

Risk Assessment, Risk Communication and Safety Culture: A Study of Selected Iron and Steel Manufacturing Firms in Lagos State

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ABSTRACT

The study investigated the relationship between risk assessment, risk communication and safety culture among selected iron steel manufacturing companies in Lagos State. This study employed survey research design. Four hundred staff of these companies were selected from a population of five thousand two hundred and thirty-four. The data obtained were analyzed using correlation analysis. The results revealed no significant relationship between safety culture and risk assessment. In the same vein, safety culture had a significant relationship with risk communication. Based on the results, it was concluded that Iron and Steel manufacturing companies in Lagos State has a relatively apparent laxity in putting in place, measures to achieve good safety performance. Thus, study recommended that firms in this class of industrial sector should intensify their efforts in the timely assessment of risks. In addition, management of these firms are enjoined to provide an effective communication system for workers to report cases where potential accidents are perceived in the dispositions of other workers within the work environment.

Key words: Risk Communication; Risk Assessment, Safety Culture, Safety Performance

1. INTRODUCTION

The relevance of the manufacturing sector in the world economies cannot be overemphasized, as it accounts for the major developments of most economies in the world (Ogbodo, 2018). In Nigeria, about 13% of the country's GDP was generated by the manufacturing industry in year 2020 (Statista, 2020). Therefore, the sector has the potential to produce a large number of jobs, combat poverty, build wealth, increase exports, and diversify foreign exchange revenues (Taufek, 2016).

Despite its importance, the recrudescence of occupational accidents in this sector is odiously alarming. According to International Labour Organisation (2016), a worker dies or is wounded on the job every fifteen seconds somewhere in the world. This assertion could be partly corroborated through a careful retrospection into the Nigerian manufacturing industry experience in relation to industrial accidents. Nigeria possesses a huge record of occupational accidents which have led to injuries and death in some cases (Fajana, 2012). However, in the face of these unfortunate incidences, there is a growing recognition that the overall likelihood of an accident occurring depends on the organisation's safety culture, and not on the conduct of individual employees (Aytac&Dursun, 2018).

In managing the interaction between system and people, emphasis is placed on safety management, which is largely dependent on the organisations disposition to assess

and handle risks (Olutuase, 2014). Essentially, risk assessment has been found to be fundamental in the containment of hazard risks relating to the operation of manufacturing firms (Kalejaiye, 2013). The information gathered throughout the risk assessment phase of risk management may be used to construct key risk response plans in risk reduction and planning (Idubor&Oisamoje, 2013). However, the assessment of risk may not lead to the fruition of the overall safety management effort if risk information is not properly communicated in a timely manner. This chasm is singly a risk that has the potential of placing personnel in a precarious position which might ultimately result in devastating consequences (Breakwell, 2000). Even when risks are properly communicated, the audience may still be sceptical and question the genuineness of the received information (Cigularov et al, 2010). More importantly, poor sense of safety culture among employees appears to be one of the factors that have exacerbated the situation of work-related injuries and accident (Meiryani, 2020). It is likely that enforcing Occupational Health and Safety (OHS) standards and complying with them are not the only ways to improve safety management, rather, enhancing corporate culture is also crucial (Umeokafor et al, 2014).

Though several literatures have investigated the nexus between risk management practices, organisational culture, safety climate, safety performance and occupational safety (Nicolic, 2012; Cook, et al., 2016; Muhammad et al, 2021; Sran et al, 2019; Abazid & Harb, 2018; ALSaadi & Norhayatizakuan, 2021; Aytac & Dursun 2018; Olutuase, 2014; Ogbu, 2011; Serpella et al, 2014; Clarke, 2006). However, to the best of the researchers' knowledge, no study has concomitantly examined the nexus between risk assessment, risk communication and safety culture among iron and steel manufacturing firms especially in Lagos State, Nigeria. Hence, the study focuses on significant relationship between risk assessment and risk communication on safety culture among iron and steel manufacturing firms in Lagos State.

2. LITERATURE REVIEW

Risk assessment is a technique for proactively identifying and addressing risks in all settings (Ogbu, 2011). According to Vaughan and Vaughan (2014), it is the summation of the processes of risk identification, risk evaluation, and risk analysis. A good risk assessment includes steps such as identifying hazards, analysing the amount of risk, determining if action is required to reduce the risk, and ultimately taking action and evaluating the implications of the action (Vaughan & Vaughan, 2014). Each of these steps is a critical component of good risk management, both in terms of health and safety and risk management in general (Meiryani, 2018). The purpose of risk assessment is for organisation to discover, analyse, and assess operational risks in order to properly prevent, reduce, and manage them (Nyce, 2009). However, detecting possible hazards or exposures, estimating their likelihood and severity, and determining if the observed risk satisfies the organisation's criteria are all part of risk assessment (Redja, 2008). The purpose of risk assessment is to determine what may go wrong and/or what scenarios could affect the system or organisation (Hopkin, 2010). Process of risk assessment includes risk identification (Brustbauer, 2016; Williams et al, 2005; Nyce, 2009), risk analysis (Dorfman & Cather, 2015), risk criteria (Rejda, 2010) and risk evaluation (Lyon & Bruce, 2012). Successful risk assessment methods involve effective communication among stakeholders before, during, and after the process (Breakwell, 2000). Therefore, serious consequences may occur if excellent communication is not maintained (Keffane, 2015). Ineffective communication, on the other hand, is a major contributor to poor outcomes such as fatal and severe incidents (Hopkin, 2010). However, communication should be a major priority when conducting risk assessments, as it should be for many other activities in businesses (Rashid, Nordin&Salleh, 2014). Risk communication

should cut across, investors, partners, suppliers, and vendors, as well as internal and external stakeholders including the evaluation team, management, impacted operators, and system users, should all be engaged in the communication process (Dorfman & Cather, 2015).

The basic notion of safety culture evolved in theory from the domain of organisational culture, which is a requirement for organisational success (Ek, Runefors & Borell, 2014). The influence of an employee's attitude toward risky conduct, which is the major cause of workplace accidents, is investigated by Safety Culture (Brondino et al, 2012). In addition, there is a notion called safety climate that is similarly related. Employee attitudes and perspectives are used to assess the safety climate, which is the external expression of the safety culture (Naevestad, 2009). Cox and Cox (1991) identified five characteristics of safety culture which include the safety perception, responsibility, and efficacy of management on safety, environmental safety, and personal exemption. Although, Idubor and Oisamoje (2013) state that management commitment to safety is a critical component of safety culture. Olutuase (2014) argue that management commitment, safety-related management activities, and the physical environment are all significant components of safety culture. However, Neal and Griffin (2006) identified management values, safety communication, safety procedures, and employee engagement in workplace safety as aspects to examine safety culture.

The majority of the theories propounded on this subject have only situated discussions on human faults and environmental problems only without considering the linkage between people and their surroundings (Machida, 2009). Thus, a systems model was propounded to fill this gap. A system model view sees a harmony between man, machine, and environment, rather than the environment being full of hazards and a person being prone to errors (Tadayon et al, 2012). This means that accidents are quite unlikely under normal circumstances. Therefore, when someone or anything disturbs this balance by changing one of the three components or the relationships between them, the chances of an accident increase (Kouvonen et al, 2016). The rationale behind the choice of this theory in the explanation of the nexus between risk assessment, risk communication and safety culture are that the systems theory of accident causation views any situation in which an accident might occur as a system with three components: person (host), machine (agency), and environment. Hence, the theory gives a broader picture on the nature, causes and effect of accident at the workplace and incorporates the postulations in earlier theories (Tadayon et al, 2012). This theory also discusses how results will help safety managers prioritize risks based on features that increase the possibility of an accident occurring and those that increase the danger of harm in order to avoid accidents and create safer workplaces (De silva et al, 2017). To achieve this, risks would be frequently assessed and information gleaned from the assessment would be dispersed throughout an organisation.

3. METHODOLOGY

The study employs a survey research design. This sort of study design is used since the information about the variables reflects just one moment in time. Primary source of data was adopted through the use of an adapted questionnaire to elicit vital information from the respondent. According to Manufacturers Association of Nigeria (2021), there are seventeen iron and steel companies in Lagos state. Thirteen of these firms were selected using the purposive sampling method. The population of the study therefore consists of 5,234 staff of these companies. A sample size of 400 was obtained from the population, using Yamane sample size. Out of 400 questionnaires, only 350 were returned. In order to administer questionnaires, the researcher applied cluster sampling technique by considering each of these firms as a cluster. Thereafter, the convenience sampling approach was employed by

handing over questionnaires to human resource personnel of each company so they could assist in administering them. Thus, a multi-stage sampling technique was employed to accomplish this study's objectives. A self-developed questionnaire was utilized to gather data needed for this study. The content validity technique was used to evaluate the research instrument's validity, and the Cronbach Alpha test for internal consistency was used to evaluate the instrument's reliability. The questionnaires were administered twice over a two-week period, and the findings of the first and second pilot studies were correlated. A Cronbach alpha of = 0.801, 0.862, 0.914 was obtained. The questionnaire was split into two sections: Section "A" was organized to collect biographical information from the respondents, while Section "B" was organized to collect information on the study's dependent and independent variables. The sectioned "B" was structured using a Likert scale to gauge responses, with the available options being Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), and Strongly Disagree (SD).

4. DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Risk assessment and safety culture among iron and steel manufacturing companies

Table 1 shows a very weak negative relationship between risk assessment and safety culture among iron and steel manufacturing companies ($R = -0.028$). It is also observed from the table above that an evaluation of the significance in the table shows a value of 0.602 which is greater than 0.01 is statistically insignificant and cannot be used in predicting the relationship between risk assessment and safety culture among selected iron and steel manufacturing firms in Lagos State. This implies that there is no significant relationship between risk assessment and safety culture among selected iron and steel manufacturing firms in Lagos State. Thus, the research hypothesis is accepted

This result signifies that, as iron and steel manufacturing firms intensify their effort towards the assessment of risk, the commitment of workers towards safety culture also dropped. This is not to say that the assessment of risk was what informed the reduction in the commitment of workers towards safety. It only shows that as efforts were put in place to assess risk, the culture of workers towards achieving a safety culture became poorer. A reason for the negative relationship between these two variables could be that the management of these organisations only embarked on the task of identifying and analysing risks which together makes up risk assessment, but fails to put up policies, procedures, rules, regulations that help to ensure that workers imbibe a sound culture towards ensuring the safety in all spheres in these organisations. This result is in consonance with the findings of Sran et al (2019) who investigated the relationship between the key practices of occupational health and safety management systems (OHSMS) and occupational health and safety risk management practices. The findings reveal that the relationship between leadership and risk management is not statistically significant.

Table 1:

Correlation Matrix		A	C
A	Pearson Correlation		.028
	Sig. (2-tailed)		602
	N	50	50
C	Pearson Correlation	.028	
	Sig. (2-tailed)	602	
	N	50	50

Source: Authors' Computation (2023)

4.3 Risk communication and safety culture among iron and steel manufacturing companies

Table 2 shows that there is a weak positive relationship between risk communication and safety culture among selected iron and steel manufacturing firms in Lagos State ($R = 0.061$). It is also observed from the table above that an evaluation of the significance in the table shows a value of 0.258 which is greater than 0.01 is statistically insignificant and cannot be used in predicting the relationship between risk communication and safety culture among selected iron and steel manufacturing firms in Lagos State. This implies that risk communication has no significant relationship with safety culture among selected iron and still manufacturing firms in Lagos State. Thus, the research hypothesis is rejected.

The result reveals that there is positive significant relationship between safety culture and risk communication among selected iron and steel manufacturing firms in Lagos State. This result shows that as the level of communication about risk continues to rise among these firms, their commitment towards imbining safety culture also increases. This does not mean that a rise in the level of risk Communication is the cause of the rise in the workers' commitment towards safety culture. It only shows that there was a rise in both level at which risk information is communicated and the safety culture practice among workers in this industrial sector. A cogent reason for this result could be that the management of these firms put in place efforts to ensure that work place accidents are overhauled. This result is consistent with the findings of Shuen and Abdul Wahab (2016) who investigated the mediating effect of Safety Culture on Safety Communication and Human Factor Accident at the Workplace. The results of the study reveal that the interaction between safety communication and human factor accident is significant.

Table 2: Correlation Matrix

		SC	RC
C	Pearson Correlation	1	.061
	Sig. (2-tailed)		.258
	N	350	350
C	Pearson Correlation	.061	1
	Sig. (2-tailed)	.258	
	N	350	350

Source: Authors' Computation (2023)

5. CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, it is safe to conclude that the effort of selected iron and steel manufacturing firms in Lagos State to assess risk does not concomitantly increase with the improvement in their safety culture. In fact, an inverse relationship was recorded in these two independent but related practices. Conversely, the disposition of staff of these firms towards the communication of risk information improved as their safety communication improved. This signifies that these firms have a lot more to do in respect to their assessment of risk, if a good result is to be recorded as regards safety performance. Thus, efforts to assess risks should be intensified than ever before. In addendum, the top management should encourage both upwards and downwards communication about risk information in the organisation. In light of achieving work place safety, management should encourage and provide an effective communication system for workers to report cases where potential accidents are perceived in other workers operations or activities.

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