explain 66% of variations in employee productivity.

The overall significance of the model carried out through the ANOVA F-test in Table 5 showed a value of 920.958, and was found to be significant at 0.05 ( $p = 0.000$ ), thus ascertaining the validity of the overall model. However, the results of the coefficients in Table 5 were as follows: 0.466 and 0.741 on hazard prevention and control policy and risk assessment policy, respectively. These results indicate that when hazard prevention and control policy and risk assessment policy increase by one percent, employee productivity increases by 0.466 and 0.741 percent, respectively. The model coefficients result shows that the t-tests of all the variables had a p-value below 0.05 ( $p = 0.000$ ) in hazard prevention and control policy and risk assessment policy, respectively, indicating that the health and safety policy management variables used in the study had a statistically significant effect on employee productivity. Therefore, this result validated hypotheses  $H_1$  and  $H_2$  of the study that hazard prevention and control policy and risk assessment policy has a significant positive effect on employee productivity in manufacturing firms.

**Table 5.** The result of multiple regression analysis for hypothesis testing

Model summary				
Model	R	R square	Adjusted R square	Std. error of the estimate
1	.813a	.661	.660	1.598

Note: a. Predictors: (Constant), Risk assessment policy, hazard prevention and control policy.

ANOVA <sup>a</sup>						
Model		Sum of squares	Df	Mean square	F	Sig.
1	Regression	4700.709	2	2350.354	920.958	.000 <sup>b</sup>
	Residual	2414.263	946	2.552		
	Total	7114.972	948			

Note: a. Dependent variable: Employee productivity. b. Predictors: (Constant), Risk assessment policy, hazard prevention and control policy.

Coefficients <sup>a</sup>						
Model		Unstandardized coefficients		Standardized coefficients	T	Sig.
		B	Std. error	Beta		
1	(Constant)	6.148	.874		7.034	.000
	Hazard prevention and control policy	.466	.031	.387	15.288	.000
	Risk assessment policy	.741	.037	.503	19.860	.000

Note: a. Dependent variable: Employee productivity.

**Table 6.** Summary of regression results for the variables

Regression	R <sup>2</sup>	F	Beta	T	Sig.
HSPM → EP	.837	4852.950	.915	69.663	.000
JS → HSPM	.789	3547.434	.888	59.560	.000
EP → HSPM/JS	.919	5379.404	.359	17.826	.000
JS → EP	.892	7823.867	.944	88.453	.000

Note: Significant at <.001; HSPM = Health and Safety Policy Management, EP = Employee Productivity, and JS = Job Satisfaction.

A series of regression analyses were performed to examine the mediating effect of job satisfaction on the relationship between health and safety policy management and employee productivity, as shown in Table 6. First, the direct effect was determined between the independent variable (health and safety policy management) and the dependent variable (employee productivity), the result was significant ( $b = 0.915$ ,  $t = 69.663$ ,  $p < 0.000$ ). Second, the mediating variable (job satisfaction) was regressed with independent variable (health and safety policy management), and the result was significant ( $b = 0.888$ ,  $t = 59.560$ ,  $p < 0.000$ ). Third, the dependent variable (employee productivity) was regressed with the independent and mediating variables (health and safety policy management and job satisfaction), and the result was significant ( $b = 0.359$ ,  $t = 17.826$ ,  $p < 0.000$ ). Finally, the mediating variable (job satisfaction) was regressed against employee productivity, the result was significant ( $b = 0.944$ ,  $t = 88.453$ ,  $p < 0.000$ ).

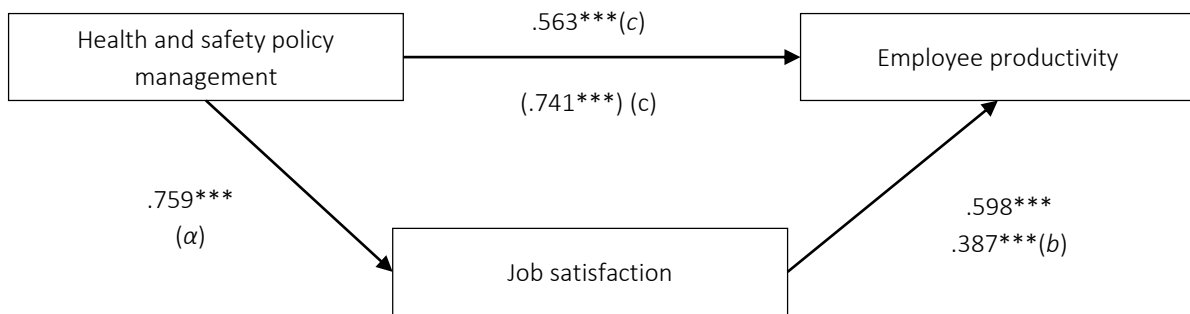
To test the mediating effect of job satisfaction on the relationship between health and safety policy management and employee productivity, and to validate hypothesis  $H_3$  of the study, Sobel test was used with the aid of Jose (2013) MedGraph to depict the mediation among the three constructs

in the study (job satisfaction, health and safety policy management and employee productivity). To ascertain whether there is significant mediation of job satisfaction on the relationship between health and safety policy management and employee productivity based on the significance of the Sobel's  $z$ -score, the rule of thumb is that the obtained  $p$ -value of the Sobel's  $z$ -score should be less than 0.05 and a 95% confidence interval with upper and lower values. If the range of the upper and lower values includes zero, there is non-significant mediation, but if the range does not include zero, there is significant mediation (Jose, 2013).

The results in Table 7 showed a Sobel  $z$ -score of 10.629412 and a  $p$ -value of  $p = < 0.000001$ , which is less 0.05. Also, the results in Table 7 revealed a 95% confidence interval with upper and lower values of .17711 and .25721, respectively. These results indicated that there is a significant mediation of job satisfaction on the relationship between health and safety policy management and employee productivity. Therefore, the result validated hypothesis  $H_3$  of the study that job satisfaction has a significant positive mediating effect on health and safety policy management and employee productivity relationship.

**Table 7.** Results of the Sobel test for the mediating effect

Significance of mediation		Significant
Sobel z-value	10.629412	$p = < 0.000001$
<b>95% Symmetrical confidence interval</b>		
Lower	.17711	
Upper	.25721	
<b>Unstandardized indirect effect</b>		
a*b	.21716	
Se	.02043	
<b>Effect size measures</b>		
<b>Standardized coefficients</b>		<b>R<sup>2</sup> Measures</b>
Total:	.563	.000
Direct:	.741	.357
Indirect:	.294	.713
Indirect to Total Ratio:	.521	.666



**Figure 1.** Standardized coefficients of the mediating effect

Figure 1 presents the standardized coefficients of the mediating effect of job satisfaction on the relationship between health and safety policy management and employee productivity. Figure 1 revealed 0.741 and 0.598 beta weights computed after the inclusion of the mediator job satisfaction and zero order correlations values of 0.563, 0.387, and 0.759, respectively. The standardized coefficients beta weights of 0.741 and 0.598 indicated that the indirect path from health and safety policy management through job satisfaction to employee productivity accounted for about 74.1% and 59.8% of the total effect, respectively.

## 5. DISCUSSION

The test of hypotheses  $H_1$  and  $H_2$  revealed a coefficient of multiple determination as indicated by the Adjusted  $R^2$ , which showed that the regressands were able to explain 66% of the variations in employee productivity. The general significance of the model carried out through ANOVA F-test showed a value of 920.958, and was found to be significant at 0.05 ( $p = 0.000$ ), thus ascertaining the significance of the overall model. The result of the model coefficients showed that the two constructs of health and safety policy management (hazard prevention and control policy and risk assessment policy) used in the study had significant values below 0.05 ( $p = 0.000$ ), respectively, indicating a significant positive influence of the constructs of safety and health policy management on employee productivity. This implies that hazard prevention and control policy and risk assessment policy has a significant positive effect on employee productivity in the selected manufacturing firms.

This finding was supported by Badekale (2012) whose similar study on the influence of organizational safety policy on employee performance in Larfarge (WAPCO) Ewerkoro found that safety policy significantly influences workers' efficiency. The finding was also supported by Odeku (2014) who found that hazard control measures play a vital role in accident reduction in organizations and that personal protective equipment and engineering control techniques significantly affect the rate of accidents in firms. Also, the finding was supported by Karakhan and Gambatee (2018) who found that hazard evaluation, control, and monitoring had a significant positive impact on accident reduction in firms. Similarly, the finding was in line with the finding of Perera (2019) that safety and health significantly influence accident reduction and employee performance in firms. Again, the research aligned with the study of Eric (2015) who found that safety programs significantly influence workers' productivity.

The test of hypothesis  $H_3$  revealed that job satisfaction significantly mediates the relationship between health and safety policy management and employee productivity. This finding was reached after a series of regression analysis was performed and the test of the mediating effect executed. The results showed a Sobel  $z$ -value of 10.629412 and a  $p$ -value of  $p = < 0.000001$ , which is less than 0.05, and a 95% confidence interval with upper and lower values of .17711 and .25721, respectively. These results indicated that there is a significant positive mediation of job satisfaction on the relationship between health and safety policy management and employee productivity. The finding was supported by Yusuf et al. (2012) who found that job satisfaction affects workers' performance. The finding was in line with that of Perera (2019)

that safety and health are significantly related to job satisfaction among field employees in an organization. Also, the finding was in agreement with the study of Mihiravi and Perera (2017) that safety measures positively correlate with workers' job satisfaction in firms.

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## CONCLUSION

This study explored the mediating effect of job satisfaction on health and safety policy management and employee productivity in manufacturing firms. Two health and safety policy management constructs were chosen for the study: hazard prevention and control and risk assessment. The study further examined the mediating effect of job satisfaction on health and safety policy management and employee productivity relationship.

The results from the analyses showed that the two constructs of health and safety policy management positively influenced employee productivity. Specifically, the study concluded that hazard prevention and control policy has a significant positive effect on employee productivity in selected manufacturing firms. Similarly, risk assessment policy has a significant positive effect on employee productivity in the selected manufacturing firms. Also, job satisfaction has a significant positive mediating effect on the relationship between health and safety policy management and employee productivity in the selected manufacturing firms.

Based on the results of the study, it is concluded that proper hazard prevention and adoption of adequate control measures, as well as regular risk assessments, are essential to reduce the rate of occupational accidents and injuries, enhance conducive occupational milieu, and improve workers' welfare and job satisfaction. In other words, proper health and safety policy management would create a feeling of safety and health assurance, boost employees' morale and meet the safety needs of employees for improved productivity. Therefore, it is imperative that the management of manufacturing firms take appropriate hazard prevention and control measures in line with global best practices in their organizations to ensure workers' safety, job satisfaction, and improved productivity.

## AUTHOR CONTRIBUTIONS

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