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HEALTH AND SAFETY COMPLIANCE MODEL FOR SMALL AND MEDIUM-SIZED ENTERPRISE CONTRACTORS IN GHANA

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ABSTRACT: *The construction industry in Ghana are dominated by the Small and Medium Sized (SMEs) contractors. A lot of accident that occurring are due to ineffective Occupational Health and Safety (OHS) practices of SMEs contractors. The purpose of the study was to develop Health and Safety (H&S) compliance model for the Ghanaian construction industry. The hypothesised integrated holistic H&S compliance model is presented in this paper based on an in-depth review of the previous models. The study adopted Delphi survey method to collect data from experts in the construction industry and academics through email. Experts were asked to rate the impact of other factors in predicting SMEs contractors compliance with H&S regulations. The rating were based on either the impact was considered to be very high or high. Data collected were analysed using Microsoft EXCEL, spread-sheet software and final results are presented in tables and charts. Features with high degree of consensus are proper positioning of tasks and equipment, provision of training, insensitive to workers and sufficient lighting system for enclosed areas. Others are adhere to company safety policies, formulate H&S policy for construction activities, implementation of H&S policy by government representatives and monitoring of H&S policy implementation by the government representatives.*

KEYWORDS: Compliance Model, Health and Safety, Measurement Variables, SMEs Contractors.

INTRODUCTION

Small and Medium-Sized Enterprise (SMEs) contractors as indicated by Ofori and Toor (2012) form the bulk, by number, of companies in each industry. Frempong and Essegbey (2006) and Laryea (2010) asserted that majority of the Ghanaian construction industries are SMEs contractors. This argument has been confirmed by Kheni, et al., (2007) and argues that their domination has contributed to their ineffectiveness to manage Health and Safety (H&S). Ghana Health Service (GHS, 2007) has observed lack of comprehensive national Occupational Health and Safety (OHS) policy as the major challenging issue facing the Ghanaian construction industries. Others include weak OHS infrastructures, insufficient OHS education, untrained and inadequate OHS professionals, and lack of proper monitoring and surveillances for occupational health and safety diseases and injuries. Kheni (2008) stated lack of skilled human resources, inadequate government support for regulatory institutions and inefficient institutional frameworks responsible for health and safety standards as the major challenges facing occupational safety practices in the Ghana. Considering the high risk nature of the construction industry, Ghana has no Health and Safety (H&S) regulations developed specifically for the sector. This limitation prevents the implementation of H&S standards on construction sites. Improving occupational health and safety has always been a concern for intensive actions to be taken. The prevalence of occupational health and safety challenges in Ghana might also be attributed to limited financial resources and attention given to OHS. Kheni

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and Braimah (2014) asserted that the attitudes of construction companies towards health and safety (H&S) in Ghana have been affected by institutional structure responsible for H&S implementing standards at workplaces. They cited the following as the major problems: poor coordination of the activities of the many institutions responsible for implementing H&S standards, lack of specific H&S regulation and undesirable level of compliance with relevant H&S legislation. It was further reported that for OH&S to be implemented, it is necessary for construction companies to have a positive change in their attitudes. The implementation of OHS wil be achieved by re-structuring of the occupational H&S administration system in Ghana (Kheni & Braimah 2014). Various attempts by previous research works to substantiate the relationship between compliance with H&S seem elusive. Due to the high rate of accidents in the Ghanaian construction industry, H&S compliance issue has become very significant. This study attempts to substantiate whether compliance with H&S of SMEs contractors in Ghana will reduce rate of accidents at the construction sites and enhances the performances. Therefore, the H&S compliance model for SMEs contractors in Ghana is presented based on the in-depth review of the previous models from literature in order to have lasting solution. The paper began with the discussion of occupational health and safety challenges and the current trends in Ghana. This is followed by Health and Safety in the construction industry. In relation to the models reviewed, four measurement variables were finally selected for the study. Two other measurement variables were added as the gaps identified in literature. They are Government support and contractor's organisational culture. The discussions of the health and safety model for SMEs contractors in Ghana are based on the selection of the variables for health and safety compliance model. The following discussions on the conceptual model latent features, specification and justification of the models and structural component of the model were carried out. Finally, the health and safety compliance model and measurement component of the model.

Aim and objectives of the study

The purpose of the paper is to present a conceptualised Health and Safety (H&S) compliance model for SMEs contractors in Ghana and the Delphi survey results.

To find out the Occupational Health and Safety (OHS) and challenges and current trends in Ghana.

To identify and present the components of the structural model.

To present the outcome of the Delphi survey.

DESIGN/METHODOLOGY

The study adopted a Delphi survey method in the data collection. Experts were made up of construction professionals and academics. Experts were asked to rate the impact of other factors in predicting Health and Safety (H&S) compliance of SMEs contractors in Ghana. The rating of the SMEs contractors were based on either the impact was considered very high or. High. Data obtained from the Delphi survey was analysed with Microsoft EXCEL, spread-sheet software. The output from the analysis was a set of descriptive statistics such as means, median, standard deviations and derivatives of these statistics. The results were further presented in tables and bar-charts. The steps in conducting the Delphi survey has not been discussed in this paper due to litted space.

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LITERATURE

Occupational Health and Safety Challenges in Ghana

The Occupational Health and Safety (OHS) legislation has been inherited from a British legal and institutional framework at the time when Ghana was a British dependency. Kheni and Braimah (2014) asserted that the Health and Safety (H&S) of workers in the mining and wood processing industries of Ghana prior to independence, was protected by the Factories Ordinance 1952. The Factories Ordinance 1952 has remained the main OHS legislation in force until its repeal by the Factories, Offices, and Shops Act 1970. However, the existing OHS legislation in Ghana is fragmented and limited in coverage. Some key economic sectors are not covered by the country's OHS laws. A notable example is the agricultural sector, although it employs over 60 per cent of the country's workforce there is no form of OHS laws regulating the activities of the sector. This unfortunate situation can be traced back to colonial rule in Gold Coast (Ghana), where the colonial government placed more emphasis on labour relations in sectors of economy where formal employment relations existed. The mining and manufacturing sectors of the economy are examples of such economic sectors. Frempong and Essegbey (2006) asserted that majority of the Ghanaian construction industries are SME's contractors and this argument has been confirmed by Laryea (2010). Kheni, et al., (2007) opined that Small and Medium-Sized Enterprise (SMEs) contractors form the bulk, by number, of companies in each industry. He argues that their domination has contributed to their ineffectiveness to manage Health and Safety (H&S). A report by Ghana Health Service (GHS, 2007) has observed lack of comprehensive national Occupational Health and Safety (OHS) policy as the major challenge issue facing the Ghanaian construction industries. Others include weak OHS infrastructures, insufficient OHS education, untrained and inadequate OHS professionals, and lack of proper monitoring and surveillances for occupational health and safety diseases and injuries. Kheni (2008) adds lack of skilled human resources and inadequate government support for regulatory institutions. He also mentioned inefficient institutional frameworks responsible for health and safety standards as the major challenges facing occupational safety practices in the Ghanaian construction industries. Considering the high risk nature of the construction industry, Ghana has no Health and Safety (H&S) regulations developed specifically for the sector. This limitation prevents the implementation of H&S standards on construction sites. Improving occupational health and safety has always been a concern for intensive actions to be taken. The prevalence of occupational health and safety challenges in Ghana might also be attributed to limited financial resources and attention given to OHS. Annan et al., (2015) observed that there is lack of body responsible for ensuring and implementation of the necessary requirements for the establishment of the missing national policy in Ghana. They acknowledged the existence of occupational health and safety (OHS) in the industries in Ghana long before the introduction of the Factories, Offices, and Shops Act 1970. Even though, the International Labour Organization (ILO) Convention number 155 is been considered in Ghana but not yet country has not yet ratified. Therefore, the international OHS requirement is not applicable in Ghana. The existence large number of industries have contributed to the high risk in workplace hazards and the different types of OHS issues in Ghana have not gone well with the construction industry. The major challenges in the implementing OHS practice has been attributed to non-availability of comprehensive national OHS policy. A reported by Ghana Health Service in the year 2007 has pointed out lack of national OHS policy, unavailability of mainstream OHS practices in national developmental agenda of Ghana (GHS, 2007). Another OHS challenge facing the Ghanaian industries are weak OHS infrastructures, untrained and inadequate OHS professionals, and lack of proper

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monitoring and surveillances for OHS diseases and injuries. They further pointed out that there is no national policy and body responsible for monitoring and ensuring OHS requirements and guidelines for implementation. The OHS challenge facing the Ghanaian industries might be due to the existence of some fragments of OHS legal requirements under jurisdictions of different agencies. Ghana should not be left out in the search for the requirements and committed bodies to take the mantle of affairs that will initiate the implementation of the national policy.

Current Trends of Occupational Health and Safety in Ghana

Ghana News Agency (GNA, 2010) has shown that there are currently two major edicts that have provided guidance in the provision of occupational or industrial safety and health services, practice and management in Ghana. These include the Factories, Offices and Shops Act 1970, Act 328 and the Mining Regulations 1970 LI 665. These have driven the mining and the labour sectors and are therefore very limited in scope, by considering the multifaceted distribution of industrial operations that we have in Ghana. There is the Workmen's Compensation Law 1987(PNDC 187) which relates to compensation for personal injuries caused by accidents at work and hence, indirectly impacts on monitoring worker or workplace safety. As per the International Labour Organisation (ILO) convention number 155 1981, member countries must formulate, implement and periodically review a coherent policy on Occupational Safety and Health (OSH) and work environment. The Labour Act 2003, Act 651, Part XV, sections 118 to 120 apparently directs employers and employees in their roles and responsibilities in managing Occupational Health, Safety and Environment in the nation. Reporting of accidents and occupational illnesses is not specified. It is not clear or does not specify what to consider as occupational illness and person responsible for the implementation of corrective actions as per recommendations. Currently, accidents that occur in factories are expected to be reported to the Department of Factory Inspectorate (DFI) but companies hardly report such events to the inspectorate for investigation and correction. Little attention has been paid to or there is no positive effect of the action of the DFI on the factories. The positive signs seen on "Safety and Health practice infection" among some of the companies are due to the influx of some multinational companies into the country. It is clear that the multinational companies have given their corporate expectations with specific requirements in the Occupational Safety and Health practices. This stems from their requirements for the contractors and subcontractors to follow their Health and Safety (H&S) standards.

Selected Variables for Health and Safety Compliance Model

Both objective and subjective attributes have been combined in the Health and Safety (H&S) compliance study models for the assessment of H&S compliance. The gaps identified in the literature review are government support and contractors' organisational culture. These two addition constructs were found to be peculiar to developing countries and Ghana as a developing nation. The Latent Variable Construct are Safe Environment (SE), Safe Act of Workers (SAW), Safe Work Condition (SWC), Reaction of Worker to Safe Condition (RWSC), Government Support (GV) and Contractors Organisational Culture (COC).

Structural Component of the Model

The integrated health and safety (H&S) compliance model for Small and Medium-Sized Enterprise (SMEs) contractors in Ghana was derived from SE, SAW, SWC, RWSC, GS and COC in the process of achieving safety in the construction industry. The postulated model is

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presented in Figure 1 (Model 1.0). The theoretical underpinning of this priori is derived from the works of Heinrich (1959) and Accident Root Causes Tracing Model (ARCTM).Most of the important rules of Accident Root Causes Tracing Model (ARCTM) was derived from the efforts of Heinrich (1959), Peterson (1971), Bird (1974), Ferrell (in Heinrich et al. (1980) and Peterson (1982) (Hosseinian &Torghabeh, 2012: 59); Jha (2011); Fang, Choudhry & Hinze (2006) as discussed in chapter 3 of my research. The conceptualized model is the notion that compliance of health and safety is related to the evaluation of many variables. Such as SE, SAW, SWC, RWSC, GS and COC. It is difficult to discuss the principal variable without reference to variables of government support and contractor's organisational culture and inclusion of the other exogenous variables. The evaluation will depend on the compliance assessment of several indicator variables under each of the exogenous variables. In this study, the objective evaluation of health and safety compliance will be assessed by measuring the actual condition of the construction industry that is an exogenous variable in the model as shown in figure1.

Conceptualised Model for Health and Safety Compliance

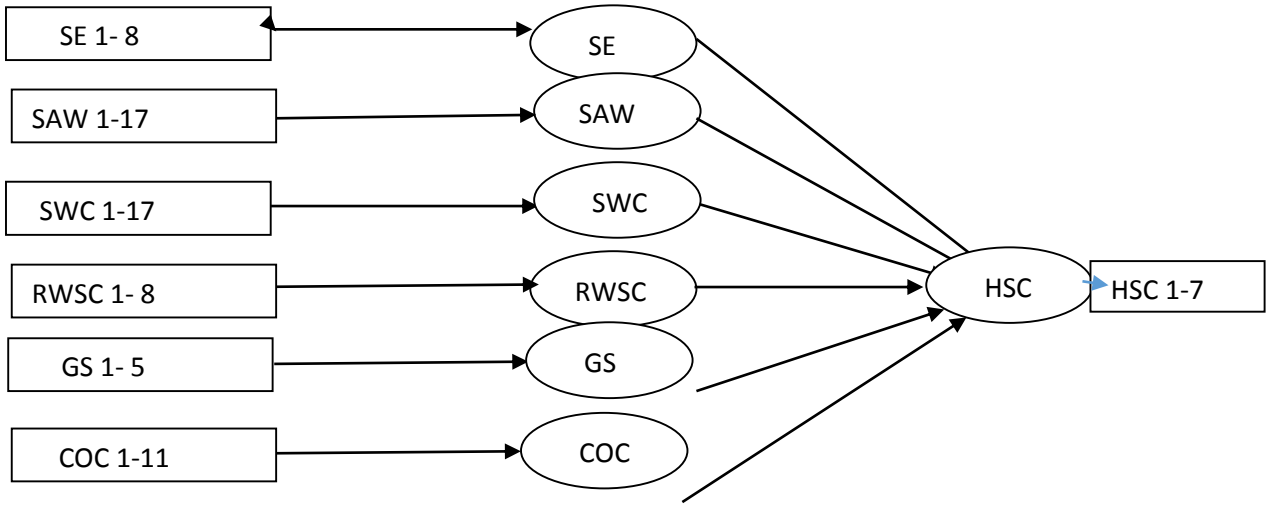

Figure 1. Conceptualised Mode for Health and Safety (H&S) Compliance

Measurement Component of the Model

The measurement component of the hypothesized model comprises of the following health and safety compliance factors: SE = 8 measurement variables; SAW = 17 measurement variables; SWC = 17 measurement variables; RWSC = 8 measurement variables; GS = 5 measurement variables; COC= 11 measurement variables and HSC = 7 measurement manifest variables. The success for the consideration of health and safety compliance for the benefit of the construction industry has been theorised in the present model. The health and safety compliance (HSC) model has seven measurement manifested variables as shown in figure 1.

RESULTS AND DISCUSSIONS

Interquartile deviation (IQD≤ 1) indicates high degree of consensus.

Table 1: Health and Safety Compliance Main Attributes

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None of the main attributes of health and safety compliance and safe environment has reached high degree of consensus as shown in Tables 1 and 2 and Figures 2 1nd 3.

Table 1: Health and Safety Compliance Main Attributes

Health and Safety Compliance Main Attributes	Median	IQD ≤ 1
Safe Environment	**8**	1.50
Safe Acts of Worker	**8**	2.00
Safe Working Condition	**8**	1.00
Reaction of Worker to Safe Condition	**8**	2.25
Government Support	**6**	2.75
Contractors Organisation Culture	**7**	1.50

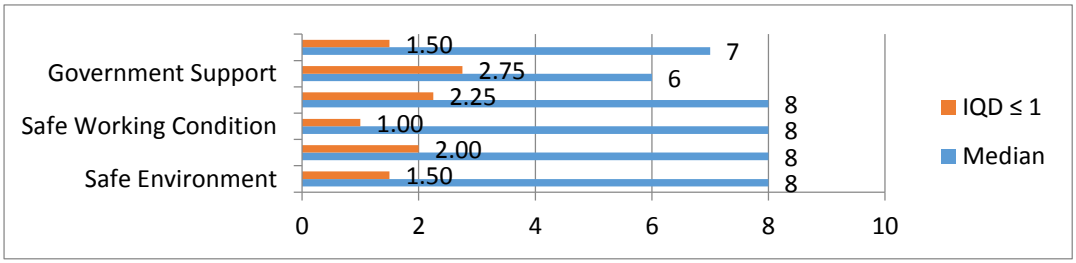

Figure 2: Health and Safety Compliance Main Attributes

Table 2: Safe Environmental Features

Safe Environment	Median	IQD≤ 1
Safe and healthy work environment	**8**	1.25
Safe storage of equipment	**8**	1.25
Safe storage of building materials	**8**	3.25
Safe storage of formwork and false-work	**7**	2.07
Safe transportation of building materials	**6**	1.5
Safe transportation of formwork and false-work	**7**	1.25
Safe transportation of equipment	**7**	1.08
Provision of warning systems	**8**	2.25

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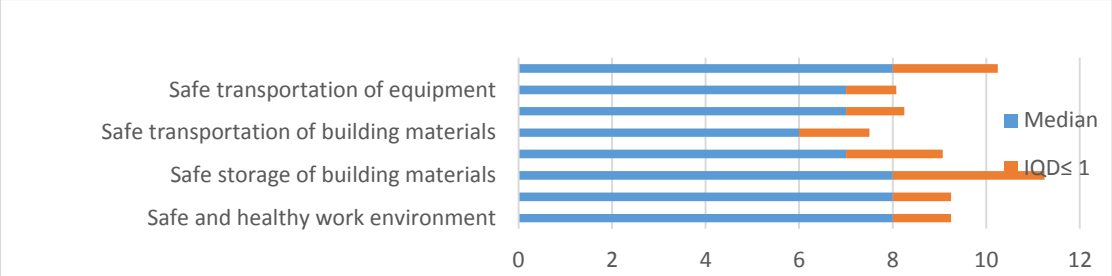

Figure 3: Safe Environmental Features

Tables 3 and 4 and Figures 4 and 5 show high degree of consensus among the following distinct features, ensuring proper positioning of tasks, and ensuring equipment /tools are in good condition before usage and provision of training, good inspection program, insensitive to workers, sufficient lighting system for enclosed areas, and safe movement around workplace and availability of facilities within a reasonable distance from the work area respectively.

Table 3: Safe Act of Workers

Safe Act of Workers	Median	IQD≤ 1
Inspect workplace before commencing any activity	9	1.36
Tidy up workplace at the end of any activity	7	1.07
Use appropriate tools/equipment	8	2.25
Do not work under the influence of alcohol and other drugs	8	2.25
Do not smoke in flammable materials store	9	2.5
Ensure equipment /tools are in good condition before usage	9	1
Use correct proper lifting, handling or moving of objects	8	1.17
Ensure proper stacking of objects /materials in safe locations	8	1.75
Avoid annoyance and horseplay at the workplace	6	1.5
Ensure the use of personal protective equipment (PPE	9	0.25
Do not remove safety guards from the workplace or equipment	7	1.5

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Do not throw or accidentally drop objects from high levels	7	1.5
Ensure proper positioning of tasks	7	1
Do not service equipment that is in operation	6	2.5
Concentrate on the task at hand	7	2
Work in good physical conditions	8	2

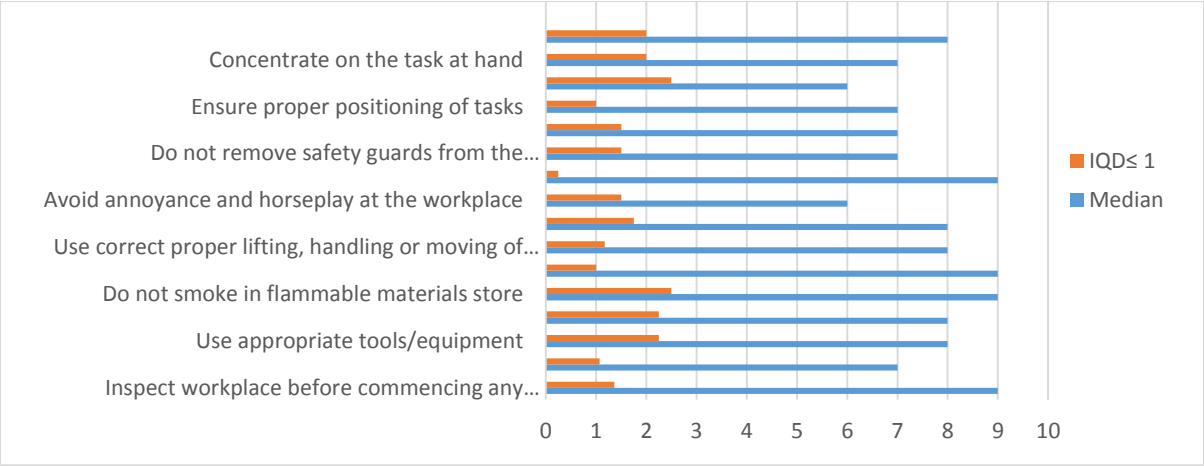

Figure 4: Safe Act of Workers

Table 4: Safe Working Condition

Safe Working Condition	Median	IQD≤ 1
Provision of training	9	0.46
Good inspection program	9	1
Provision of insensitive to workers	7	0.8
Provide Safety regulations of equipment	9	1.25
Good company safety policies	8	1.25
Good salary	6	1.5
Payment of Social Security and National Insurance Trust (SSNIT)	5	1.5
Provision of sufficient lighting system for enclosed areas	7	1
Safe movement around workplace	8	0.5
Provision of guidance on the recommended illumination level for various types of task	8	1.5
Workers should be given proper ventilation	7	1.5
Provision of adequate facilities (toilet, drinking water, washing and canteen)	8	3.5
Provision of facilities that are clean, safe and accessible to all workers	8	3
Availability of facilities within a reasonable distance from the work area	6	0.5

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Provision of change room for workers	6	2.5
Facilities must be available for both day and night workers	6	2.75
Facilities must be available for both day and night workers	6	2.75
Facilities must be available for both day and night workers	7	1
Provision of break periods for workers to access the facilities	8	2.5

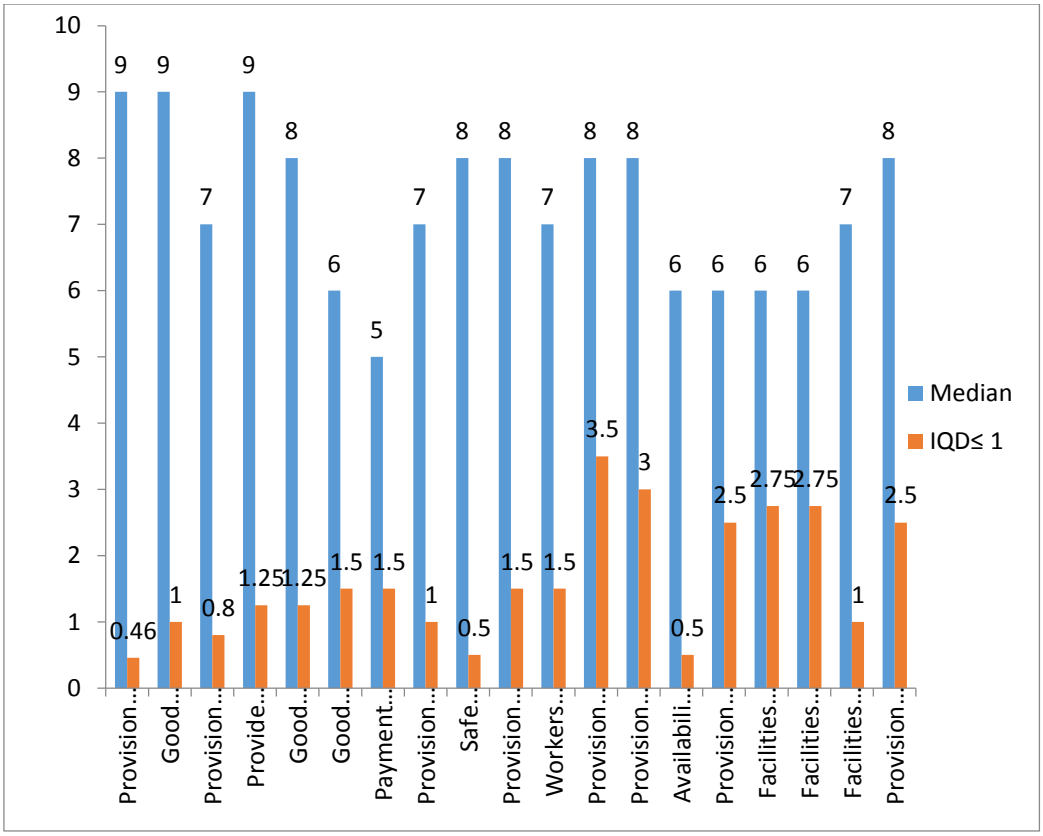

Figure 5: Safe Working Condition

Tables 5 and 6 and Figures 6 and 7 show high degree on consensus in follow safety regulations, adhere to company safety policies, put to proper use of the available facilities (toilet, drinking water, washing and canteen), and formulate H&S policy for construction activities, implementation of H&S policy by government representatives and monitoring of H&S policy implementation by the government representatives respectively.

Table 5: Reaction of Worker to Safe Condition

Reaction of Workers to Safe Condition	**Median**	**IQD≤ 1**
Attend safety education program	8	1.68
Attend safety training program	8	1.57
Adhere to warning signs and notices	8	1.25
Follow safety regulations	8	0.93
Adhere to company safety policies	8	0.93

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Adhere to guidance on recommended illumination level for various tasks	7	1.25
Put to proper use of the available facilities (toilet, drinking water, washing and canteen)	7	0.46
Adhere to regular use of provided change room	6	1.61

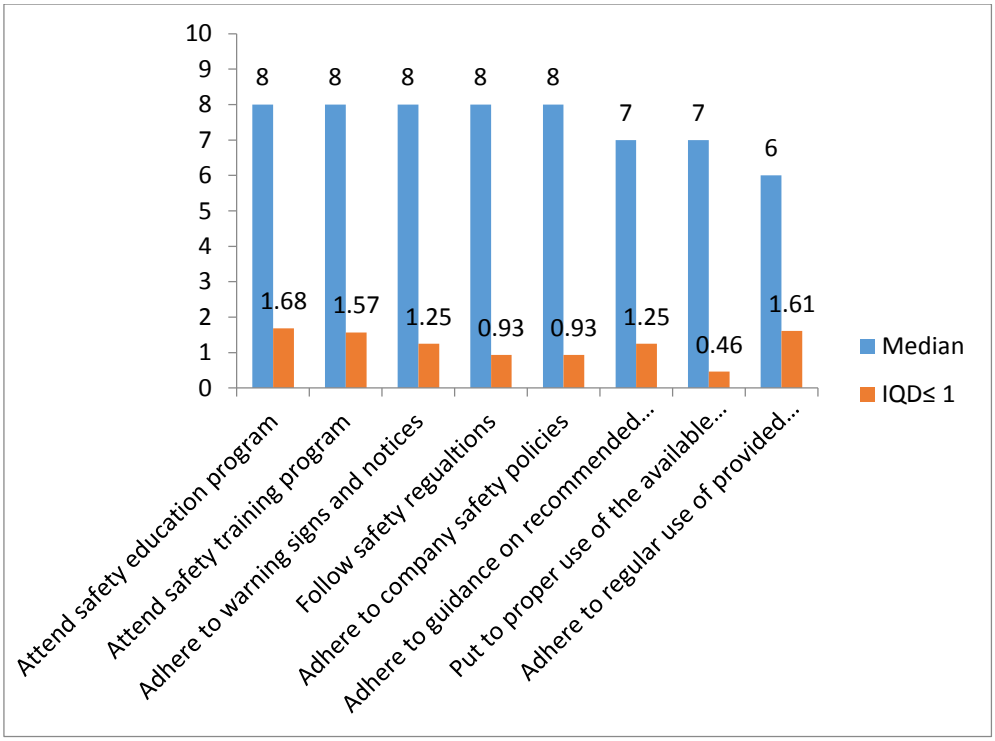

Figure 6: Reaction of Worker to Safe Condition

Table 6: Government Support

Government Support	Median	IQD≤ 1
Formulate H&S policy for construction activities	8	1
Implementation of H&S policy by government representatives	7	1
Monitoring of H&S policy implementation by the government representatives	8	1
Provision of H&S policy update by government representatives	8	2

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Provision of Health and Safety (H&S) training by government representatives	7	3

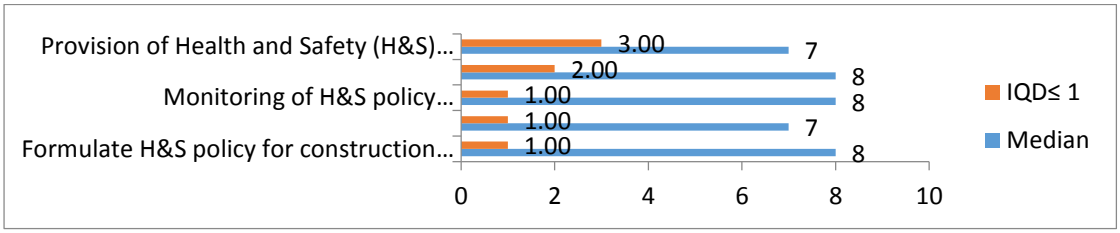

Figure 7: Government Support

Tables 7 and 8 show high degree on consensus in communication of H&S information to workers, and changes in company structure and ownership at various stages of growth and short track records of H&S regulations respectively.

Table 7: Contractors Organisational Culture

Contractors Organisational Culture	**Median**	**IQD≤ 1**
Provision of personal protective equipment (PPE)	8	2.25
Provision of Signs/Notices on sites	7	2
Training of Workers on Health and Safety (H&S)	9	1.25
Involve workers in H&S program	9	2
H&S staffing	7	2.25
H&S inspection	8	1.25
Company H&S policy	8	1.5
Management commitment in H&S	8	2.25
Appropriateness of site for erection of residential building	8	3
Communication of H&S information to workers	9	0.82
Update on H&S information to workers	8	2

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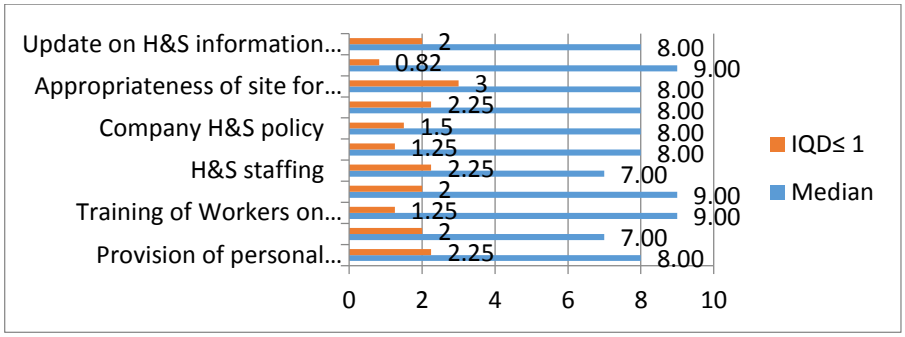

Figure 8: Contractors Organisational Culture

Table 8: Factors that enable SMEs to comply with H&S regulations

Factors that enable SMEs to comply with H&S regulations	Median	IQD≤ 1
Changes in company structure	6	0.75
Changes in ownership at various stages of growth	5	0.58
Lack of H&S experts	6	4.5
Lack of finance in the management of H&S regulation	6	2.75
Lack of personnel to monitor changing legal requirements	6	3.5
Short track records of H&S regulations	5	1
Company limited cash flow	5	2.5
Lack of enforcement from the legislative bodies overseeing the implementation of OSH Act	7	1.93
Lack of knowledge to understand H&S regulations	7	3
Lack of knowledge to interpret H&S rules	7	3.25
Lack of knowledge to identify hazards or risks	7	2.5
Lack of interest in compliance with environmental health regulations	6	2.75

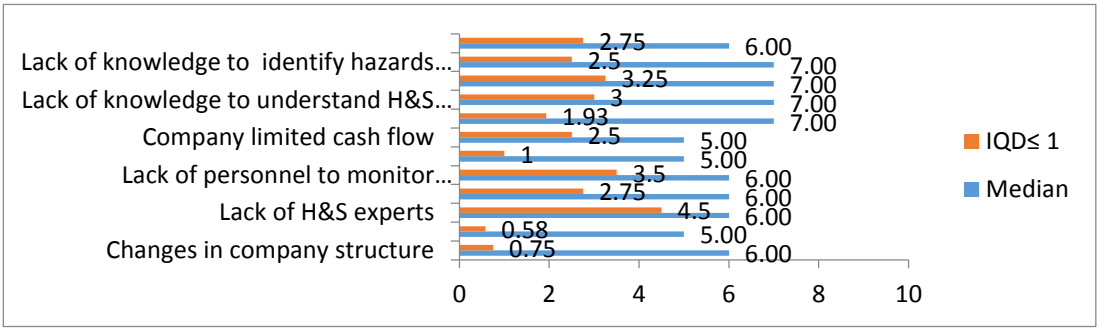

Figure 9: Factors that enable SMEs to comply with H&S regulations

Tables 9 and 10 show in limited company resources, unavailable Health and Safety (H&S) policy, limited knowledge of Occupational Health and Safety (OHS) and Limited access to body responsible for the implementation of H&S policy, and loss of funds due to accident compensation and training of new employees, loss of funds in the employment of Health and

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Safety (H&S) personnel and payment of government representatives on H&S education respectively.

Table 9: Factors that affect SMEs in not (to) complying with H&S regulations

Factors that affect SMEs in not (to) complying with H&S regulations	Median	IQD≤ 1
Limited company resources	7.00	0.82
Unavailable Health and Safety (H&S) policy	8.00	0.71
Limited knowledge of Occupational Health and Safety (OHS)	8.00	0.71
Inability to employ H&S personnel	7.00	1.25
Inability to train employees on H&S regulations	8.00	3.00
Lack of knowledge on H&S policy implementation	7.00	1.61
Lack of coordination of the implementation of H&S policy within the organisation	7.00	2.25
Limited access to body responsible for the implementation of H&S policy	7.00	0.25
Lack of cooperation from client	6.00	1.50
Management bottleneck	7.00	1.50

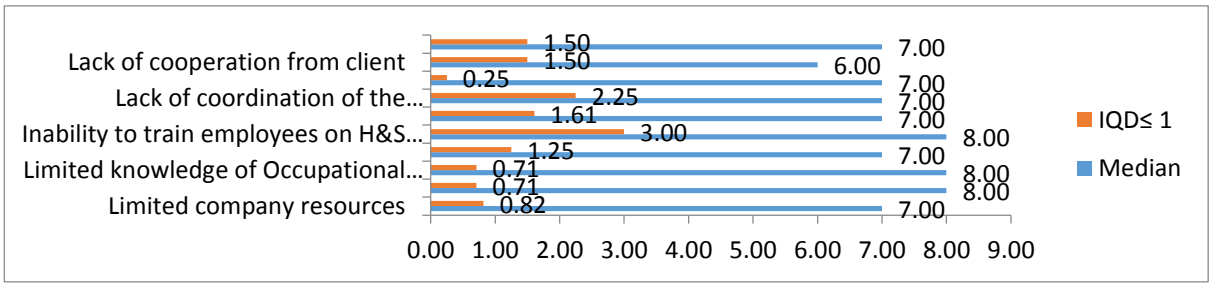

Figure 10: Factors that affect SMEs in not (to) complying with H&S

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Table 10: Effects of H&S non-compliance on SMEs contractors

Effects of H&S non-compliance on SMEs contractors	Median	IQD≤ 1
Reduction in profit margin	5.00	1.75
Loss of funds due to accident compensation	7.00	1.00
Loss of funds in the training of new employees	5.00	0.54
Loss of funds in the employment of Health and Safety (H&S) personnel	5.00	0.54
Payment of government representatives on H&S education	5.00	0.54
Loss of company reputation	7.00	1.25
Loss of clients	7.00	1.11

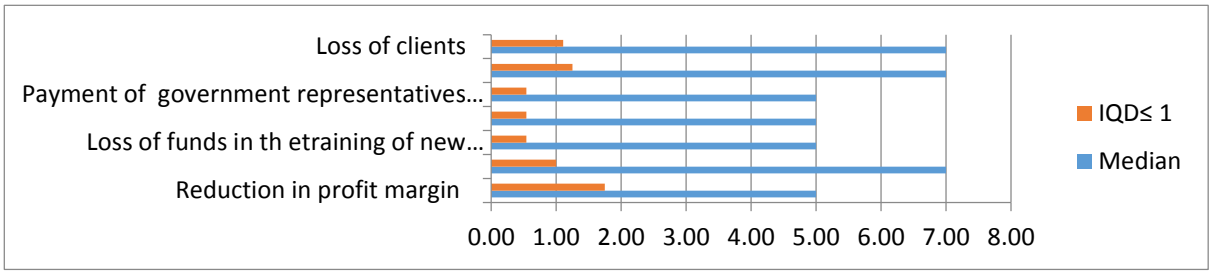

Figure 11: Effects of H&S non-compliance on SMEs contractors

Tables 11 and Figure 12 show high consensus in limited cash-flow and short track of records of H&S regulations.

Table 11: Management issues that affect government in the implementation of H&s policies

Management issues that affect government in the implementation of H&s policies	Median	IQD≤ 1
Lack of finance in the management of H&S	7.00	1.82
Lack of H&S experts	8.00	1.25
Limited cash-flow	8.00	1.00
Lack of capacity	8.00	1.50

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Lack of personnel to monitor changing legal requirements	7.00	2.50
Short track of records of H&S regulations	7.00	0.50
Lack of knowledge to understand H&S regulations	7.00	1.50
Lack of knowledge to interpret H&S rules	6.00	2.00
Lack of knowledge to identify hazards or risks	7.00	2.00
Lack of interest to comply with environmental health regulations	7.00	3.00

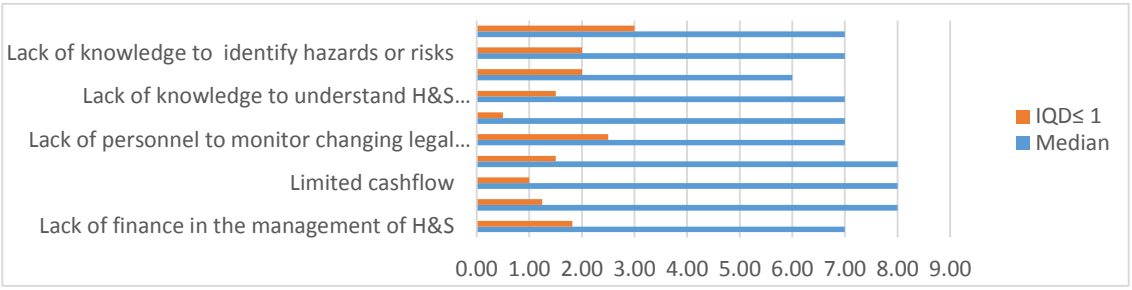

Figure 12: Management issues that affect government in the implementation of H&s policies

Further Research

Further studies will be conducted for the validation of the conceptual model developed in this study and should be focussed in the Small and Medium-Sized Enterprise (SMEs) contractors in Ghana.

CONCLUSION

The theorised conceptual model given in this paper is not based on prior study that Health and Safety Compliance (HSC) model is a multidimensional structure composed of six latent variables of safe work environment, safe acts of workers, safe work condition, and reaction of worker to safe condition, government support and contractor's organisational culture. These factors were derived from the literature review. All the explanation of the selected variables for the construction of the modified conceptualised health and safety compliance model for SMEs contractors in Ghana have been highlighted in the theoretical framework of the main study. The results provided from the Delphi survey indicates consensus reached in the measurement variables to achieve Health and Safety compliance.

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