Effect of Contractors' Human Capacity on Performance of Road Implementation in Twifo Atti Morkwa District

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Abstract
The performance of road construction projects in Ghana is marred by a slew of issues that harm the contracting parties. The purpose of this study was to investigate the effect of contractors' human capacity on Performance of road implementation in Twifo Atti Morkwa District. The hybrid methodology used in this study combines qualitative and quantitative research techniques. Quantitative data supported the results of thematic analysis, which was used to analyse qualitative data. To ascertain the connection between the dependent and independent variable, regression analysis was also used. Human Capacity was determined to be critical for performing the numerous operations required to ensure that the overall project met the established standards and requirements. The results showed that better project implementation techniques, staff efficiency, work experience and knowledge of prior experience, and contractor training levels all had a significant impact on the performance of road projects. It is obvious that, there is a connection between contractors' human capacity and the performance of road projects thanks to model summary values of R=0.715, R-square=0.511, and adjusted R-square=0.485. Furthermore, contractors' human capacity can be held responsible for 72% of changes or variations in the implementation of road projects. Human capacity, according to the study, must be improved in order to ensure quality road project implementation and timely completion of road construction projects.
Keywords: Contractor, Human capacity, Performance

1. Introduction
Any country's development depends on the construction industry, and a country's economic progress may be gauged by how well its physical infrastructure, such as its buildings, roads, and bridges, have progressed (Ofori, 2015). Aje, odusuami and ogunsemi (2009) reported that the construction industry is a major driver of every nation's economy, and that it has contributed significantly to the growth of Gross Domestic Products. The World Bank (2011) noted that lack of infrastructure that supports green and inclusive expansion will put a country in a tough position not only meet its basic needs but also struggle to become competitive.

In Africa, road infrastructure is one of the major sectors that is predicted to revolutionise failing economies, and provide economic prosperity. It has been argued that building a planned, continuous road network across the entire country will have a significant impact on the economy because it will open up opportunities for interconnection with neighbouring nations and within the nation itself, supporting the growth of industries and agriculture (Danso & Antwi 2012; Ofori-Kuragu, Baiden & Badu 2016). As a result, the success of the road industry is a basic concern for majority of governments and communities throughout Africa, and in particular Ghana.

Globally, stakeholders establish a common roadmap for carrying out the projects before the road projects are put into action. Different geographical regions have different methods from which predetermined criteria are employed in construction. For instance, American Standards are utilized in the United States, Indian Standards serve as a baseline for construction in India, and European Norms are frequently used to establish standards for the design of highways and bridges (Schoon, 2000).

As a basis for uniformity and as a guide for practicing engineers, international practice on the implementation of infrastructure projects requires that various road features be designed based on the specified standards. The unique conditions used to create contracts and agreements with contractors carrying out the road work will be based on the regional standards in use (Osei 2013; Tefe & Jones 2013).

According to Pheng's definition from 2006, a project is successful when it is finished on schedule, on budget, and with the desired quality, as well as when the client is satisfied. The success of a project can be measured by how well its indicators perform. Regardless of its complexity, scale, or setting, Chan (2002) argued that a construction project is deemed successful if it is finished on schedule, under budget, and to a satisfactory level of quality. Performance in building, however, is influenced by a wide range of unforeseen circumstances. Construction performance is influenced by contractual obligations, resource availability, environmental factors, and party performance (Alaloul, Liew, & Zawawi, 2016).

One of the frequently studied subjects in construction industry research is the qualifications of contractors. However, the question of how well contractors perform and whether projects are successful is still largely

unresolved and warrants further research (Mbachu, 2008: Dadzie, Abdul-Aziz, & Kwame, 2012). Every construction project is different, and each one entails particular hazards and complications throughout the course of the project. Modern construction projects are becoming more complicated in their designs and involve a large number of stakeholders, which presents new obstacles for both customers and contractors in matching the necessary skills and competencies to complete the project successfully. The success of a contractor on a project depends on a variety of underlying factors, including project complexity, technical proficiency and human capacity. Consequently, choosing the correct contractor through a thorough prequalification process is a crucial first step in assuring the success of potential projects (Arslan et al., 2008).

1.1 Statement of the Problem
The size of the financial investments governments make in road construction and the number of people they employ give a good indication of how important road projects are, particularly in Ghana. According to the World Bank (2011), Sub-Saharan Africa spends an average of $1.8M of its GDP on roads, which is a reasonably high percentage. In Nigeria, the construction sector contributes over 16.0% of the country's GDP and employs about 25% of the labor force (Ayangade, Wahab, and Alake, 2009). In Ghana, the same is true (Danso and Antwi 2012; Ofori-Kuragu, Owusu-Manu, and Ayarkwa 2016; Osei 2013; Tefe and Jones 2013). According to the Road Sector Investment Plan 2010–2024, Ghana has made significant investments in infrastructure. Around 7% of the gross domestic product in Ghana is contributed by the construction sector (Tefe and Jones, 2013).

The performance of road construction projects in Ghana is plagued by numerous issues that have detrimental effects on the contracting parties. The difficulties range from inefficient use of finances for road projects, completion delays along with poor service delivery to road users, and an excessive reliance on foreign contractors for large-scale projects that require technical expertise. Furthermore, the contractors' performance management procedures for road projects are inadequate, and unethical behavior is widespread. Numerous reliable reports and empirical research have identified these issues as well as their connections to the contractors that have been hired and their capacity (Ministry of Transport, 2011).

Agyeman, and Ampadu, (2016), provided evidence showing that despite investing in training, implementation and maintenance in the Ghanaian construction industry, the construction projects still do not meet key performance criteria, which is the strongest indication that, lack of capacity by contractors has contributed to this dire situation in road construction in Ghana. Government of Ghana incurred a total road fund of GH¢1,023,118,781.22 from January to September in 2017, GH¢139, 3753,839.00 in 2020 and GH¢4.8billion in 2021 (Ayeh-Paye, 2019). According to the Ministry of roads and highways medium term expenditure framework 2019-2022, GH¢217,236,492 was allocated each year for road construction, rehabilitation and maintenance between the periods of 2019 to 2022 (Ministry of Roads and Highways, 2019).

Similarly, Ministry of Roads and Highways annual report (2011) indicated that, in 2011, Ministry of roads and transports invested GH¢1,500,000 on Twifo Praso –Dunkwa road. In 2015, Twifo Praso-Dunkwa road project was awarded to MAWUMS construction limited and the stipulated time for the project completion was 18months. This project exceeded its timeline and it is currently on going as at 2023 by different contractors (Ministry of roads and highways 2023).

These investigations mostly looked into the contractors' resources, construction technology and processes, and management strategies employed by the contractors (also see Badu et. al, 2012). The investigations fell short of fully evaluating the contractors' human capacity and providing an authoritative justification for the glaring performance differences in road construction; this study fills that gap

1.2 Purpose of the Study
The purpose of the study was to examine the effect of Contractors' Human Capacity on the performance of road implementation in Twifo Atti Morkwa District, Ghana. The hypothesis used for the study was;
H0: There is no relationship between human capacity and performance of road implementation in Twifo Atti Morkwa District.

2. Literature Review
2.1 Human Capital Theory
The Human Capital Theory proposed by Schultz (1961) and propounded by the Nobel prize-winning economist Gary S. Becker in his seminal work on the economics of employer provider training (1962, 1964). The human capital theory is based on the assumption that education or training provide workers with knowledge and skills which increase their productivity and income (Becker, 1964). Becker makes a distinction between specific and general human capital by affirming that, education and training obtained for a specific firm is termed as specific human capital, whereas education and training valuable across board is a general human capital. This assertion was supported by Bohlander et al. (2001) and they defined human capital as the individual knowledge, skills and capacities that have economic worth to an organization. Similarly, the Organisation for Economic Cooperation and

Development (OECD, 2001) defined human capital as the knowledge, skills, abilities and traits embodied in individuals that promotes creation of personal, social and economic wellbeing.

However, Smith (1937) criticized the human capital theory arguing that the theory is too simple to analyze employee's productivity and education alone cannot promote organizational productivity but must be complemented with other factors. Additionally, Levin and Kelley pointed out that economist and other social scientist focus solely on the benefits of education while ignoring other factors such as training, contract terms and management practices that must exist to improve productivity. According to Thurow (1975), employers use education credentials to select their employees since better educated employees can easily be trained for a specific task at a lower cost than less educated people. Furthermore, Spence (1973) argued that education may simply be a market indication of employee's potential productivity since firms have options for determining a worker's productive traits. Despite these critiques Becker's human capital theory continue to be the primary theoretical construct for understanding human capital investment both from the individual and firms' perspective (Bassi &McMurrer, 2006).

The human capital theory is applicable to this study since it explains how training can be a primary mechanism by which a human capacity is developed. Developing the capacity of contractors will equip them with knowledge and skills to meet road quality requirement, reduce schedules and ensure effective planning and implementation of road projects.

2.2 Human Capacity

Human capacity is widely recognized as being intertwined with education, training, and human resource development. In recent years, the traditional paradigm has evolved into a broader and more holistic view that encompasses both institutional and country-specific initiatives (William, Rajabifard &Feeney, 2003). Basic education according to Aniekwu and Ozochi (2010) improves people's capacity to learn and interpret information while higher education increases the technical training required to develop a workforce capable of keeping up with constant stream of technological improvement which compress product cycles and accelerate the depreciation of human capital in industries like construction. Recognizing these benefits, many countries have made significant progress in increasing enrollment at all levels of education with several making primary and secondary education universal. Clearly Karthik and Rao (2019) affirmed that, massive investment in tertiary education enabled East Asian countries to maintain their new industries, sustain their technology adoption strategy and provided the basis for their later growth. Similarly, as workers learn better methods to use new technology, coordinate production and monitor product quality, training can lower the unit cost of production. Supportively, United Nations Committee of Experts on Public Administration [UNCEPA], (2006) opined that, individual who are engaged in the process of learning and training can easily adapt to change in an organization.

Hansson et al. (2003) cited in Bassi and McMurrer (2007) conducted a thorough review of literature to determine the impact of investment on human capacity development at the firm level in European countries and revealed that training generates substantial gains for employers. Tamkin et al. (2004) further found out that firms with high productivity are usually associated with better educated workforce, high level of training and the age of the labour force. Similarly, Amron (2009) revealed that age of workforce is sufficient to determine the success of a firm thus; old workers have weak and limited physical strength where as young workers have strong physical abilities. He recommended that; the age of a person should be an important selection criterion for every growing firm.

Several studies conducted in the United States (Buckingham and Coffman, 1999; Low and Kalafut, 2002; Pfau and Ira, 2002) concluded that, human capacity is directly related to firm's present and future performance, high financial performance, employee retention, customer satisfaction and productivity. Certainly, there is a growing body of literature indicating that human capacity can play a vital role in increasing organization's financial performance, productivity and other key operational outcomes.

2.3 Performance of Road Projects

Early in the 1990s, a project's ability to be implemented successfully was directly related to its performance metrics, which were then linked to its goals. At the project level, cost, quality, and duration were used to measure success. Cost, quality, and project quality are collectively known as the "iron triangle" by Atkinson (1999). He asserted, however, that adopting the project management Iron Triangle—time, money, and quality—as the success criteria may have led to a biased assessment of project management success. Instead, he advocated using the Square Route, which contains four key success criteria categories—the Iron Triangle, the Information System, Stakeholder Community Benefits, and Organizational Benefits—instead of solely focusing on process-driven metrics for project management.

There are no accepted definitions for project management success, according to Shenhar and Wideman (2000). Dvir et al. (2006) also drew this conclusion from their observation that different projects have different project success factors, so there are no universal project success factors that apply to all projects. According to Lim and

Mohamed (1999), a project is only successful when its goals are met. Project success is frequently seen as a binary outcome: either the project was successful or it failed (Kam and Muller, 2005). The micro and macro perspective, which approaches project success from a new angle, was proposed by Lim and Mohamed in 1999. The macro view encompasses the operational component of projects and focuses on long-term customer satisfaction, while the micro view emphasizes and evaluates project management performance upon project conclusion. A similar distinction between project success and project management success was made by De Wit in 1988. De Wit (1988) emphasizes that after the project is over, the success of the project is evaluated in relation to the overall project objectives.

Additionally, other researchers thought that it was important to evaluate performance from the viewpoints of each individual contractor, employer, developer, end-user, and the broader public. Consequently, it is widely acknowledged that various projects may have unique success criteria (Dvir et.al., 1998). Every project might even have its own own set of success metrics, according to Liu (1999). Evidently, this makes it more difficult to arrive at a consensus definition of project success. Interestingly, while it is widely acknowledged that the iron triangle benefits from the inclusion of stakeholder satisfaction, a successful project must also please its stakeholders (Baccarini, 1999). According to Kam and Müller (2005), the project may appear successful from the project management perspective, but the final product may be a failure if it does not satisfy the client while still being completed within the required time, budget, and quality parameters. The line "The operation was a success, but the patient died" highlights this discrepancy even more. Therefore, in a nutshell, the two primary components of a successful project are successful project management and successful products. The definitions of successful implementation that were examined for this study provide a clear explanation of the idea of achieving and completing the intended goals. Successful implementation, for instance, is defined by BNQP (2009) as the outputs and outcomes of processes, goods, and services that permit evaluation and comparison in relation to predetermined objectives, benchmarks, historical data, and other requirements. To evaluate and measure the successful implementation of projects, a variety of concepts and metrics have been tested. Alarcon (1994) noted that the majority of these metrics prevent their evaluation against preferred benchmarks like time, cost, or production.

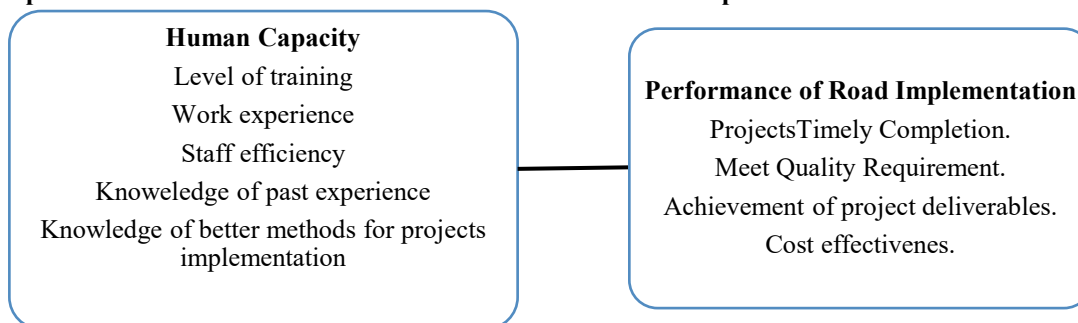**Independent Variable**   **Dependent variable**

Human Capacity

Level of training

Work experience

Staff efficiency

Knowledge of past experience

Knowledge of better methods for projects implementation

Performance of Road Implementation

ProjectsTimely Completion.

Meet Quality Requirement.

Achievement of project deliverables.

Cost effectivenes.

Figure 1: The Conceptual Framework

Source: Authors' Construct, 2023.

2.4 Empirical Review

2.4.1 Human Capacity and Performance of Road Implementation Projects.

One of the most important issues facing the development of the road sector in developing and transitional countries is the level of staff training or capacity building. Over the past ten years, almost all nations and development organizations have viewed capacity building as a crucial element of development assistance (Langaas, Odeck & Bjorvig, 2007). One of the most frequently discussed subjects in personnel research and practice is work experience. Work experience is necessary for many resource operations, including selection (Ash & Levine, 1985), training (Ford, Quinones, Sego & Sorra, 1992), and career development (e.g., Campion, Cheraskin & Stevens, 1994). There has been a significant amount of research because of the importance of work experience in project management and research, which is not surprising. Ford, Sego, Quinones, and Speer (1991) conducted a survey of the literature on work experience and found that, majority of authors' utilized tenure or duration on the job to measure work experience. On the other hand, other studies measured a person's level of experience by counting how many projects they had successfully performed. (Refer to Vance, Coovert, MacCallum, & Hedge, 1989; Lance, Hedge, & Alley, 1989) In their 2016 examination of the delays in road construction projects in Cambodia, Santoso and Soeng made several key discoveries, one of which was the poor quality of contractor human resources. A comparable study on the reasons for delays in road construction projects across 25 developing nations was carried out by Rivera, Baguec, and Yeom in 2020. They came to the conclusion that inexperienced construction managers could cause delays in the execution of road building projects.

Lack of experience and training among contractors, members of the project team, and engineering firms can

result in projects going over budget and taking longer than expected, claims WYDOT (2002). Amoatey and Ankrah (2017) investigated the crucial elements that contribute to road project delays in Ghana and discovered that inadequate contractor experience and training are some of the main reasons for implementation and delay of road construction. In order to better understand how human capacity affects the effectiveness of county road development projects, Ngaira and Malenya performed a study in Busia County in 2019. The technical staffs of road construction projects have the expertise and training that, in the long run, have had a substantial impact on the performance of county projects, the researchers found using a descriptive survey methodology and a random sample of 123 technical officers. Successful projects have been associated with the existence of a technical team as well as the level of expertise and training of the team, according to Iyer and Jha (2015). Leading the organization through the project implementation process is the responsibility of project implementers; this is a crucial role that requires a certain degree of training and expertise in order to properly support staff members through the implementation process. Companies that effectively utilize the technical expertise of their staff complete their tasks, which aids in the coordination of activities and progress toward predetermined goals and targets. According to Assefa (2021), by assuring ongoing training and development programs, technical employees can improve their technical knowledge and expertise. These skills allow technical personnel to address problems swiftly and spare the project team the expense of recruiting specialists. Technical staff can utilize their imagination to make sure their ultimate objective is accomplished.

Employees should take part in training to improve their skills with project implementation as well as the practical aspects of employing tools and equipment that help with project implementation (Zulu & Chileshe, 2010). In 2017, Amare, Quezon, and Busier (Amare, Quezon, and Busier) performed study on the reasons why road projects in Addis Abeba City Road Authority lag behind schedule during the building phase. They distributed 51 questionnaires to employers, consultants, and contractors, and found 65 reasons why road projects were delayed. Contractor workers not properly trained in professional construction management practices came in at number ten among these causes. Project execution was hampered by inadequate personnel training.

The lack of professional skill and level of experience in road engineering obstructs proper network management, resulting in high cost of road implementation as well as increased risk of road crashes, according to Nxumalo and Nordengen's (2010) study on improving human resource capacity for road network preservation.

Nianjun (2014) sent 170 questionnaires to project staff, important project implementers, and community people in order to assess the influence of socio-economic determinants on the implementation of road construction projects by chosen contractors in Nyeri south sub-county, Kenya. The results showed that 119 people, or 72.1%, had construction-related training. Additionally, it was shown that there is a strong correlation between project employee experience and training and the execution of road building projects. The findings led to the conclusion that project staff had attained construction training from Technical Training Institutes.

3. Methodology
3.1 Research Design
The study used correlational research design, which is a non-experimental research design in which the researcher focuses on determining the relationship between the variables without controlling any extraneous variables. Correlational research according to Wallen and Fraenkel (2013) is a study that aims to determine the cause-and-effect relationship between two or more variables.

3.2 Research Approach
This study also employs the mixed approach; making use of both qualitative and quantitative research approaches. The adoption of this approach is largely conditioned by the nature of the study and the expected results. This study goes beyond the description of characteristics to analyse and explain the human capacity and performance of road contractors in the Ghana, in general and the study area in specific.

Quantitative methodology has been applied through the use of a structured questionnaire, administered to key informants. The aim has been, to use some statistics to explain aspects of the study to support the human perceptions, behavior, feelings, and attitudes in greater depth. Closed ended questionnaires were administered which included all possible pre-written response categories and respondents were asked to choose among them. This approach helped in generating 'objective' numerate data, untouched by people's interpretive and reality-constructing capacities (Miller & Brewer, 2003). As it followed a set format, it was then easier to enter most responses into a computer for analysis.

3.3 Study Area
One of the twenty-two districts of Ghana's Central Region is called Twifo-Atti Morkwa District. Prior to the southeast portion of the district being divided off to become Hemang-Lower Denkyira District on June 28, 2012, it was a part of the larger Twifo/Heman/Lower Denkyira District. As a result, the remaining portion has been renamed Twifo-Atti Morkwa District. Twifo Praso serves as the district assembly's capital city. It is located in the

northwest corner of Central Region. The Upper Denkyira East Municipal serves as the district's northern border. The Abura Asebu Kwamankese District, Cape Coast Metropolitan, and Komenda Edina Eguafo Abirem Municipal serve as its southern and western and eastern borders, respectively. According to the 2021 population and housing census, there are 100,851 people living in the District, with 49,998 men and 50,853 women (Ghana Statistical Service, 2021).

3.4 Target Population
In this study, the population of consist of 2 registered contractors that work in the road sector. From the records available at the Twifo Atti Morkwa District Assembly. Other category of respondents includes 8 Engineers, 127 Technical staff (project manager, quantity surveyors etc.) in the Twifo Twifo Atti Morkwa District of Ghana. A total of 137 respondents were selected.

3.5 Sample size and Sampling procedure
The sample size that was used for this study was determined using the formula postulated by Yamane (1967). According to him, the sample size for any study can be determined using the relation; $n = \frac{N}{1+Ne^2}$ Where the parameters;n, represents the sample size,
N represents the total population
e is the margin of error (usually 0.05).
Substituting these values into the formula yields a sample size of; $n = \frac{137}{1+137(0.05)^2}$

 $n \cong 102$

The study used a mixed of probability and non-probability sampling techniques in the selection of respondents for various reasons. The study used purposive sampling (a non-probability sampling) technique to select a section of the respondents because they meet particular criteria of interest and are thought to be capable of providing a specific amount of data relevant to the achievement of the objectives of the study. Specific to this study, contractors are purposively selected. The engineers have the mandate of coordinating documentation and making sure that contractors who are sourced to implement road projects have the capacity to do so. The engineers and technical staff also have the onus of working directly with contractors to ensure that they adhere to construction standards and provisions, for the benefit of road users. Again, Simple random sampling (a probability sampling) technique is used to select research participants from the technical staff and engineers.

3.6 Data collection Instruments
To obtain data from respondents, the study used questionnaires and interview guide. The study relied on primary data sources. A semi structured questionnaire was used to collect data. Open and closed ended questions were used in this survey. Closed ended questions gathered quantitative data and had predetermined answers.

3.7 Data Analysis and Processing
Quantitative data was coded and entered into spreadsheet and analysed at 5% level of significance using Statistical Package for Social Sciences (SPSS) Version 29.000. Qualitative data was thematically analysed and the findings corroborated with the quantitative data. In addition, the researcher will use regression analysis to establish the strength of the relationship between dependent and independent variable.

4. Findings and Discussions.
Descriptive analyses entailing tables and Pearson correlation regressions were carried out and interpreted as such. The discussion also involved qualitative data collected from two interviews conducted engaging two contractors in the study area.

4.1 Socio Demographic Data of Respondents
The study took basic data on respondents including gender, age, level of education, years worked in organization among others. Table 1 is a summary of the variables, their categories, frequencies, and respective percentages.
What is outstanding is the gender of respondents. It indicates the dominance of men in the construction industry. Even though there are no laws generally restricting women from joining the construction industry, the stereotype over the years on what women can do and cannot do reflects in this work. This shortage of women in the construction industry seems not to be limited to Ghana as other studies in the UK and US for example have presented similar findings. The construction industry in the United Kingdom has a very low female participation rate. Over 11 million women are currently employed in the United Kingdom, accounting for nearly half of the labour force (Amaratunga et al., 2006). Despite advances in the number of women engaged in the construction industry over the past decade, women still make up only 9% of the labour force. This means that men will continue to dominate the construction business. It discovered that women face ranges of obstacles, ranging from difficulty

in entering the construction industry to attaining the most senior position in an organization's hierarchy (Amaratunga et al., 2006). The construction industry in the United States face labour shortage. As the current workforce ages and the demand for new workers rises, it is anticipated that building cost will increase significantly (Morello et al., 2018). This shortfall could be mitigated by encouraging more women to seek construction-related occupation. Prior studies indicate, however, that construction is an unattractive choice for women for reasons such as unsanitary work sites, lack of work-life balance and gender bias. How can present recruitment and retention methods be improved to attract more women into construction-related occupations, given that these characteristics are likely to alter rapidly? (Morello et al., 2018).

Table 1: Summary of Demographic Data of Respondents

Variable	Category	Frequency	Percentage
Gender	Male	90	90
	Female	10	10
Age	18 - 30	23	23
	31 - 40	67	67
	41 – 50	10	10
Level of education	Diploma	8	8
	Undergraduate	29	29
	Master	13	13
	Others	50	50
Position in organization	Engineer	11	11
	Project manager	20	20
	Quantity surveyor	9	9
	Others	60	60
Number of years served in organization	Less than 5 years	17	17
	5 - 10 years	37	37
	11 - 15 years	33	33
	16 - 20 years	13	13
Years of experience	1 - 5 years	46	46
	6 - 10 years	34	34
	11 - 15 years	18	18
	16 years and above	2	2
Projects implemented in the last 5 years	1 - 10 projects	65	65
	11 - 20 projects	35	35
N		100	100

Source: Field data, 2023

4.2 Human Capacity of Contractors and Performance

The purpose of the study was to examine whether there any relationship between a contractor's human capacity, such as the knowledge, skills and experience necessary to perform road projects properly and the implementation of the projects or simply put performance of the contractors. In this study, the human capacity of contractors can be judged by their level of training, work experience, staff efficiency, knowledge of past experience and knowledge of better methods for project implementation. Human capacity which is the process people in the construction industry improve their skills, either on their own or as a group, in order to come up with and reach project goals is matched with the performance of road implementation is the dependent variable to determine relations using Pearson correlation regression. The predictors or independent variables in this case were knowledge of better methods, staff efficiency, high level training, long work experience and knowledge of past experience. In the preceding tables, thus table 2, table 3, and table 4, are a summary of regression analysis run on the capacity of contractors and their ability to implement road projects.

Table 2: Model Summary on Capacity of Contractors and their Performance on Road Implementation

Mode	R	R Square	Adjusted R square	Std Error of the Estimate
1	0.715[a]	0.511	0.485	0.803

a. Predictors: (Constant, knowledge of better methods, knowledge of past experience, long work experience, staff efficiency, and high level of training for contractors

From table 2, the R-value represents the relationship between the dependent variable and the independent variables. The R-square indicates the amount of the dependent variable's variance that can be explained by the independent variables. In multiple regression, the adjusted R-square indicates the generalization of the results,

such as the deviation of the sample results from the population. There must be a minimal difference between R-square and adjusted R-square. In this instance, the value of R-square is .511, which is close to the adjusted R-square of .465, so it is acceptable (Jain & Chetty, 2019). The next table (table 3) is an ANOVA analysis on the capacity on contractors and their ability to implement road projects.

Table 3: ANOVA on Capacity of Contractors and their Performance on Road Implementation

Model	Sum of squares	Df	Mean Square	F	Sig
Regression	63.203	5	12.641	19.611	0.00[b]
Residual	60.587	94	0.645		
Total	123.79	99			

a. Dependent Variable: Implementation of road infrastructure projects

b. Predictors: (Constant), knowledge of better methods, knowledge of past experience, long work experience, staff efficiency, and high level of training for contractors

Source: Field data, 2022

A 95% confidence interval or a 5% significance threshold is selected and used done in this study for the investigation. Consequently, the p-value must be smaller than 0.05. In the table above, the value is .000. Hence, the outcome is noteworthy.

The F-ratio signifies a boost in the variable's prediction by fitting the model, taking into account the model's inaccuracy. The value for the F-ratio yield efficient model should be larger than 1. In the table above, the value of 19.611 is satisfactory.

Table 4 is a summary of coefficient values of the analysis on contractors' capacity and road projects implementation.

Table 4: Summary of Coefficients on the Capacity of Contractors and their Performance on Road Implementation

	coefficients[a]				
	Unstandardized coefficient		Standardized Coefficients		
Model	B	Std Error	Beta	T	Sig
Constant	5.855	0.744		7.867	0.000
High level training for contractors	-0.211	0.067	-0.277	-3.123	0.002
Long work experience	0.14	0.06	0.171	2.334	0..000
Staff efficiency	-0.818	0.152	-0.435	-5.394	0..000
Knowledge of past experience	0.294	0.074	0.334	3.967	0..000
Knowledge of better methods for projects implementation	-0.266	0.063	-0.361	-4.251	0..000

a. Dependent Variable: Performance of road infrastructure projects

With a P-value of .000 the data in table 5 is interpreted below

Table 5: Interpretation of Coefficients of Variables on Capacity of Contractors and Implementation   of Road Projects by Contractors

Variables	Sig	Hypothesis testing at 95% confidence level	Interpretation
High level training for contractors	0.002	Null hypothesis rejected	This outcome indicates there is a significant relationship between
Long work experience	0.022		high level of training for contractors,
Staff efficiency	0.000	(0.002 < 0.05;	Staff efficiency, long work experience
Knowledge of past experience	0.000	0.022 < 0.05	Knowledge of past experience and
Knowledge of better methods of project implementation	0.000	0.000 < 0.05)	Implementation of road projects by contractors

The study discovered that, the management skills of the contractors affected the performance of the road construction projects, as the contractor's ability to manage and assess the project to ensure that it adhered to the blueprint's scope and specifications is essential, as delegating tasks to team members who had a thorough understanding of the project. This is consistent with the work of Akali (2018) as he concluded that technical skills had the greatest impact on the success of road construction projects, followed by equipment holding capacity, financial capacity, and managerial abilities. The study concluded that technical skills needed to be improved to ensure quality workmanship and timely completion of road construction projects; that constructors needed to increase their equipment holding capacity and adopt new technologies to improve on the existing ones; that the

financial capacity of the contractors needed to be improved to ensure that the projects are completed on time and to a high standard; and that management skills needed to be improved to ensure that contractors implement projects well (Akali, 2018).

According to the respondents, contractors continue to struggle with a deficiency of skilled tradespeople in order to execute the project satisfactorily. The quality and quantity of available workers have significant effects on construction projects. According to government rules, the lengthy process of getting licenses and work permits may pose issues for the contractor while importin labor. This approach may hinder the contractor from delivering the necessary labor force prior to construction and may retard the project's progress. One of the most significant causes of delay is determined to be ineffective site administration and oversight. There may be deficiencies in the contractor's site planning, implementation, and control. Poor site management causes delays in addressing issues that arise on the site and may hinder the overall success of the project. Oprong (2020) concluded that a contractor's technical capacity influences road project implementation by 0.364%, a contractor's financial capacity influences road project implementation by 0.812%, a contractor's quality management influences road project implementation by 0.5744%, and a contractor's management structure influences road project implementation by 0.134%. It was also found that 86% of the change in the delivery of road development projects in Meru County was due to the technical, financial, quality management, and management structure capacities of the contractor (Oprong, 2020). However, this study found that 51% of variations in implementations can be explained by capacity of contractors.

4.3 Contractors Participation in Training and Development Programmes

In gathering qualitative data, interviews were conducted. A participant lamented as follows:

"There is a dearth of qualified construction professionals with a foundational understanding of construction operations. The supervision and management of construction activities in Ghana are equally problematic. .... many workers (artisans) lack the training required to perform their work. Currently, "someone simply stands up and says I am a mason" (Joe, January 15, 2023).

The situation is not any better in the quantitative analysis as 55 respondents representing 55% said they only attend training and capacity building programmes yearly. This is depicted in figure 4.5.1. Similarly, Laryea (2010) reported that, in Ghana there are no entry requirements, credentials, or barriers for artisanship. He added that some contractors have complained about a lack of work as a result of low capacity and funding. In recent years, the volume of construction work has decreased due to a shortage of funding, and it can take up to six months to land a job (Laryea, 2010).
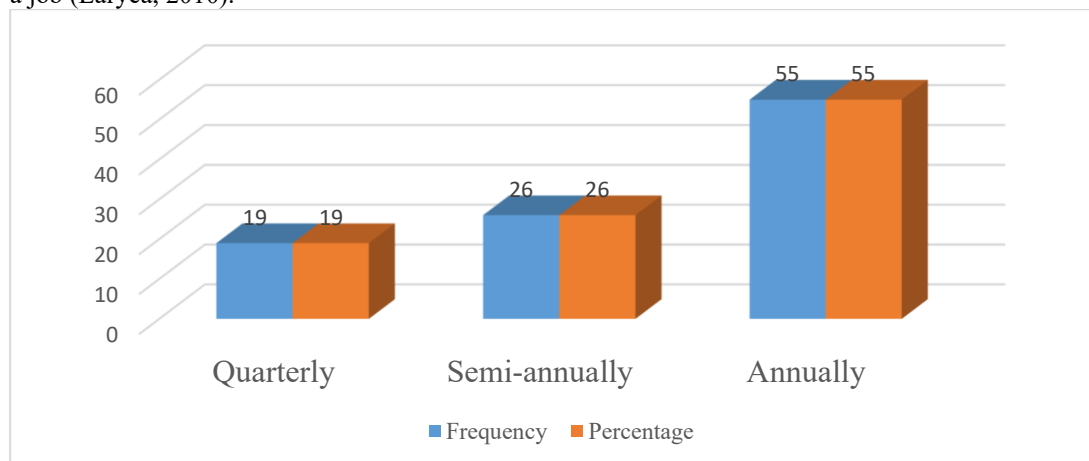
Source: Field data, 2023

Figure 2: Frequency of contractors participating in training and development programmes

5. Conclusion and Recommendation

It was determined that technical expertise is crucial for performing the numerous operations required to ensure that the overall project met the established standards and requirements. Per the findings, level of training for contractors, work experience and knowledge of past experience, staff efficiency, better methods of project implementation were found to have significant change in implementation of road projects. With a model summary of R=0.715, R- square=0.511 and adjusted R-square =0.485, it is conclusive there is a relationship between human capacity of contractors and performance of road implementation. Additionally, 72% of changes or variations in road project implementation can be explained by human capacity of contractors.

H01: There is no relationship between human capacity and performance of road implementation in Twifo Atti Morkwa District.

HA1: There is a relationship between human capacity and performance of road implementation in Twifo Atti

Morkwa District.

The study recommended that contracts should be allocated to road construction companies based only on their financial, skills knowledge and experience. Nonetheless, contractors might increase their operating capital by forging public-private partnerships with financiers prepared to finance large building projects. In contrast, the government should ensure the consistent distribution of money. Contractors must also take up training programs to upgrade their skills and knowledge in the area of construction and make use of current technology to reduce cost of operations.

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