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Assessing Safety Culture Metrics Influencing Organisation Risk Scorecard among Selected Manufacturing Firms in Lagos, Nigeria

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Abstract

This study evaluated the effects of safety culture metrics on risk scorecard among manufacturing firms in Lagos State. The study employed a descriptive survey research design; cum multiphase sampling techniques comprised of judgmental and convenience. Thus, a structured questionnaire of two hundred and eighty-two (282) were gathered from selected manufacturing firms in Lagos State. The statistical techniques adopted were simple frequency percentage, Friedman rank test, and simple regression method. While rank order tests were conducted for both safety culture and risk score metrics, positively low relationship was established between safety culture and risk scorecard among selected manufacturing firms in Lagos State. On recommendations, firms should endeavour to scale and underwrite in promoting vigorous safety cultures that permit for safety performance. The integration of safety culture and risk scorecard metrics should be yearned for to enhance organisational capabilities and ensure survival. Ensuring safety participation, priority, control, engagement, and communication will help organisation in building robust capacities to advance operational efficiency and quality.

Keywords: Safety Culture, Risk Scorecard, Safety Performance, Manufacturing Firms, Lagos State
JEL Classification: D81,

1. Introduction

In today's competing marketplace, businesses face a whole lot of challenges such increasing pricing rivalry and the desire for greater stakeholder fulfillment (Faride & Setiawan, 2022; Ibarra-Cisneros, Hernández-Perlines, & Rodríguez-García, 2020).

However, entities encounter huge disruptions because of accidents and unpleasant incidents within their premises. These incidents, occasioning every fifteen seconds worldly (as per the International Labour Organization cited in Amushiem & Oamen, 2017), not only cease work activities but thus have hazardous consequences. Accidents lead to financial strains through compensation payments under legal regulations like the Nigerian Employee Compensation Act of 2010 (Ngwama, 2016). Thus, a soiled reputation and complexity in recruiting new employees due to safety issues affect customer service and organisational performance. As such, adopting a robust safety culture becomes pivotal for manufacturing firms to ensure a safe working milieu and avert astronomical losses (Abeje, & Luo, 2023). A devoid of a safety culture, a cardinal facet of worthwhile organizational culture, largely affects organisations' entire performance (Pereira, Ahn, Han, & Abourizk, 2020). In the competing business milieu sculptured by globalization and technology, organizations must guarantee flexibility, creativity, and coordination to motivate competitiveness and attain objectives (Farokhzadian, Nayeri, & Borhani, 2022; Sewpersadh, 2023; Skavronska, 2023). However, workplace accidents derange strategic aspiration, affecting resource availability, machinery, customer expectations, and finances. Poor cooperativeness in safety practices among similar firms further worsen these risks (Kirwan, Reader & Parand, 2019).

The deplorable plight of safety culture has been attributed to various industrial accidents and disasters with disturbing fatality rates in workplaces (Appiah, 2019; Gonawan & Othman, 2022). Often times, health safety at workplace are superscribed basically via lawful and enforcement measures, devoid of undisputed participation from workers (Hafeez, Abdullah, Zaheer & Ahsan, 2021). Consequently, the misbelief concerning safety culture's variation from safety climate hampers implementation efforts (Casey, Griffin, Harison, & Neal, 2017). While judicious safety issues like OSHA compliance are vital, their long-term strategic contribution to organisational sustainability is often overlooked (Manjula & De Silva, 2013). Several studies have highlighted the interrelationship between safety culture, balance scorecard and financial performance (Bautista-Bernal, Quintana-Garcia, & Marchante, 2024; Hammed, King, Joe, & Miller, 2023; O'Neil, Wolfe, & Holley, 2015). However, while Tuan (2020) emphasised the need to consider non-financial aspects such as like quality customer service and interpersonal relationships for enhanced organizational performance, studies such Hopkins (2021) and Sanjay and Swati (2017) suggested a risk scorecard metrics as performance measurement.

More so, comprehending the connectivity between safety culture and organisational risk scorecard inspire the purpose for the empirical investigation. To address this gap, this study aims at assessing the safety culture's metrics influencing organisational risk

scorecard among selected manufacturing companies in Lagos state, Nigeria. The specific objectives are to examining the rank-order analysis of safety culture metrics among selected manufacturing firms in Lagos State; ascertaining the rank-order analysis of organisational risk scorecard metrics metrics among selected manufacturing firms in Lagos State, and evaluating the relationship between safety culture and organisational risk scorecard among selected manufacturing firms in Lagos State.

2. Literature Review

Conceptual Review

Safety culture is a firm's culture that places a greater level of impact on safety values, norms, beliefs, and attitudes; which are shared by greater number of persons within the entity (Ashour, Hassan, & Alekam, 2018). It is an informal part of safety management that represents the shared ways of thinking and acting that are crucial for safety (Naevestad, Bloom, & Phillips, 2020). It embraces shared framework of reference which make provisions for ways of perceiving hazards, which motivate and legalise specific work practices for influencing identities, controlling emotions, and proving values for the desired ways of getting things done (Lundell, & Marcham, 2018). For organization to attain positive safety culture, it is vital to take relevant steps which embrace commitment from leadership circle, employee engagement, frequent evaluation, and audits, efficacious communication, inclusive safety training, and recognition with rewards (Victoria State Government, 2020).

However, safety culture is delineated as an enduring relevance, precedence, and bond placed on safety by each individual agent within the organisation (Kitronza, Masumbuko, & Mairiaux, 2021). Previous studies (such as Bishey, Kilcullen, Thomas, Ottosen, Tsao, & Salas, 2021; Isa, Abdul Wahab, Omar, Mohd Nordin, Taha, & Roslan, 2021; Utami, 2019) noted that an organisation's safety culture advancement is hinged on maintaining shared responsibility, learning always, having open communication, and handling risks properly. This is an indication that every organisation's employee is saddled with unearthing and superintending risks, divulging occurrence, and close calls, and ensuring, always, an improved safety practice. Not being able to scale the safety culture of an organizational settings through a prepared template or scorecard becomes hazardous to its continued survival.

Sanjay and Swati (2018) emphasized that a risk scorecard is, most times, used as a guide to identify organisationaal goals, stakeholders' desires, and vitally, core dependencies. This tool is a crucial value added technique to an organisation's existing risk management approaches. Earlier studies (such as Siddiqi, 2005; Wu & Olson, 2009) noted that a firm's risk scorecard is a compilation of the analysis of each organisation's risks that could impact on core dependencies that support every cardinal

facet. Kotze, Vermaak, and Kirsten (2015) stipulated that adopting firm's risk scorecard facilities can help enhance organizational risk quantification by ensuring that the propensity of entity failing to identify consequential risks are much minimised. Hopkins (2021) described firm risk scorecard as a tool that offers a classification mechanism for the risks to the cardinal dependencies in an organization. He proffered further that every organization should be more concerned with such mechanisms like finances, reputation, infrastructure, and marketplace. He buttressed that while financial and marketplace risks can be measured easily in pecuniary terms, infrastructural and reputational risks are more complex to estimate.

Theoretical Review

This study is unpinned by High-Reliability Organization (HRO) theory. HRO theory is a management theory that has attracted huge attention for its prominence on promoting strong safety cultures in entities (Tolk, Cantu & Beruvides, 2015), especially those handling high-risk environments manufacturing organisations. This theory states that firms can attain and sustain greater performance level even when encounter by risky and unpredictable situations by implanting and hierarchising a vigorous safety culture (Sutcliffe, 2011). HRO theory helps an organization achieve quality, safety, and efficiency objectives by preserving its principles of operational sensitivity, preoccupation failure, resilience, unwilling to simplify, and variations to expertise. HRO theory suggests, in contrast, that high risk organization can perform safely in spite of the risk of complex systems; by demonstrating demonstrated regular unique attributes for safe performance (Sauders, 2015). Olde Seholtenhuis and Doree (2014) contended that studies on HRO have some limitations by simplifying focus on absolute reliability and milieu that are safety-critical in the nature.

However, the limitation of HRO theory is that it is always treating issues with safety and reliability as equivalent concepts, while in reality, they are different. According to earlier work of Leveson, Dulac, Marais, and Carroll (2009), safety is seen as 'being free from undesirable losses (accident) and reliability as 'being the frequency of a component satisfying its specific behavioural necessities over a period of time and under certain conditions'. For Rose and Schulman (2008), reliability means the commitment of service, for others, the safety of major activities and processes. It encompasses regularity of activities, expectations, and flexibility to shocks. In this wise, deliverables regarding safety-critical project may be safe but undependable or dependable but not safe, undependable and unsafe, or safe and dependable. As to manufacturing firms, this theory emphasises the magnitude of energetic safety metrics and a keen-eyed technique to risk management to regularly achieve operational superiority. In the context of this study, the HRO theory holds significant relevancy to safety culture.

Empirical Review

Wolniak and Olkiewicz (2019) examined the nexus between safety culture and quality culture, with empirical evidence in Poland. The study pinpointed at integrated systems as to include culture to integrated management systems, which will relate to individual partial cultures. Taking a look at the managerial practices, it would be uneasy to ponder on culture separately from individual subsystems, where in many organisations, these ideologies do not happen but are executed in the form of integrated structure.

Mararu, Babut, Cioca, Popescu-Stelea, and Vasilescu (2020) evaluated an organizational safety culture by investigating perpetual challenges or opportunities for Romanian firms. This study was synthesised by systematic investigation on certain factors influencing the nexus between organizational culture and safety behaviour. The results revealed vital insights into how, theoretically, systematise safety culture and provided sequence of suggestions to its development. A proposal model into understanding the implications of safety culture was provided to its practices among Romanian enterprises.

Isa et al. (2021) investigated factors influencing workplace safety culture compliance in connection with government-owned companies in Malaysia. This study evaluated five factors comprised of management commitment regarding safety, safety rules availability, safety communication and feedback, safety training effectiveness, and safety knowledge acquisition in connection to safety culture compliance. This study placed emphasis on the nexus between these two research variables and provided an insight into which of safety management practices possesses an improved nexus with an entity safety culture. The study established a positive nexus between these five factors and employees' safety compliance.

Jaaskelainen, Tappura, and Pirhonen (2022) ascertained the way regarding successful safety performance metrics in Finland. This study analysed matureness of safety performance metrics in connection with occupational health and safety (OHS). This study gathered data via a field survey with two hundred and seventy (20) participants from five industrial enterprises. A Partial Least Square Structural Equation performance metrics was employed in the analysis; and thus, explained factors for both supervisor and employees OHS scorecard. The results revealed that potential benefits can be derived from the implementation of safety performance metrics. The study suggested that using safety performance metrics properly will earn managers direct benefits while wider performance benefits would be derived among employees.

Suharnomo and Perdhana (2023) examined safety-based dynamic uncertainty reduction that increase safety performance in Indonesian aviation industry. The study attributed that many air flight accidents were caused by human errors, while the principles of

work safety via safety performance can assist organization minimise the frequency of work accidents and create zero accidents. The study employed 214 participants in the data gathering. The tool of data analysis was Partial Least Square - Structural Equation Modeling (PLS-SEM). The findings revealed significant impacts of leadership on safety culture and safety performance. As recommendation, safety based dynamic uncertainty can be considered as an efficient technique in advancing safety performance in the workplace.

Ashour et al. (2018) and Victorian State Government (2020) observed that firms' decisions upon safety culture, among other things are safety training, participation, performance, communication, commitment, control, and priority. For firms risk scorecard, Hopkins (2021) and Kotze et al. (2015), suggested financial, reputational, infrastructural, and marketplace measures. Pondering on these numbers of existing literature examined on both safety culture and firms' risk scorecard metrics, streams of studies conducted in this area in Nigeria seem to be rare, and then, appeared not to have been extensively explored. There seems to be a practical, knowledge, theoretical, methodological, and empirical gaps in Nigeria; which therefore calls for this intervention and part of which initiated this study. Thus, this study differs from subsisting ones conducted in Nigeria, by examining the nexus between safety culture and risk scorecard. There exists then the evidence gap in relations to the application of Friedman's rank statistical test and simple regression technique.

3. Methodology

This study adopted the descriptive research design. The engagement of this design was premised on its projection temerity (Creswell & Creswell, 2017) and the standard of being able to procure information regarding all sample subjects. The study population embraced all safety managers, safety officers and safety champions engaging with thirty-one (31) conveniently chosen listed manufacturing organisations in Lagos State, which are particularly situated in all five divisional areas of Lagos State (Lagos-Island, Ikorodu, Ikeja, Epe, and Badagry). In the course of writing this report, the actual participants' population was unknown. With the assistance of the Raosoft online sample size estimator for infinite population, a sample of 377 participants was drawn cum a judgmental sampling method. A structured questionnaire was developed and adopted following a tool evolved in the study of Caliendo, Fossen and Kritikos (2010). The choice of the survey technique was due to fitness to its adopted research design, economic nature, and simplicity in distribution (Sallies, Gripsrud, Olsson, & Silkoset, 2021). A total of 377 copies of questionnaires were distributed, out of which 295 were retrieved, and 282, accounting for 74.8% participation rate. The validity and reliability were ensured by ascertaining that construct, content, and predictive validity were examined and certified appropriate for the study. For reliability, after the pilot study

was carried out, the items were found to yield nothing below 0.70 which was the standard norm for research across the globe. Descriptive and inferential statistics were used to analyse the data with the aid of the Statistical Package for the Social Sciences (SPSS) version 21.

4. Results

Table 1: Demographic Information of Participants

Variable	Category	Frequency (%)
Gender	Male	158 (56%)
	Female	124 (44%)
Age	18 but less than 30	100 (35.5%)
	30 but less than 40	99 (35.1%)
	40 but less than 50	45 (16%)
	50 but less than 60	27 (9.6%)
	60 & above	11 (9.6%)
Marital Status	Single	99 (35.1%)
	Married	169 (59.9%)
	Separated	12 (4.3%)
	Widow	2 (0.7%)
Educational Qualification	BSc/HND	122 (43.3%)
	Master's Degree	81 (28.7%)
	Doctorate Degree	19 (6.7%)
	Professional Certificate	11 (3.9%)
	Others	49 (17.4%)

Source: *Field Survey (2023)*

The analysis of demographic variables reveal significant insights into the composition of the studied population. The gender distribution indicates a relatively balanced representation, with 56% identified as male and 44% as female. This close gender ratio within the sample population suggests a degree of gender parity within the manufacturing sector. Regarding age distribution, the data reflects a diverse age range within the sample. The majority of participants fall within the age brackets of 18 and less than 30 years, and 30 to less than 40 years, accounting for 35.5% and 35.1%, respectively. Comparatively smaller proportions are observed in the older age groups, with 16% falling between 40 to less than 50 years, and 9.6% each for the 50 to less than 60 years and 60 and above categories. This distribution indicates a relatively younger cohort dominating the sample. The marital status presents an interesting facet of the demographic profile. The majority, constituting 59.9%, are identified as married, while 35.1% are single. Separated individuals comprise a smaller segment, representing 4.3%,

and widows constitute a minimal 0.7% of the sample. Educational qualifications within the sample population exhibit varying levels of attainment. A considerable portion, accounting for 43.3%, holds a BSc/HND qualification, followed by 28.7% possessing a Master's degree. Smaller proportions are observed to be those holding a Doctorate degree (6.7%) and Professional Certificate (3.9%), while 17.4% fall under the category of 'Others'.

Table 2: Participants' Demographic Information

Variable	Response Label	Frequency	Percentages (%)
How do you classify your position in the organization?	Top manager	17	6.1
	Middle	59	20.9
	supervisor	73	25.9
	worker	118	41.8
	Any other	15	5.3
Do you have organizational risk management guidelines in your organisation?	Yes	239	84.8
	No	43	15.2
Management fully considers risk in determining the best course of action in my organisation	Yes	227	80.5
	No	55	19.5
The existence of risks and managements' recognition of risks are often communicated to employees	Yes	214	75.9
	No	68	24.1
Organisational risk scored does not exist in my organisation	Yes	148	52.5
	No	134	47.5

Source: Authors Computation

The data presented in Table 2 provides further insights into other demographic variables. These statistics offer a glimpse into the composition of the surveyed participants, allowing for valuable observations and implications. The participants' responses as to their position in the organisation revealed that majority fell into workers with a response rate of 41.8 percent, followed by supervisors, middle managers, top managers, and others. As to the shares of the participants who responded to the existence risk management guidelines within the organisation, 84.8 percent reacted by saying 'Yes', while others said 'No'. as to management consideration of risk when taking their best course of action, 80.5 percent reacted 'Yes', while 19.5 indicated 'No'. As for the existence of risk communication systems within the organisation, 75.9 percent implied 'Yes', while 24.1 percent expressed 'No'. As for the existence of risk

scorecard with the organisation, while 52.5 percent agreed, 47.5 percent expressed their disagreement. This revealed a slight variation in their response.

Table 3: Safety Culture Metrics

Variables	Scale Level					Mean	Std Dev.
	SD	D	U	A	SA		
	1	2	3	4	5		
In my organisation, management is always committed to the safety of members of staff at all times	0.7	5.3	20.6	51.4	22.0	3.90	0.832
Staff members are permitted to participate in the safety procedures in my organisation	0.7	3.2	11.7	52.5	31.9	4.12	0.785
There are always effective communication systems in our organisation when it comes to safety atmospheric conditions	2.8	5.7	7.5	59.2	24.8	3.98	0.898
Safety training is always the priority of my organisation	0.7	4.3	17.0	55.3	22.7	3.95	0.794
Safety competence is at the top agenda of my organisation when seeking for the right personnel to fill the gap	1.1	9.5	11.0	53.2	25.2	3.92	0.915
Management of my organisation place priority on staff safety even at the expense of organisational activities	1.4	6.4	9.9	44.4	37.9	4.11	0.923
Safety control is on the mission statement of my organisation	0.4	4.6	15.2	48.2	31.6	4.06	0.827
Workers' involvements in safety are usually allowed in my organisation	1.1	3.9	14.9	51.4	28.7	4.03	0.830
Safety procedures are always applied in the running of my organisation	0.7	7.1	18.8	44.0	29.4	3.94	0.911
Event happenings are frequently reported in my organisation to ensure safety at all times	0.7	12.1	16.7	38.3	32.2	3.89	1.014

Source: Author's Computation,

In Table 3 (Fig. 1), the safety culture survey items for which data were gathered from the entire participants were *safety commitment, safety participation, safety communication, safety training, safety competence, safety priority, safety control, safety engagement, safety procedures, and safety frequency.* The participants reacted to the numerous items, wherein 6.0 percent expressed their disagreement in terms of *safety commitment,* 20.6 percent indifferent, and 73.4 percent indicated their agreement. For *safety participation,* while participants expressed 3.9 percent in not supporting this item, 11.7 percent were undecided with it. Then, 84.2 percent supported. As for *safety communication,* 8.5 percent of the entire participants exhibited their disagreement, 7.5 percent were indecisive, and 84.0 percent agreed. For *safety training,* 5.0 percent disagreed, 17.0 percent undecided, and 78.0 percent expressed their agreement.

For *safety competence*, while participants expressed 10.6 percent in not supporting this item, 11 percent were undecided with it. Then, 78.4 percent supported. As for *safety priority*, 7.8 percent of the entire participants exhibited their disagreement, 9.9 percent were indecisive, and 82.3 percent agreed. For *safety control*, 5.0 percent disagreed, 15.2 percent undecided, and 79.8 percent expressed their agreement. For *safety engagement*, while participants expressed 5.0 percent in not supporting this item, 14.9 percent were undecided with it. Then, 80.1 percent supported. As for *safety procedures*, 7.8 percent of the entire participants exhibited their disagreement, 18.8 percent were indecisive, and 73.4 percent agreed. For *safety frequency*, 12.8 percent disagreed, 16.7 percent undecided, and 70.5 percent expressed their agreement. The mean and standard deviation scores supported the outcomes for all the items surveyed. This is an indication that manufacturers' judgments towards the survey items were normally distributed and centered around the mean. The result of the descriptive statistics on safety culture obviously imply that all the metrics have similar judgments about all the subject matter in the distribution of the participants' judgments.

In Table 4 (Fig. 2), the risk scorecard survey items for which data were gathered from the entire participants were *financial measures, infrastructural measures, reputational measures, and marketplace measures.* The participants reacted to the numerous items, wherein 24.1 percent expressed their disagreement in terms of *financial measures,* 29.1 percent indifferent, and 47.0 percent indicated their agreement. For *infrastructural measures*, while participants expressed 13.8 percent in not supporting this item, 41.1 percent were undecided with it. Then, 45.1 percent supported. As for *reputational measures*, 18.4 percent of the entire participants exhibited their disagreement, 18.8 percent were indecisive, and 62.8 percent agreed. For *marketplace measures*, 12.4 percent disagreed, 19.9 percent undecided, and 67.7 percent expressed their agreement.

Figure 1: The Graphical Model explains the Safety Culture Metrics among Manufacturing Firms in Lagos State, Nigeria

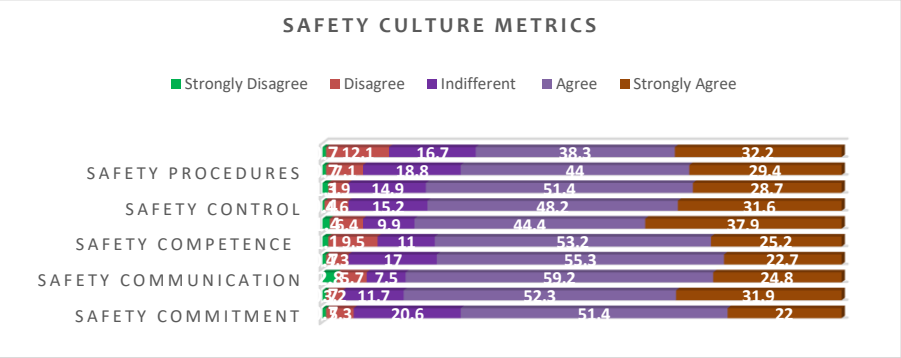

Figure 1: Safety Culture Metrics

Table 4: Firms' Risk Scorecard Measures

Variables	Scale Level					Mean	Std Dev.
	SD	D	U	A	SA		
	1	2	3	4	5		
Financial Measures	9.9	14.2	9.1	38.7	8.3	3.21	1.101
Infrastructural Measures	1.4	12.4	41.1	35.2	9.9	3.40	0.880
Reputational Measures	5.3	13.1	18.8	56.4	6.4	3.45	0.980
Marketplace Measures	3.2	9.2	19.9	53.5	14.2	3.66	0.941

Source: Researchers' Computations, 2023

The mean and standard deviation scores supported the outcomes for all the items surveyed. This implies that manufacturers' judgments towards the survey items are normally distributed and centered around the mean. The result of the descriptive statistics on risk scorecard plainly indicate that all the measures have identical decisions about all the subject matter in the distribution of the participants' opinions.

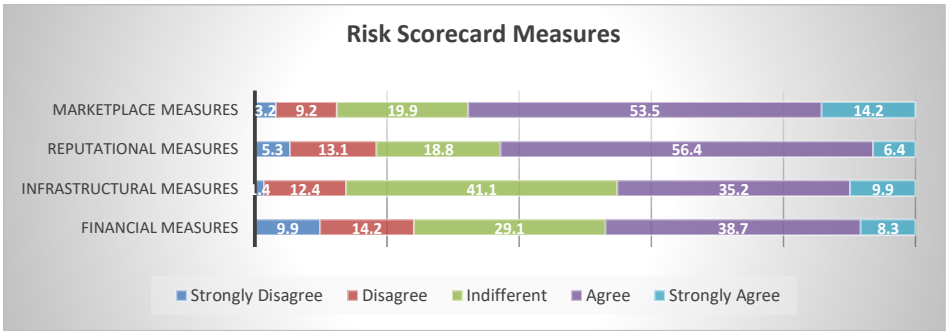

Figure 2: The Graphical Model explains the Risk Scorecard Measures among Manufacturing Firms in Lagos State, Nigeria

Test of hypothesis

Friedman's symbiotic analysis test, represented by K, measures repeatedly identical population with same median. Friedman's test presupposes, under a null hypothetical atmosphere, that the dependent variable has similar underlying constant distribution, which thus require at least an ordinal measurement (Eisinga, Heskes, Pelzer, & Grotenhuis, 2017). However, data, under the Friedman's rank test, are always pitched in a symbiotic tabular model consisting 'n' rows and 'k' column.

Friedman's test ascertains that the rank combined effects for each of the conditions estimated is different largely from the estimations which could be expected by prospect (St. Laurent & Turk, 2013). *Ho_1:* There is no rank-order analysis for safety culture metrics among selected manufacturing firms in Lagos State

Table 5: Results of Friedman's Rank Test and Chi-Square on Metrics for Safety Culture among Manufacturing Firms in Lagos State

Survey Items	Mean Rank	Rank
Safety Commitment	5.03	10
Safety Participation	6.01	1
Safety Communication	5.46	5
Safety Training	5.31	7
Safety Competence	5.25	9
Safety Priority	5.99	2
Safety Control	5.64	3
Safety Engagement	5.61	4
Safety Procedures	5.39	6
Safety Frequency	5.30	8
N	282	
Chi-Square	40.992	
Df	9	
Asymp.sig.	0.000	

Source: Author's Computations

The analytical outcomes of the Friedman's test signify the existence of a statistically significant variance in safety culture metrics [*safety commitment, safety participation, safety communication, safety training, safety competence, safety priority, safety control, safety engagement, safety procedures, safety frequency*, X^2 (9, n=282) = 40.992, $p < 0.05$]. Consequently, taking critical scrutiny of the mean calculations suggested a descending layer in safety culture adopted in the selected manufacturing firms from *safety participation (6.01)* to *safety priority (5.99*), to *safety control (5.64),* to *safety engagement (5.61),* to safety communication (5.46), to *safety procedures (5.39),* to *safety training (5.31),* to *safety frequency (5.30),* to *safety competence (5.25),* to *safety commitment (5.03).* The significance of these metrics affecting safety culture in the selected manufacturing firms were plainly ranked to give grounds for the above

clarifications. *Ho_2:* There is no rank-order analysis for risk scorecard metrics among selected manufacturing firms in Lagos State

The analytical outcomes of the Friedman's test signify the existence of a statistically significant variance in safety culture metrics [*financial measures, infrastructural measures, reputational measures, marketplace measures*, X^2 (3, n=282) = 33.191, $p < 0.05$]. Consequently, taking critical scrutiny of the mean calculations suggested a descending layer in risk scorecard adopted in the selected manufacturing firms from *financial measures (2.37) to infrastructural measures (2.39),* to *reputational measures (2.41),* to *marketplace measures (2.83).* The significance of these metrics comprising the risk scorecard adopted in the selected manufacturing firms were plainly ranked to give grounds for the above clarifications. *H_{o3}:* Safety culture metrics have no effect on risk scorecard among selected manufacturing firms in Lagos State

Table 6: Results of Friedman's Rank Test on Metrics for Risk Scorecard among Manufacturing Firms in Lagos State

Survey Items	Mean Rank	Rank
Financial Measures	2.37	1
Infrastructural Measures	2.39	2
Reputational Measures	2.41	3
Marketplace Measures	2.83	4
N	282	
Chi-Square	33.191	
Df	3	
Asymp.sig.	0.000	

Source: Author's Computations

From the Table 7 results of the regression analysis presented above, it is clear that there is positive relationship between safety culture and risk scorecard. The model also shows the variations experienced by the dependent variable that could be explained by the independent variable (R square) which shows that safety culture is responsible for about 1.3 percent of variance in risk scorecard. This means that 98.7 percent of the risk scorecard enjoyed among manufacturing firms in Lagos State comes from other factors other than the predictor used in this model (*safety culture*). The generalisation of the results (Adjusted R square) indicates that true 0.9 percent of the variation in risk scorecard is explained by safety culture (*safety commitment, safety participation, safety communication, safety training, safety competence, safety priority, safety control, safety engagement, safety procedures, and safety frequency).* This result is almost close to reality as the difference between R Square and Adjusted R Square is not high.

Table 7: Simple Regression Results for Safety Culture vs Risk Scorecard

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	23.715	2.320		10.221	.000
Celebrity Trustworthiness	.110	.058	.113	1.901	.058
R Square	.013				
Adjusted R Square	.009				
F	3.615				
Sig.	.058				

Note: Dependent Variable: Risk Scorecard. Source: Author's Computations

The standard error fit, which is a measure of the precision of the model, shows how wrong the statistical outcomes could be at 3 percent if one uses this model to make real life predictions. The above result is statistically significant as seen in the ANOVA table (*p-value = 0.058*) as it is greater than the 0.05 confidence interval used in this study. A value greater than 1 show that F-ratio yield an efficient model but 3.615 F-ratio indicates that this model is not very efficient.

Discussion of Findings

The results of hypothesis one indicated that safety culture adopted in the selected manufacturing firms was evident from safety participation, to safety priority, to safety control, to safety engagement, to safety communication, to safety procedures, to safety training, to safety frequency, to safety competence, to safety commitment. This result corroborated recent studies (such as Isa et al., 2021; Jaaskelainen et al., 2022; Marau et al., 2020) who noted that safety performance metrics if properly infused will earn managers direct benefits while wider performance benefits would be derived among employees.

The hypothetical results two signified that risk scorecard adopted in the selected manufacturing firms was evident from financial measures, to infrastructural measures, to reputational measures, to marketplace measures. Earlier works (such as Hopkins, 2021; Kotze et al., 2015) stipulated that adopting firm's risk scorecard facilities can help enhance organizational risk quantification by ensuring that the propensity of entity failing to identify consequential risks are much minimised. The hypothetical outcome three showed a positively low relationship between safety culture and risk scorecard among selected manufacturing firms in Lagos State. The aligned with earlier works of Bishey et al. (2021); Kitronza et al. (2021); and Utami (2019); who suggested that organisation's employee should be saddled with unearthing and superintending risks, divulging occurrence, and close calls, and ensuring, always, an improved safety practice.

5. Conclusion and Recommendations

Findings from the study have exhibited the significance of safety culture on risk scorecard among manufacturing firms in Lagos State. Results proved that there existed a rank-order analysis of safety culture cum the rank-order for risk scorecard among selected manufacturing firms in Lagos State. The study further established a positively low nexus between safety culture metrics and risk scorecard among the participants. This study concluded by stating that a plainly ranked metrics placed a ground justification for safety culture. This thus was established for the risk scorecard metrics. Safety culture end up influencing, though positively low, the existing risk scorecard metrics for organization survival.

The knowledge derived from this study, several recommendations came up for manufacturing firms to enhance their safety culture and leverage its impact across various facets. In the First instance, firms should endeavour to scale and underwrite in promoting vigorous safety cultures that permit for safety performance. The integration of safety culture and risk scorecard metrics should be yearned for to enhance organisational capabilities and ensure survival. Ensuring safety participation, priority, control, engagement, and communication will help organisation in building robust capacities to advance operational efficiency and quality. More so, sustaining flexible safety procedures that develop with adaptive industry beliefs, norms, and values is crucial. Consistent refinement of safety procedures ensures their efficacy in controlling risks and enhancing overall safety performance metrics over period of time.

Contribution to Knowledge and Future Directions

This study contributes to literature mythological, and theoretical gaps; hence it provided more conceptual clarifications, theoretical background and infusion of methodological approach. As suggestions, future studies should delve strongly into the causal relationships between safety culture and various organizational risk outcomes and thus, take longitudinal studies evaluating the long-term effects of safety culture interferences on combined risk scorecard metrics; as this could provide more deeper insights.

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