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Analysis of Criteria for Measuring Project Success in the Construction Industry of Ghana

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Abstract
This study provides analysis of the effect of culture on the construction industry in the developing world focusing on Ghana. The culture exhibited considered the key factors influencing performance measures; the critical performance variables in assessing contractors (construction industry) performance; extent to which each performance measure affect performance outcome correlation; the major challenges contractors in Ghana faced; and extent to which cultural dimensions influence the contractor performance. Research questionnaires where design and administered in five regions of Ghana. Data collected from Six hundred (600) respondents comprising Five hundred (500) workers from construction industries, Seventy-Five (75) contractors, Fifteen (15) consultants and Ten (10) clients. Five hundred experienced staffs across five regions were also interviewed. The mixed method was adopted for the study.
Keywords: Culture, Construction Industry, Bribery, Corruptions

1. Introduction

In Africa, the market for major construction projects tends to be dominated by foreign contractors. In a study on contractor development in Nigeria, in which 69 indigenous contractors and 71 professionals responded, Adams (1997) found that major projects in most developing countries are carried out by foreign contractors because of deficiencies in indigenous construction capacity.

Many projects in the construction industry in developing countries have progressed only because bribes were paid to ignore environmental and social hazards, often with the collusion of consultants who risk forfeiting future projects if they fail to endorse their client's interest in promoting these investments. This seems to have become the norm and established beliefs in the construction industry particularly in the developing world (Global Corruption Report 2005).

The study presents the Ghanaian situation relating to the challenges faced in construction industries in developing countries. The analysis were based on the following key underlining questions: What are the key factors influencing performance measures in the construction industry in Ghana; What are the critical performance variables in assessing contractors (construction industry) performance in Ghana?; What extent does each performance measure affect performance outcome correlation?; and what are the major challenges contractors in Ghana faced?

Questionnaires were developed and administered to players within the industry in line with the key questions raised.

2 Demographical Attributes of Respondents

The demographic information of respondents.

Table 1: Demographical Data

	Frequency	Percent
Male	472	78.7
Female	128	21.3
Total	600	100.0

Table 1 indicates that 78.7% of the respondents were male whilst 21.3 were female. This supports the perception that there are more male in the construction industry than female.

3 Frequency distribution of respondents in Years within the construction industry

Table 2 Frequency distribution of Years in construction industry

Years	Frequency	Percent
1-5	170	28.3
6-10	307	51.2
11-15	69	11.5
16-20	35	5.8
21-25	6	1.0
26-30	7	1.2
31-35	6	1.0

Source: Field Data, 2014

Table 2 indicates that 51.2% of the respondents spent 6-10 years in the construction industry followed by 28.3% representing 1-5years. 11.5% spent 11-15years, 5.8% spent 16-20years, and almost 3% spent 21-35 years in the industry. It is observed that most people in the construction industry have not spent over 20 years in the industry.

4. Profession of Respondents

Table 3Percentage distribution of Profession

Profession	Percentage	Cumulative Percentage	N
Architect	17.2	17.2	103
Quantity surveyor	20.7	37.8	124
Project manager	14.7	52.5	88
Construction manager	13.8	66.3	83
Structural engineer	18.5	84.8	111
Site Engineer	4.7	89.5	28
Draughtman	0.8	90.3	5
Contractor	1.7	92.0	10
Electrical Engineer	2.5	94.5	15
Civic Engineer	1.2	95.7	7
Land surveyor	1.7	97.3	10
Maintenance engineer	0.2	97.5	1
Accountant	1.3	98.8	8
Consultant	1.2	100.0	7
Total	**100**		

Source: Field Data, 2014

Table 3 below shows that out of the six hundred respondents from the construction industry 20.7% are Quantity surveyors, 18.5% are Structural Engineers, 17.2% are architects, 14.7% are Project managers, 13.8% are Construction managers, 4.7 are Site Engineers and 0.2-2.5% are Maintenance Engineers, Draughtsmen, Civil Engineers, Consultants, Accountants, Land Surveyors, Contactors and Electrical Engineers.

5 Status of Respondents in their Respective Organization

Table 4 Respondents' status in the organization

Responses			
Status	**Percent**	**Cumulative Percent**	**N**
Director/principal partner	18.8	18.8	113
Associate partner	20.8	39.7	125
Senior Staff	40.3	80.0	242
Junior staff	5.8	85.8	35
Trainee/Intern	14.2	100	85

Source: Field Data, 2014

In trying to find out the positions each of the respondents holds in his/her company, a question on status in organization was posed and out of the 600 respondents, 40.3% said they were senior staffs, 20.8% said they

were associate partners, 18.8% said they hold the position of director/principal partner, 14.2% said there are just trainee/internship personnel while the remaining 5.8% were junior staff and this is evident in the table 4.

6 What are the critical performance variables in assessing contractors (construction industry) performance in Ghana?

Respondents were surveyed on several criteria that are used for measuring performance and related causes and which they believed could bring improvement in the Ghanaian construction industry. Such criteria as identified were: cost criteria, time criteria, quality criteria, managerial criteria, innovation and learning criteria, environmental impact assessment criteria and project execution efficiency criteria. Responses that were obtained on each of the aforementioned criteria have been carefully analyzed in the following sub-sections.

The study reveals that the cost efficiency on the whole in the industry is a good one. 79% of the respondents considered the cost efficiency of operations in the construction as either good or excellent. While 51.3% of the 79% respondents said the cost efficiency was good, another 27.7% of the 79% of respondents said that cost efficiency was excellent.

Furthermore, all 83% of respondents agreed that the timely completion of projects in the construction industry was either good or excellent. This gives an indication that on the whole projects undertaken in the construction industry are completed in a timely fashion. In specific terms, 56.2% of respondents indicated that the timely completion of projects in the construction industry. Another 26.8% of respondents considered the timely completion of projects as excellent.

Again, it was important to measure the level of task accomplishment by the construction industry. The results in the table below give an indication that tasks performed in the construction industry have a high rate of accomplishment. The results of the table show that 61.8% of the respondents indicated that the rate of task accomplishment in the industry could be considered as good. Another 18% of the respondents indicated that the rate of task accomplishment in the construction is excellent.

The quality of completed projects as a measure of performance in the construction industry was also explored. The general response by respondents suggests that the quality of completed projects in the construction industry is performing well. 50.7% of the respondents indicated that the quality of completed projects was "Good". Another 34.7% of the respondents indicated that the quality of completed projects in the construction industry was excellent.

In addition, the measurement of performance with respect to job satisfaction revealed that 47.3% of respondents indicated that job satisfaction performance measurement was good. Also another 40% of the respondents indicated that the job satisfaction measurement performance was excellent for the respective construction firms that they worked with. On the whole the job satisfaction performance of the construction seems to be doing very well.

Finally, in response to performance measure of the construction industry with respect to operating efficiency, respondents were asked to rate the performance of their firms on the basis of their operating efficiency. The results reveal that 49.3% of respondents thought that the operation efficiency was good while a further 40.5% of respondents indicated that the operating efficiency of their firms was excellent. On the whole the operating efficiency of Ghanaian construction firms is high.

7 Analysis of factors influencing performance measures in construction industry in Ghana.

Criteria for Measuring Success or Failure

Out of the 600 respondents 349 chose cost as their criteria for measuring success or failure. Out the same number 339 agreed that time is their criteria, another 464 also chose quality while 387 agreed that client satisfaction was their criteria. In essence, it was observed that quality and client satisfaction is 77.3%, were the predominant criteria for success or failure in the construction industry.

Non-Traditional Criteria for Measuring Success or Failure in Construction Projects

Out of the 600 respondents, 369 chose knowledge creation as a non-traditional criteria for success or failure of their projects; 329 chose business success; 395 agreed that innovation and learning was their non-traditional criteria; 395 agreed to financial/commercial success, 323 chose future perspective, 443 agreed that project execution efficiency, 344 agreed to market impact, 266 chose managerial, 274 chose personal growth, 279 agreed that completeness of design was a criterion,416 chose meeting design goals; 341, 309, 296 chose benefit to end user, benefit to national infrastructure and environment impact assessment respectively.

Majority of the respondents therefore agreed that project execution agreement and meeting of the design goals are the criteria. However generally more than half of them agreed to all the criteria.

Criteria for Assessing Performance and Related Causes

Respondents were surveyed on several criteria that are used for measuring performance and related causes and

which they believed could bring improvement in the Ghanaian construction industry. Such criteria as identified were: cost criteria, time criteria, quality criteria, managerial criteria, innovation and learning criteria, environmental impact assessment criteria and project execution efficiency criteria. Responses were obtained on each of the aforementioned criteria have been carefully analyzed in the following sub-sections.

Cost Criteria

More than 70% of respondents indicated that both factors as being pertinent criteria when considering cost in the construction industry. Other factors considered by respondents as being relevant in the cost criteria included variation, fluctuation costs and costs in relation to the environment. About 60% of respondents indicated these cases as being a part of the cost criteria in the construction industry. Other factors such as corruption, accident costs and dispute costs were not considered by respondents as costs criteria. Less than 45% of respondents indicated issue such as cost criteria in the construction industry.

Time Criteria

The two most important time criteria are time for arrival of supplies (74.5%) and actual times for completion of planned activities as against schedule (72.2%). 68% of respondent on time for evaluation and certification, 64% respondent on actual times for site meetings as against estimated, 60.3% respondent on actual time for honouring certificates as against agreed, 59.5% respondent on actual commencement time, 59.0% respondent on times for inclement weather, 53.0% of respondents on variation between estimated and actual completion time, 50.3% respondent on dispute resolution time, 46% respondent on times for industrial activities/strikes, 45% respondent on times taken by accidents and injuries, 43.8% on time for addressing environmental issues and 37.7% respondent on times for rework.

More than 70% of respondents indicated both of them as influential time criteria in the construction industry. Time for evaluation and certification, actual time for honouring certificates as against agreed and actual times for site meetings as against estimated were other factors that were considered by a pretty large percentage specifically above 60% of respondents as being important factors to consider in the time criteria. The time for rework was considered by only 37.7% of respondents as being an important time criteria.

Quality Criteria

Factors that measured quality were investigated to find out which of them would be appropriate to serve as quality criteria. Records of material tests, records of service tests and records of engineers' or architects' approvals were all factors that respondents indicated were important criteria for quality.

More than 80% of respondents indicated each of them as imperative as quality criteria. Also more than 70% of the respondents indicated records of engineers' disapprovals and technical specifications for variations as important criteria for measuring quality in the construction industry. Also 63.7% and 65.8% representing significant percentages of respondents indicated that records of variations orders and variation between original design and actual completed work respectively as being important criteria to consider in measuring of quality in the construction industry. The number of reworks was the only dimension which was considered by a comparatively smaller percentage, specifically 40.3% of respondents as not serving as an important quality criteria.

Managerial Criteria

Communication with team and workers was identified by majority of respondents (82.5%) as the most important managerial criteria for performance assessment in the industry. Budget management, decision making procedures, communication and reports and configuration control were other factors that respondents felt were also highly pertinent for management criteria in the construction industry.

More than 70.0% of all the respondents who answered the questionnaire indicated that these four factors were important management criteria. On the other hand two other services, architectural and engineering services were not considered by respondents as relevant management criteria. Less than 1% of the respondents attested to these services as management criteria.

Innovation & Learning Criteria

Innovation in the construction industry was explored to come up with various aspects that could be considered as criteria for determining innovation in the industry. Several dimensions of innovation were considered. Uniqueness of the project was considered by a large percentage of the respondents as an important criterion for innovation.

It was observed that 85.7% of the respondents considered uniqueness of the project as an innovation criterion. Innovation resulting from disputes and those resulting from external environmental issues were not considered as part of the innovation criteria. Less than 45% of respondents indicated either of them as forming

part of the innovation criterion. Innovation resulting from site conditions, contract peculiarities and build abilities were tipped by respondents as important criteria for innovation in the construction industry.

Environmental Impact Criteria

The exploration of the criteria that measure the construction industry's impact on the environment revealed that the nature of waste handling by construction firms in the industry was an important criterion for the impact of construction on the environment.

It was observed that, 90.7% of respondents indicated construction waste handling as an environment criterion. 54.8% of respondents indicated records of EPA departments as an environment criterion. 63.0% of the respondents also indicated records of communal/societal complaints regarding environmental issues as important environment criteria.

Project Execution Criteria

Various dimensions under the project execution criteria used were explored to ascertain which of them was considered by most respondents as contributing significantly to the project execution criteria. Site organization was cited as an important criterion for project execution.

89.2% of the respondents indicated it as a project execution criterion. The number of reworks and the extent of reworks were considered are by respondents as not being important criteria for project execution. Only 39.7% and 45.8% of respondents indicated number of reworks and extent of reworks respectively as criteria for project execution. A considerable percentage of respondents specifically, 78.0% felt like contractors' diligence to work was an important criterion for project execution.

8 To what extent does each performance measure affect performance outcome correlation?

The researcher sought respondent's views on the four types of culture that have been espoused in this research work namely; competitive culture, entrepreneurial culture, bureaucratic culture and consensual culture. The questions were coded on a five point likert scale with strongly disagree as minimum through to strongly agree as maximum.

As observed from the study, the average response to questions on the four different types of culture is approximately 4.0. This indicates that respondents agree (as agree is coded as 4 on the scale) to a large extent that these cultures are exhibited in the construction industry in Ghana. That is to say that the Ghanaian construction firm is competitive, bureaucratic, consensual and also very entrepreneurial.

Correlation between Performance Variables and Organizational Cultures

It is desirable to test as to whether or not there is a relationship between the performance measure variables (i.e. cost effectiveness, timely completion of projects, task accomplishment, quality of completed projects, job satisfaction, operating efficiency and customer satisfaction) and the types of culture.

The results from the study indicates that there is a positive correlation between all the performance measures and all the culture types. This is revealed in the positive Pearson correlation value. Again, all the correlation coefficients are significant at the 5% significance level as all p-values are less than 5% (or 0.05).

Regression Analysis

It has been noted that whiles correlations are a useful research tool for examining the relationship between variable, they provide little information about the predictive power of the individual variables. Because regression modeling provides the means of assessing the predictive ability of individual variable, multiple regression was applied to the data to try and model the relationship between the performance variables and culture types. The aim is also to identify the cultural variables with the most predictive power for each measure of performance. The results are presented as follows:

Regression of Cost Effectiveness on Organizational Cultures

To identify which factors influence cost efficiency, multiple regression analysis was applied to the data with all four types of culture included as predictors and cost effectiveness as the outcome variable. The value of the adjusted R^2 (R-square) for the model generated is 0.061, implying that the four cultures identified in this work account for 6.1% of the variation in cost effectiveness in the construction industry in Ghana.The ANOVA which tests whether or not the model is a useful predictor of cost effectiveness gives a highly significant result (0.000), indicating that this model significantly improves the prediction of cost efficiencies.

The results provides the actual parameters of the regression model give an indication that the entrepreneurial and bureaucratic cultures should be dropped from the model as they do not make a significant contribution to the model. This is because the p-values of their coefficients are greater than the significance level of 0.05.

In other words, it is the competitive cultural parameters (such as; the organization is goal demanding, the company aspires to achieve market superiority, making profit is the firm's goal etc.) and the consensual cultural parameters (such as; loyalty is required of employees, personal commitment is important to the firm, the company prefers team work and self-management, the firm desires to have social influence etc.) that have enough predictive ability to determine cost efficiency in the industry.

In order to determine an appropriate model that could predict cost effectiveness in the industry, the regression analysis is run again, this time without the inclusion of the entrepreneurial and bureaucratic cultures in the model. The following on Table 5 is the result of that analysis:

Table 5: Regression analysis for cost effectiveness

R	0.246	Adjusted R^2	0.057
R^2	0.060	Std. Error	0.720

Analysis of variance	**Sum of Sq.**	**df**	**Mean Sq.**	**F**	**Sig**
Regression	19.898	2	9.949	19.179	0.000
Residual	309.700	597	0.519		
Total	329.598	599			

Variables in equation	**B**	**Std. Error**	**Beta**	**t**	**Sig**
Constant	2.440	0.268	0	9.107	0.000
Competitive culture	0.230	0.055	0.176	4.162	0.000
Consensual culture	0.177	0.062	0.121	2.855	0.004

Again, the ANOVA which test the overall significance of the model is significant (0.000) which reveals that the second regression analysis is useful. In effect, a prediction model for cost efficiency or cost effectiveness in the construction industry of Ghana, as determined by the results on Table 5 is summarized as:

Cost effectiveness (Ce) = 2.440 + 0.230*Competitive culture + 0177*Consensual culture

Regression of Timely Completion of Projects on Organizational Cultures

Table 6: Regression analysis for timely completion of projects

R	0.301	Adjusted R^2	0.084
R^2	0.091	Std. Error	0.732

Analysis of variance	**Sum of Sq.**	**df**	**Mean Sq.**	**F**	**Sig**
Regression	31.705	4	7.926	14.803	0.000
Residual	318.589	595	0.535		
Total	350.293	599			

Variables in equation	**B**	**Std. Error**	**Beta**	**t**	**Sig**
Constant	1.971	0.293	0	6.720	0.000
Competitive culture	0.226	0.061	0.167	3.705	0.000
Entrepreneurial culture	0.103	0.063	0.075	1.629	0.104
Bureaucratic culture	-0.034	0.052	-0.028	-0.655	0.513
Consensual culture	0.235	0.068	0.156	3.485	0.001

The correlation analysis presented on Table 6 indicates that all four dimensions of culture have some amount of positive correlation with timely completion of projects in the industry. To determine which of these cultures actually influence timely completion of projects in the industry, the linear regression analysis is performed with all four culture types included as predictors in the model.

The results show that the regression analysis performed is significant. However, the "variables in equation" section of the table gives an indication that entrepreneurial culture and bureaucratic culture are not predictive enough. Their significance values fail to meet the significance criteria of less than 0.05. As a result, they have to be dropped from the model.

A more robust regression analysis is performed again. This time with competitive culture and consensual culture as the only predictors in the model. This is shown in Table 7

Table 7: Regression analysis for timely completion of projects

R	0.294	Adjusted R^2	0.083
R^2	0.086	Std. Error	0.732

Analysis of variance	**Sum of Sq.**	**df**	**Mean Sq.**	**F**	**Sig**
Regression	30.189	2	15.094	28.151	0.000
Residual	320.104	597	0.599		
Total	350.293	599			

Variables in equation	**B**	**Std. Error**	**Beta**	**t**	**Sig**
Constant	2.040	0.272	7.487	0.000	
Competitive culture	0.254	0.056	0.188	4.516	0.000
Consensual culture	0.255	0.063	0.169	4.050	0.000

As observed from Table 7, the regression analysis gives a significant ANOVA of (28.151, 0.000) which is even more powerful and predictive then former of 14.803, 0.000 as observed from Table 7. The model could be fitted as:

Timely Completion of Projects (Tcp) = 2.040 + 0.254*Competitive culture + 0.255*Consensual culture

The model presents an adjusted R^2 (R-square) value of 0.083 which means that about 8.3% of variations in project completion times in the Ghanaian construction industry is attributable to competitive cultural parameters (such as; the organization is goal demanding, the company aspires to achieve market superiority, making profit is the firm's goal etc.) and the consensual cultural parameters (such as; loyalty is required of employees, personal commitment is important to the firm, the company prefers team work and self-management, the firm desires to have social influence etc.)

One could say that there are many other factors that determine project completion time in the industry than the four dimensions of culture espoused.

Regression of Task Accomplishment on Organizational Cultures

It is the desire of the researcher to determine whether or not all four dimensions of culture as described in this section is predictive of task accomplishment by contractors in the industry.

The multiple linear regression in SPSS is again employed with all four culture types included as regressors in the model. Table 1.8 indicates the regression analysis for task accomplishment.

Table 8: Regression analysis for task accomplishment

R	0.315	Adjusted R^2	0.093
R^2	0.099	Std. Error	0.677

Analysis of variance	**Sum of Sq.**	**df**	**Mean Sq.**	**F**	**Sig**
Regression	30.133	4	7.533	16.429	0.000
Residual	272.826	595	0.459		
Total	302.958	599			

Variables in equation	**B**	**Std. Error**	**Beta**	**t**	**Sig**
Constant	1.821	0.271	0	6.707	0.000
Competitive culture	0.223	0.056	0.178	3.963	0.000
Entrepreneurial culture	0.031	0.059	0.024	0.523	0.601
Bureaucratic culture	0.058	0.048	0.052	1.212	0.226
Consensual culture	0.225	0.063	0.160	3.604	0.000

As observed from the Table 8 indicates that the model is significant as the ANOVA presents a significant value of (16.429, 0.00). The adjusted R^2 value of 0.093 means that the model explains about 9.3% of variations in task accomplishment.

That notwithstanding, the "variables in the equation section" which is used to determine coefficients of independent variables and their relevance in the model reveals that the entrepreneurial and bureaucratic cultures do not have significant coefficients. That is to say that they cannot effectively predict task accomplishment parameters in the model. They have insignificant coefficients of (0.031, 0.601) and (0.058, 0.226) respectively. Consequently, they would have to be dropped from the model.

A new regression analysis is performed as such without the inclusion of entrepreneurial and bureaucratic cultures in the model. Table 9 gives the results of the regression analysis.

Table 9: Regression analysis for task accomplishment

R 0.311 Adjusted R^2 0.093
R^2 0.096 Std. Error 0.677

Analysis of variance	Sum of Sq.	df	Mean Sq.	F	Sig
Regression	29.230	2	14.615	31.875	0.000
Residual	273.728		597	0.459	
Total	302.958		599		

Variables in equation	B	Std. Error	Beta	t	Sig
Constant	1.958	0.252	0	7.772	0.000
Competitive culture	0.247	0.052	0.197	4.749	0.000
Consensual culture	0.255	0.058	0.181	4.369	0.000

The ANOVA value of (31.875, 0.00) observed in Table 9 shows that the regression model is significant and is also an improvement of the earlier one on Table 9. The regression equation is fitted as follows:

Task Accomplishment (Ta) = 1.958 + 0.247*Competitive culture + 0.255*Consensual culture

The adjusted R^2 value of 0.093 means that the model accounts for 9.3% of total variations in task accomplishment in the Ghanaian construction industry.

Regression of Quality of Completed Projects on Organizational Cultures

Another multiple linear regression analysis is performed to determine which of the four dimensions of culture can be effective predictor of the quality of completed projects in the industry. The result of this analysis which is summarized in Table 10 below shows that the model is significant.

Table 10: Regression analysis for quality of completed projects

R 0.344 Adjusted R^2 0.112
R^2 0.118 Std. Error 0.719

Analysis of variance	Sum of Sq.	df	Mean Sq.	F	Sig
Regression	41.156	4	10.289	19.908	0.000
Residual	307.509	595	0.517		
Total	348.665	599			

Variables in equation	B	Std. Error	Beta	t	Sig
Constant	1.925	0.288	0	6.680	0.000
Competitive culture	0.177	0.060	0.131	2.952	0.003
Entrepreneurial culture	-0.144	0.062	-0.105	-2.307	0.021
Bureaucratic culture	0.164	0.051	0.136	3.222	0.001
Consensual culture	0.362	0.066	0.240	5.459	0.000

From the Table 10, the ANOVA which test the overall significance of the model is seen to be very significant at the 5% significance level with a coefficient of (19.908, 0.000)

Unlike the other regression models obtained from Table 9, this one has all four predictors being very significant in the model. The "variables in equation" section has all five coefficients being significant at 5%. This means that all four dimensions of culture are collective important in the determination of the quality of projects in the industry. They are therefore included in the model as following:

Project Quality (Pq) = 1.925 + 0.177*Competitive culture – 0.144*Entrepreneurial culture + 0.164*Bureaucratic culture + .362*Consensual culture

The model (with adjusted R^2 value of 0.112) can account for 11.2% of variations in the quality of completed projects in the industry.

Regression of Job Satisfaction on Organizational Cultures

In addition, there is also the regression of culture dimensions on job satisfaction amongst players in the industry. This analysis seek to determine whether there is any causal relationship between the four dimensions of culture and job satisfaction in the industry.

Similarly, all four dimensions of culture are included as predictor in the model. The results are shown below in Table 11.

Table 11: Regression Analysis for Job Satisfaction

R 0.404 Adjusted R^2 0.157
R^2 0.163 Std. Error 0.718

Analysis of variance	Sum of Sq.	df	Mean Sq.	F	Sig
Regression	59.679	4	14.920	28.955	0.000
Residual	306.581	595	0.515		
Total	366.260	599			

Variables in equation	B	Std. Error	Beta	t	Sig
Constant	1.291	0.288	0	4.486	0.000
Competitive culture	0.308	0.060	0.224	5.163	0.000
Entrepreneurial culture	0.131	0.062	0.093	2.103	0.036
Bureaucratic culture	0.190	0.051	0.154	3.739	0.000
Consensual culture	0.120	0.066	0.078	1.810	0.071

The "variables in equation" section determines with parameters are suitable for inclusion in the model. All four cultural dimensions were seen as important determinants of quality of completed projects in the industry, it becomes however not far-fetched to see all four dimensions as important determinants of job satisfaction. There is therefore a connection between quality of completed projects and job satisfaction in the industry.This is obvious because contractors are satisfied with quality projects.
The regression model is expressed as:
Job satisfaction (Js) = 1.291 + 0.308*Competitive culture + 0.131*Entrepreneurial culture + 0.190*Bureaucratic culture + 0.120*Consensual culture.
It could as well be said that an appropriate mix of all four culture dimensions is key in determining both job satisfaction and quality of projects in the industry.

9 What are the major challenges contractors in Ghana faced?
According to Shakantu (2003) High poverty levels corruption siphons off goods and money intended to alleviate poverty. Stansbury 2006 provides features of construction projects that are particularly prone to corruption:

Size of projects-:While construction projects vary in scale, infrastructure projects in particular are often huge. The costs of dams, power stations, industrial plants and highways can run into billions of dollars. It is easier to hide large bribes and inflated claims in large projects than it is in small projects.

Uniqueness of projects-: The fact that many major construction projects are one off makes costs difficult to compare, which in turn makes it easier to inflate costs or hide bribes.

Government involvement-:Most infrastructure projects are government owned. Even privatized projects require government approvals for planning or agreements to pay for end-product use. The industry tends to be heavily regulated at both national and local government level. Numerous permits are often required. Where there are insufficient controls on how government officials behave, their power– combined with the structural and financial complexity of the projects – makes it relatively easy for officials to extract bribes.

The number of contractual links-*:* While there are numerous variations to the project structure outlined above the contractual cascade could easily have more than 1,000 links, each depending on other contractual links in the chain. Every single link provides an opportunity for someone to pay a bribe in exchange for the award of a contract. In addition, work and services are exchanged for payment in relation to every contractual link. Every item of work and every payment provide further opportunities for bribes to be paid in return either for certifying too much work, certifying defective work, certifying extensions of time or paying more expeditiously.

The number of phases makes project oversight difficult.Projects normally have several different phases, each involving different management teams and requiring handovers of the completed phase to the contractors undertaking the next phase. For example, a power station project may have the following phases: demand determination, choice of type (hydroelectric, coal, oil, and gas), design, excavation, foundations, and civil works, building works, equipment manufacture, equipment erection, commissioning and operation. Even if a single contractor undertakes all the project's phases, it will normally subcontract different elements of the task to individual subcontractors, which creates difficulties in control and oversight.

The complexity of projects-:Because of project complexity, the interrelationship between contractors and events is often uncertain. People working together on a project frequently appear not to know, or to disagree upon, the reasons why something has gone wrong, or why costs overrun. This makes it easier to blame others

and to claim payment, even when such claims are unjustified. Bribes and inflated claims can easily be hidden and blamed on other factors, such as poor design or mismanagement. Complexity also generates reasons to pay bribes since decisions on cause and effect and their cost consequences can have an enormous impact.

Lack of frequency of projects-: Major projects come at irregular intervals. Winning these projects may be critical to the survival or profitability of contractors, which provides an incentive to contractors to bribe.

Work is concealed-*:* Most components in construction end up being concealed by other components. Structural steel may be concealed by concrete, brickwork by plaster, engineering components in casings, and roof structures by cladding. The industry places an enormous dependence on the individuals who certify the correctness of the work done before it is concealed; once an item is concealed, it can be very costly or difficult to check if it was completed to the required standard. This cost and difficulty creates an incentive for contractors to do defective work or use inferior materials and to bribe the relevant official to certify that the work was done according to specification.

A culture of secrecy-: There is no culture of transparency in the construction industry. Costs are kept secret even when it is public money that is being spent. Commercial confidentiality takes precedence over public interest. The routine inspection of books and records that might uncover malpractice does not normally occur.

Entrenched national interests-*:* Local and national companies often have entrenched positions in their own market. These positions have often been cemented by bribery. International companies seeking to enter these markets may find it impossible to win work unless they pay a bribe.

No single organisation governs the industry-: Construction brings together a wide range of professions, trades and specialist contractors, leading to varying standards of skill, integrity and oversight. The professions include architects, engineers, surveyors, accountants and lawyers; and the trades include machine operators, scaffolders, bricklayers, electricians and plumbers. Contractors' skills range from excavation to insulation and from generators to cooling systems. Each profession or trade may have a different professional association, with different codes of conduct and levels of enforcement of these codes. No single organisation has overall responsibility.

Lack of 'due diligence'-: The scale of funds involved in major infrastructure projects places great influence in the financing bodies that determine whether a project goes ahead, and which companies win the contracts. Commercial banks and global or regional development banks provide most of the funds; while government sponsored export credit agencies may underwrite risky international projects. Their frequent lack of due diligence on participants in construction projects allows corruption to continue.

The cost of integrity-: It is striking how many people working in the construction sector either accept the status quo, or makes no attempt to change it. Bribery and deceptive practices are so engrained that they are often accepted as the norm. Bribery is frequently a routine business cost that many companies expect to include in the contract price. The fact that so many businesses in construction routinely pay bribes or engage in deception makes it very costly for any one company to act with integrity since that company would risk losing out to its less scrupulous competitors. As a result, many companies find themselves in a vicious circle in which they engage in corruption

Conclusion:

In summary, it has been established that the respondents agree to a large extent that the Ghanaian construction industry exhibit all four dimensions of culture namely; competitive, bureaucratic, consensual and entrepreneurial cultures.

In addition, a significant positive relationship was identified to exist between all performance measurement variables (namely; cost effectiveness, timely completion of projects, task accomplishment, quality of completed projects, job satisfaction, operating efficiency and customer satisfaction) and all four dimensions of culture. For this reason, one could say that an effective blend of the four culture types is likely to have a positive impact on performance in the construction industry.

With recourse to the results obtained per the correlation analysis, the researcher sought to use regression analysis to further investigate as to how these cultural dimensions influenced each performance indicator. Stated differently, which cultural dimension had significant influence on each performance indicator?

In this regard, it was identified, that, all four dimensions of culture had significant influence on the quality of completed projects (or project quality) and job satisfaction amongst contractors. Contractors are

satisfied whenever completed projects are of top rated quality. And this depended on a good mix of all four cultural dimensions.

On the contrary, however, the analysis showed that cost efficiency, task accomplishment and project completion time depended significantly on just two cultural dimensions – competitive and consensual. Customer satisfaction largely depended on consensual and entrepreneurial cultures whereas operating efficiency depended on consensual, entrepreneurial and bureaucratic cultures.

Finally, all four cultural dimensions are significant for proper project execution and general performance in the construction industry of Ghana.

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