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Significance of Compliance with Contractors' Safety Policy

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Abstract: **Small and Medium-Sized Enterprise (SME) contractors' behaviour on site has contributed to their non-compliance, leading to several accidents. The paper examined the activities of contractors' in Ghana to determine their safety policy. Data collected from administered questionnaires were analysed using Structural Equation Modeling (SEM) software with EQations (EQS) version 6.2. Findings from the SEM analysis confirmed that the Rio coefficient and the Cronbach's alpha coefficient on the internal consistency were over 0.70 criteria for acceptability. The influence of contractors' safety policy features on the Health and Safety (H&S) compliance was statistically significant. The study makes a significance contribution towards SME contractors' safety policy. The study further provides a significant insight for improvement in H&S compliance among SME contractors safety policy.**

Keywords: **Compliance. Construction Industry. Ghana. Safety Policy. SME Contractors.**

I. INTRODUCTION

Small and Medium-Sized Enterprise (SME) contractors' are found to be adamant in complying with Health and Safety (H&S). SME contractors' non- compliance may have an effect on their behaviour and compliance levels among their employees [1]. The well-being of workers among SME contractors' will decline due to the high rate of accidents at their workplaces. This is plagued with financial resources, expertise and shortage of staff, which have significant effect on safety regulations compliance [1]. Moreover, SME contractors' have no financial support for purchase of equipment and training of their employees [2] [3]. The SME contractors form bulk of the contractors in Ghana [2] [3]. Hence, the integration of Health and Safety (H&S) policy into the management systems at all levels of construction industries and its effective implementation, regular education and training should be encouraged both by the government and the parties involved. Contractors' safety policy in relating to SME contractors H&S compliance is lagging. This indicates that there is a fundamental link between theory and measurement leading to the confirmation of measures at the first stage of theory testing. The identified contractors safety policy constructs found in literature will be effective in measuring contractors' safety policy for H&S compliance in the Ghanaian cultural context. The purpose of this paper is to carry out a confirmatory factor analysis of safety policy features for use in H&S compliance study among Ghanaian SME contractors. The paper begins with an overview of a literature review on the topic in question. The adopted methodology for the study, the results of the questionnaire survey and findings of the research are in the proceeding sections. Finally, conclusions are drawn and recommendations made based on the findings. The paper makes a significant contribution towards contractors' safety policy features. The paper also provides significant insight into how H&S compliance among SME contractors will lead to improvement in health and safety.

II. LITERATURE

This section discusses about the Small and Medium-Sized Enterprise (SME) Contractors Health and Safety. It also discusses about Occupational Health and Safety (OHS) Culture, Policy formulation, implementation and monitoring.

2.1 SMEs Contractors' and Occupational Health and Safety

Small and Medium-Sized Enterprise (SME) Contractor is the engine of l economy and major source of present and future employment in all countries. In response to the demands for flexibility arising from globalization, many large companies concentrate on a few specialized core areas. Hence, the high numbers of SMEs, micro-enterprises and self-employed workers as argued in the [3] report are due to outsourcing and subcontracting. Most SME contractors in the developing countries is not adequately covered by safety and health legislation and a large number of them operate in the informal economy beyond any coverage by the formal Occupational Safety and Health (OSH) or inspection services. SMEs contractors are also reluctant to seek advice that is relevant with H&S inspection [3]. Hence, occupational hazards is more widespread in SME contractors than in large enterprises. A report from the [4] shows that the activities in the construction industry are at high risk due to its poor H&S performance record. Existing legislations or targeted regulations influence H&S performance projects [5]. Moreover, construction H&S has become one of the top ten risks (Furter, 2011).SMEs contractors have limited resources and technical capacity, and also limited awareness of the existence of occupational safety and health standards, or how to comply with them without undermining business performance [3].

The Institution of Occupational of Safety and Health [6] contends that it is insufficient, for example, to provide safe equipment, systems and procedures if the culture is not conducive to a healthy and safe working environment. Since, culture creates a homogeneous set of assumptions and decision premises in which compliance occurs without surveillance [7]. A positive culture leads to both improved H&S as well as organisational performance [8]. Behaviour is a product of culture just as much as accidents are a product of the prevailing culture [9]. "Sustained improvement in H&S would not happen without cultural change" [9]. OSH culture is in terms of the informal, cultural aspects of an organisation. The latter can have an impact on how OSH is perceived and on whether people are aware of OSH-related issues and act in a safe and healthy way [10]. 'OSH culture' is in terms of the relationship between organisational culture and OSH. OSH culture is about how an organisation's informal aspects influence OSH in a positive or negative way. They are in two levels [10] by:

i. Setting the values and norms, and underlying beliefs and convictions, through which workers deal with or disregard risks;

ii. Influencing the conventions for (safe or unsafe, healthy or unhealthy) behaviour, interaction, and communication.

OSH culture is a process of organisational improvement. It is the way to dealt with workers in an organization: whether workers are aware of OSH-related issues and act in a safe and healthy way. The knowledge and information, gained from such a cultural approach, can, in turn, be very useful in the process of changing OSH-related policies, processes, and practices or step by step, adapting them to the existing local context and culture, and eventually leading to better OSH performance [10]. In order to achieve continuous improvement of workers' safety and health, a systematic, integrated, proactive, participative, and multiple-strategy approach towards OSH management. Employers, business managers and OSH professionals striving for excellence in the field of occupational safety and health, the key issue is to ensure that occupational accidents and work related ill health are prevented as much as possible, and that safe and healthy behaviour among all employees is promoted [10].

Policy formulation, implementation and monitoring are the responsibility of government and it are vital indicators that determine compliance of H&S among SME contractors. However, an organisation's H&S policy statement details out how it will ensure a healthy and safe work environment. Individual policies need to be developed for specific hazards and issues. Policies initiation procedures must provide systematic instructions on how policies implementation. Section 2 of Health and Safety at Work (HSW) Act 1974 has indicated that if an organization employs more than five people, it must have a written H&S policy [11]. The first step towards the management systems approach to OSH and is reflected in the Occupational Safety and Health Convention of 1981 (No. 155). Although, the Act deals with OHS and working environment in a comprehensive manner, but it is largely a policy rather than a prescriptive instrument. The Occupational Safety and Health Convention of 1981 (No. 155) also provide priority to the formulation, implementation and periodic review of a national policy to prevent accidents and injury to health arising from or that is linked with occurrence of accident in the course of work. It also seeks to minimize, as far as possible the causes of hazards inherent in the working environment [3]. Moreover, the scope and coverage of OSH provisions has evolved from a focus on industrial safety to one on workplace safety and health, from protection to prevention and assessment of risks. Modern standards reflect on

collective responsibilities to workplace safety and health, respective roles, rights, responsibilities and areas for cooperation of and between employers, workers and their representatives [3].

It is mandatory for the formulation H&S policy by the government to guide the activities of contractors' in the construction industry. The formulation of the government policy and its implementation will enable contractors' to provide safe and healthy work environment for all their employees, store their equipment, formwork and false work at a safe place. Finally, to monitor all operations of employees and insist on putting off all equipment during service. It is the responsibility of the H&S personnel to provide general H&S advice to workers, relating to construction H&S issues [12] [13]. Occupational Health and Safety (OHS) is core to the successful long-term sustainability of any business and fortunately in South Africa, Health and Safety (H&S) is a legislatively compliant criterion, enforced by the OHS Act 85 of 1993 and the Department of Labour [14]. Health policy formulation through rigorous and objective assessment of data. Modern health policy poses complex legal, ethical and social questions. Hence, the goal of health policy is to protect and promote the health of individuals and the community. Government officials can accomplish this objective in ways that respect human right [15]. Official government policy making that is legally binding or least has persuasive force in law should comprise of the following: evaluation of the relevant strengths and weaknesses of each of government with respect to health policy formulation. It should also examine sources of information and influence to help in driving policy making.

TABLE 1: CONTRACTORS' SAFETY POLICY CONCEPTUAL VARIABLES

Latent constructs	Indicator variables
Contractors' Safety Policy (CSP)	Safe storage of equipment
	Safe and healthy work environment
	Do not service equipment which is in operation
	Safe storage of formwork and false work

III. METHODOLOGY

The study employed a quantitative method of data collection - a face-to-face method of questionnaire administration among SME contractors in Ghana. Data collected questionnaire were analysed using Structural Equation Modeling (SEM) software Version 6.2. The SEM software assessed the factor structure of the constructs. Prior to SEM test was conducted on the obtained variables.

3.1 Model testing

A total of 558 samples deemed fit for the SEM analysis were finally taken through random sampling before carrying out the exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Two hundred and sixty-nine (269) samples were realised for the EFA and 289 samples for CFA. CFA using EQS Version 6.2 to test the contractors' safety policy features prior [16].The construct parameters used the maximum likelihood method. The use of Yuan, Lambert and Fouladi's coefficient were because psychometric data have a tendency not to be normally distributed. This means that if Yuan, Lambert and Fouladi's values showed significance deviation from normality, the Satorra-Bentlet scale statistics (robust) would be used as these have been found to perform adequate under such conditions [17]. The construct validity for the variables demonstrated the extent to which the constructs hypothetically relate to one another in order to establish the score reliability. This also referred to the test of measurement invariance (MI), factorial invariance or measurement equivalence between indicator variables. MI is an important requisite in SEM because it attempts to verify that the factors are measuring the same underlying latent construct within the same condition. MI ensures that the attributes would relate to the same set of observations in the same way. The MI for the contractors' safety policy features was determined based on the examination of the residual covariance matrix from CFA output results as opposed to the correlation matrix. Covariance matrix establishes the variables that adequately measure the government support constructs.

EFA was conducted on government support indicator variables to identify items appropriately measure the government support features. Identified indicator variables with an unacceptable high residual covariance matrix greater than 2.58 were not included. This implies that the identified indicator variables do not sufficiently measure the government support features regardless of their importance in other cultural contexts and previous studies. Bryne [18] [19] opined that residual covariance matrix greater than 2.58 are considered large. Therefore, in order for a variable to be fitting in measuring a

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construct such as government support, the distribution of residual covariance matrix should be systematically and centred on zero [18] 19]. The assumption of measurement invariance in CFA (Meredith, 1993) [20] in order to allow for comparison of indicator variables under the same condition. In the current paper, multi-sample CFA for the assessment of measurement invariance across latent variables was the basis for the analysis. Several researchers [21] [22] adopted similar methodology.

IV. FINDINGS

4.1 Measurement model for contractors' safety policy

Five hundred and fifty- eight (558) samples were analysed and the data showed four (4) indicator variables (CSP 1, CSP 2, CSP 3 and CSP 4) with acceptable residual covariance matrix. The assessment of the contractors' safety policy model goodness-of-fit on four indicator variables. Bollen [23] [24] disagreed with the number of variables. Some scholars [23] [18] [25] have suggested a minimum of four indicator variables. Analysis of Yuan, Lambert and Fouladi's values showed that data deviated significantly from normality (Yuan, Lambert and Fouladi = 262.0696), hence the decision to use the robust maximum likelihood method. The examination of the Bentler-Weeks structure representation for the approved construct revealed that CSP construct has four (4) dependent variables, five (5) independent variables and eight (8) free parameters. The number of fixed non-zero parameters was five (5). This representation is in Fig. 1

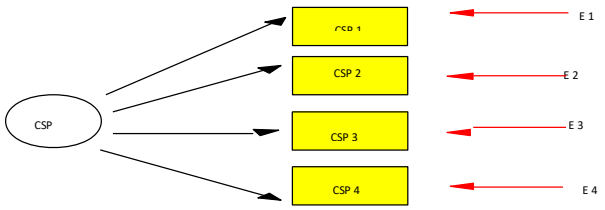

Fig. 1: Measurement model of Contractors' Safety Policy

Table 2shows that the sample data on CSP measurement model yield an $S - B\chi^2$ of 3249.5 with 1861 degrees of freedom. The associated p-value was determined to be 0.0000. The chi-square value advocated that the difference between the sample data and the postulated contractors' safety policy features measurement model was significant. From these values, the chi-square value was determined to be 1.75. The normed chi-square is the procedure of dividing the chi-square by the degree of freedom. The normed values up to 3.0 or 5.0 [26]. The ratio of $S - B\chi^2$ to the degree of freedom was lower than the lower limit value of 3.0 suggesting a good fit of the data to the construct.

TABLE 2: ROBUST FIT INDEXES FOR CONTRACTORS' SAFETY POLICY FEATURES CONSTRUCT

Fit Index	Cut-off value	Estimate	Comment
$S - B\chi^2$		3249.5	
df	0≥	1861	Good fit
CFI	0.90≥ acceptable 0.95≥ good fit	0.794	Acceptable
RMSEA 95%	Less than 0.05 with confidence interval (CI) 0.00-0.05 "good fit"	0.051	Good fit
NFI	Greater than 0.90 "good fit"	0.629	Acceptable
NNFI	Greater than 0.80. "good fit"	0.777	Acceptable
RMSEA 95% CI		0.048: 0.054	Acceptable range

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Table 2 shows the goodness-of-fit indexes. The comparative fit index (CFI) of 0.794 was slightly lower than the cut-off value for good fit model. A good fit model in CFI is above the cut-off value of 0.95 [16] [19]. This indicates a drop (difference of 0.156) in the CFI; hence, the model is to have an acceptable fit, though not well fitting. However, the robust mean square error of approximation (RMSEA) with 95 per cent confidence interval was found to be 0.051 (lower bound value = 0.054 and the upper bound value =0.048) which is within the acceptable range for a good fit model [25]. Both the normed fit index (NFI) and non-normed fit index (NNFI) to be within the acceptable range of 0.629 and 0.777 respectively. Evaluation of RMSEA (95% CI), CFIs, NFIs and NNFIs indicated an acceptable fit of the measurement model, but not for a government support features factor.

4.2 Testing the direct influence of contractors' safety policy (CSP) features on overall health and safety compliance

Determination of the internal consistency for the CSP measurement model must be done through the examination of the Rio coefficient and the Cronbach's alpha coefficient to establish reliability. Kline [26] posited that the desired multivariate reliability coefficient should fall between 0 and 1.00. The Rio coefficient of internal consistency was 0.964, which was above the minimum value of 0.79. The Cronbach's alpha was to be above the minimum value 0.70 at 0.937. High levels of internal consistency and internal reliability were as shown in Table 3. The examination of the magnitude of the parameter coefficients led to the determination of the construct validity. Hence, high parameter coefficients greater than 0.50 indicate a close relation between the factor and the indicator variable. Hair, Anderson, Tatham and Black [27] posited that a parameter coefficient of 0.50 is 25 per cent of the total variance in the indicator variable, explained by the variable (factor). In this case, a parameter coefficient has to be between 0.50 and 0.70 or greater to explain about 50 per cent of the variance in an indicator variable. Hence, the inspection of the standardized parameter coefficient shown in Table 3 were significantly high (values from 0.747 to 0.604). The minimum estimate of 0.604 suggested that the measured factor accounts for 9.540 of the Z-statistics in predicting the overall health and safety (H&S) compliance. The Z-statistics for each indicator variables by the endogenous variables revealed that the scores were significant at 5 percent level.

TABLE 3: RELIABILTY AND CONSTRUCT VALIDITY OF CSP MODEL

Indicator Variable	**Stad. Coeff. (λ)**	***Z*- Stat.**	R^2	***Factor Loading***	**Sig.@5% level?**
CSP1	0.471	6.509	0.602	0.5632	Yes
CSP2	0.787	10.710	0.779	0.5187	Yes
CSP3	0.629	10.021	0.381	0.5898	Yes
CSP4	0.573	9.506	0.605	0.4125	Yes

Cronbach's alpha = 0.937; Rio coefficient = 0.964
(Robust statistical significance at 5% level)
*** SEM analysis norm (Kline, 2005) [26] – One variable loading per latent factor is set equal to 1.0 in order to set the metric for that factor*
**Parameter estimates is based on standardized solutions*

Assessment of the inter-factor correlation (R^2) values for the contractors' safety policy feature revealed that only one indicator value was close to the desired value of 1.00, therefore not significant in predicting the contractors' safety policy H&S compliance. The inter-factor correlation test of statistics (Z-stats) which functions as a Z-statistics test shows that the estimate is significantly different from zero. However, the R^2 did not significantly measure the R^2 variable. The statistical assessment of the score results showed that the influence of this factor on the R^2 variable was weak (indirect). This is not withstanding, the fact that the combined results revealed that it has a good indirect association in the prediction of the overall H&S compliance.

V. DISCUSSION OF RESULTS

Findings from the study show that contractors' safety policy variables satisfied internal reliability and the construct validity criteria. The Rio value was above the minimum value of 0.70 (Table 3). The construct validity criteria were justified by the magnitude and statistical significance of all parameter coefficients. The CFA analysis of the contractors'

safety policy feature revealed that four indicator variables passed the test. The indicator variables were closely associated with the dependent variable. The remaining indicator variables were weak in predicting the contractors' safety policy variables. This was clear in the assessment of contractors' safety policy overall H&S compliance. Further assessment of the Z-statistics accounted for each measure by the indicator variables revealed that the scores were significant, since two Z-statistics, values were close to 10.00 and two were above 10.00. These results suggest that the direct influence of these variables on the H&S compliance was strong (direct). The government is responsibility for the H&S policy formulation. Moreover, the implementation and monitoring of H&S policy among contractors by government officials. This measure will serve as an important indicator that will determine contractors' compliance. It is important to conduct a confirmatory factor analysis to confirm the factorial validity of the contractors' safety policy features. The analysis of confirmatory factor analysis made it possible to characterize and identify specifically the factors of contractors' safety policy have statistically significant influence on the contractors in Ghana. Hence, contractors will find it important to implement and monitor the safety policy formulated by the government in relation to their established safety policy to ensure H&S compliance. The preceding facts indicate that that the confirmation measures should be the first stage of theory testing.

VI. CONCLUSION AND RECOMMENDATIONS

The postulated prior was analysed using SEM software with EQS version 6.2. SEM process throug both EFA and CFA of the prior variables. The CFA analysis revealed that four indicator variables were successful in the factorial validity test conducted. Further findings indicated that the Z-statistics for the four indicator variables were within the acceptable range. The robust fit indexes had an acceptable fit, while RMSEA value and the RMSEA with 95 per cent confidence interval produced an acceptable range. Moreover, the parameter estimates were statistically significant and dealt with successfully. Hence, the measurement model for contractors' safety policy features had an adequate fit to the sample data. The CFA result shows few variables in other cultural contexts from the literature review, to determine contractors' safety policy in Ghana. Checklist of items defining the factors of contractors' safety policy features should be available to guide all contractors.

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