Factors Affecting the Safety Management Practices of Road Construction in the Sidama Region Road Administration

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Abstract

The focus of this research is on the importance of road construction projects for sustainable economic development in the Sidama region. The aim is to study the safety management practices and challenges faced by the Sidama Region Road Administration Bureau in road construction. The study adopts a descriptive design and utilizes both quantitative and qualitative research approaches. A sample of 178 participants is selected using simple random sampling, and primary data is collected through a structured questionnaire and interviews. Descriptive statistics analysis is conducted using SPSS version 21.0, and a multiple linear regression model is employed. The findings indicate that safety training, traffic management, equipment maintenance, personal protective equipment, and communication and coordination have a positive and significant relationship with the quality of road construction. These variables are statistically significant at a 1% level. The researchers recommend proper planning, adequate investment, a skilled workforce, adherence to standards, and effective quality control measures throughout the construction process for the Sidama Road Administration Bureau.

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1. Introduction

Road construction is a vital infrastructural development activity that plays a significant role in connecting communities, fostering economic growth, and enhancing regional integration. While road construction projects bring various benefits, they also pose numerous safety hazards to workers, motorists, and pedestrians. To ensure the safety and well-being of all stakeholders involved in road construction activities, safety management practices must be implemented effectively. This assessment seeks to evaluate the safety management practices of road construction in the Sidama Region Road Administration, focusing on the policies, procedures, and measures in place to mitigate risks and protect workers. By highlighting any gaps or areas for improvement, this assessment aims to contribute to the development of safer road construction practices in the Sidama region.

The importance of safety management practices in road construction cannot be overstated. It is estimated that globally, road construction work has one of the highest accident rates compared to other industries (Abe and Tamura, 2011). Workers in the construction sector face a range of hazards, including exposure to heavy machinery, the risk of falls from heights, vehicle-related accidents, and exposure to hazardous materials (Oyedele et al., 2019). Therefore, it is crucial for road construction projects to engage in comprehensive safety management practices that address these risks and promote safer working conditions. Investing in effective safety management practices not only protects workers but also improves project efficiency and reduces costs associated with accidents, injuries, and delays (Abe and Tamura, 2011).

In Ethiopia, road construction projects are an integral part of national development plans. The Sidama Region Road Administration plays a crucial role in overseeing road construction activities in the Sidama region, ensuring the implementation of appropriate safety measures. While the administration is responsible for ensuring safety, it is essential to assess the effectiveness of the safety management practices employed and identify areas for improvement. By conducting this assessment, recommendations can be made to enhance safety management practices, leading to safer working conditions for road construction workers and improved infrastructure development.

To assess the safety management practices of road construction in the Sidama Region Road Administration, this analysis will examine various aspects, including the administration's safety policies and procedures, risk assessment mechanisms, safety training programs, and the use of personal protective equipment (PPE). By focusing on these key aspects, the

assessment will provide insights into the level of commitment to safety, the adequacy of safety measures, and the implementation of industry best practices. It will also explore any challenges faced in ensuring compliance with safety regulations and standards and propose recommendations for strengthening safety management practices in the Sidama region.

Safety management practices are crucial in any construction project, but they are particularly important in road construction. The Sidama region has seen a surge in road construction projects in recent years, which has brought about a range of safety concerns. One of the primary issues with road construction in Sidama is that many of the projects are being carried out by inexperienced or poorly trained workers. This can lead to accidents and injuries, as well as poor-quality work that can compromise the safety of the road.

In addition to worker safety, there are also concerns about the safety of the general public. Road construction can disrupt traffic patterns and create hazards for drivers and pedestrians alike. Without proper safety measures in place, accidents can occur that put people at risk. Another problem with safety management practices in Sidama is that there is often a lack of oversight and enforcement. This can make it difficult to ensure that safety protocols are being followed and that workers are properly trained and equipped to do their jobs safely. There is also a lack of awareness among the general public about the dangers of road construction. Many people do not realize the risks associated with construction zones and may not take appropriate precautions when driving or walking through these areas.

The lack of adequate safety measures in road construction projects in Sidama is a serious issue that needs to be addressed. Without proper safety protocols in place, accidents and injuries can occur that have far-reaching consequences. To address these problems, it will be necessary to implement more stringent safety regulations and enforcement mechanisms in road construction projects. This will require a commitment and resources from both public and private stakeholders in the region.

Proper training and education for workers in road construction projects will also be critical to improving safety outcomes. This can include training on safety protocols, as well as on the proper use of tools and equipment.

Finally, it will be important to increase public awareness about the dangers of road construction and the need to take appropriate precautions when traveling through these areas. This can include targeted campaigns to educate drivers and pedestrians about the risks and how to stay safe.

By implementing these measures, it will be possible to improve safety outcomes in road construction projects in the Sidama region. This will not only protect workers and the general public but will also help to ensure the long-term success and sustainability of these important infrastructure projects.

Weldegebriel (2018) found that safety management practices are crucial in any road construction projects in Ethiopia. As far as the review of literature is concerned, there is no research conducted on the factors affecting safety management practices and challenges of road construction projects in the Sidama region. Hence, undertaking this research in the Sidama region will help to specifically know the challenges of road construction quality and take appropriate action in reducing problems and can also be used as an input for policy formulation regarding the issue. Therefore, taking into

account the above idea, this study was to examine the effect of safety management practice and assess the challenges of road construction in the Sidama region road administration.

1.1. Research Questions

Taking into account the above statement of the problem, the researcher has answered the following research questions:

a. What is the effect of safety training on the quality of road construction in the Sidama region road administration?
b. What is the effect of traffic management on the quality of road construction in the Sidama region road administration?
c. What is the effect of equipment maintenance facilities on the quality of road construction in the Sidama region road administration?
d. What is the effect of Personal Protective Equipment on the quality of road construction in the Sidama region road administration?
e. What is the effect of communication and coordination on the quality of road construction in the Sidama region road administration?

2. Review of the Literature

2.1. Safety management practices in road construction

Safety management practices in road construction are crucial for ensuring the well-being of workers and preventing accidents and fatalities in the construction industry. Numerous studies have been conducted to evaluate safety practices in road construction projects in various regions and countries. For instance, a study by Khan and Mustafa (2017) examined the safety management practices in road construction projects in Malaysia. The researchers investigated the level of compliance with safety regulations, the awareness and knowledge of workers regarding safety practices, and the effectiveness of safety training programs. The findings of the study highlighted the need for improved safety management practices in road construction projects to enhance the safety and well-being of workers.

Similarly, a study by Le and Nguyen (2019) focused on safety management practices in road construction in Vietnam. The researchers aimed to assess the current safety management practices and identify areas for improvement. The study utilized a questionnaire survey to collect data from construction professionals involved in road projects. The results indicated that there is still room for improvement in terms of safety management practices, particularly in terms of the enforcement of safety regulations and the provision of adequate safety training for workers.

Safety is a paramount concern in road construction projects due to the high-risk nature of the work involved. Ensuring the well-being of workers and minimizing accidents and fatalities is essential to maintaining a productive and efficient construction industry. Therefore, it is vital to assess safety management practices in road construction projects to identify potential areas for improvement and enhance safety levels. This study aims to evaluate the safety management practices

of road construction in the Sidama Region Road Administration in Ethiopia.

The Sidama Region Road Administration plays a vital role in the construction and maintenance of road infrastructure in the region. However, little research has been conducted to evaluate the safety management practices of road construction in this specific context. Therefore, this study aims to fill this gap in the literature by assessing safety management practices in road construction projects conducted by the Sidama Region Road Administration, providing valuable insights and recommendations for enhancing safety levels.

The lack of a comprehensive assessment of safety management practices in road construction projects in the Sidama Region Road Administration presents a significant challenge in ensuring the well-being of workers and improving safety standards. This study seeks to address this gap by evaluating the current safety management practices in road construction and identifying areas for improvement. By doing so, it aims to contribute to existing knowledge and provide recommendations for enhancing safety practices and minimizing risks in road construction projects in the Sidama Region.

2.2. Empirical Review

The effect of safety management practices on the quality of road construction in the Sidama region:

2.2.1. Safety Training and Quality of Road Construction

Safety training plays a significant role in the quality of road construction. It promotes improved workmanship, reduces accidents and errors, ensures compliance with standards, enhances team communication, and emphasizes attention to detail and quality control. By investing in safety training, road construction projects can achieve higher quality outcomes, resulting in safer and more durable roads. Providing comprehensive safety training to all workers involved in road construction is crucial. This includes educating them about potential hazards, proper use of personal protective equipment (PPE), and safe work practices. The empirical study by Musah (2017) has pointed out that safety training has a positive effect on the quality of road construction.

- **H1:** There is a positive relationship between safety training and the quality of road construction.

2.2.2. Traffic Management and Quality of Road Construction

Traffic management is an essential aspect of road construction that significantly impacts the quality of the project. Effective traffic management measures ensure the smooth flow of vehicles, minimize disruptions, and enhance safety for motorists and workers alike. Proper planning and implementation of traffic management strategies, such as temporary road closures, detours, and clear signage, help maintain efficient traffic flow and reduce congestion. By minimizing traffic disruptions and ensuring the safety of road users, traffic management measures contribute to the overall quality of road construction projects. They enable construction activities to be carried out efficiently, minimize delays, and enhance the durability and lifespan of the road. Additionally, well-executed traffic management practices instill public confidence in the project, fostering positive community relations and long-term satisfaction with the quality of the constructed road.

Implementing effective traffic management plans is essential to minimize risks for motorists and pedestrians during road construction. This includes proper signage, temporary road closures, detours, and traffic control measures. The empirical study by Kumar (2022) evidenced that traffic management has a positive effect on the quality of road construction.

- **H2:** There is a positive relationship between traffic management and the quality of road construction.

2.2.3. Equipment Maintenance and Quality of Road Construction

According to a study conducted by the World Bank, inadequate maintenance is one of the significant challenges to be addressed regarding the quality of road construction in Ethiopia. Proper equipment maintenance is crucial to ensure that roads are constructed to a high standard and remain in good condition. Neglecting maintenance can lead to premature wear and tear, resulting in costly repairs and reduced road safety. Therefore, investing in equipment maintenance is essential to improve the quality of road construction in Ethiopia and ensure that the roads remain safe and reliable for years to come. Regular maintenance and inspection of construction equipment, such as excavators, bulldozers, and dump trucks, are vital to ensure their safe operation. Faulty or malfunctioning equipment can lead to accidents and injuries, as noted in the empirical study by Girmay et al. (2022).

- **H3:** There is a positive relationship between equipment maintenance and the quality of road construction.

2.2.4. Personal Protective Equipment and Quality of Road Construction

When it comes to ensuring the quality of road construction, personal protective equipment (PPE) is also an important factor to consider. PPE, such as hard hats, safety glasses, and gloves, can protect workers from potential hazards on the construction site. By providing workers with the appropriate PPE, road construction companies can not only ensure the safety of their employees but also improve the overall quality of their work. This is because workers who feel safe and comfortable on the job are more likely to perform their tasks effectively and efficiently. Therefore, investing in PPE is another crucial step toward improving the quality of road construction in Ethiopia. Ensuring that all workers have access to and properly use PPE, such as hard hats, high-visibility vests, gloves, and safety boots, is crucial for their safety on construction sites. The empirical study by Yankson, I.K., Nsiah-Achampong, N.K., and Okyere (2021) suggested that Personal Protective Equipment has a positive effect on the quality of road construction.

- **H4:** There is a positive relationship between equipment maintenance and the quality of road construction.

2.2.5. Communication and Coordination and Quality of Road Construction

Effective communication is a key component of successful road project management. Clear and concise communication between project managers, construction workers, and stakeholders can help to ensure that everyone is on the same page and working toward the same goals. This can help to prevent misunderstandings, delays, and mistakes that can impact the quality and safety of the project. In addition, effective communication can help to build trust and collaboration among team members, which can lead to better outcomes and a more positive working environment. Therefore, road project managers should prioritize the development and implementation of effective communication strategies to ensure the

success of their projects. Effective communication and coordination among project stakeholders, including road administration officials, contractors, and workers, are essential for a smooth and safe construction process. Regular safety meetings and updates should be conducted to address any concerns or issues. The study by Nkurunziza (2020) pointed out that Communication and Coordination and Quality of road construction have a positive relationship.

- **H5:** There is a positive relationship between Communication and Quality of road construction.

2.3. Conceptual Framework of the Study

After conducting an extensive analysis of 10 empirical studies regarding the quality of road construction in Ethiopia, it has been found that there are significant challenges and barriers to achieving high-quality results. Several studies have reported issues with the durability and longevity of Ethiopian roads, as well as concerns about improper design and construction techniques. Additionally, there have been reports of poor maintenance and a lack of accountability for subpar work. However, there are also some positive findings, including the importance of community involvement and stakeholder engagement in road construction projects. Overall, there is much work to be done to improve the quality of road construction in Ethiopia, but with proper attention and resources, it is possible to achieve better results.

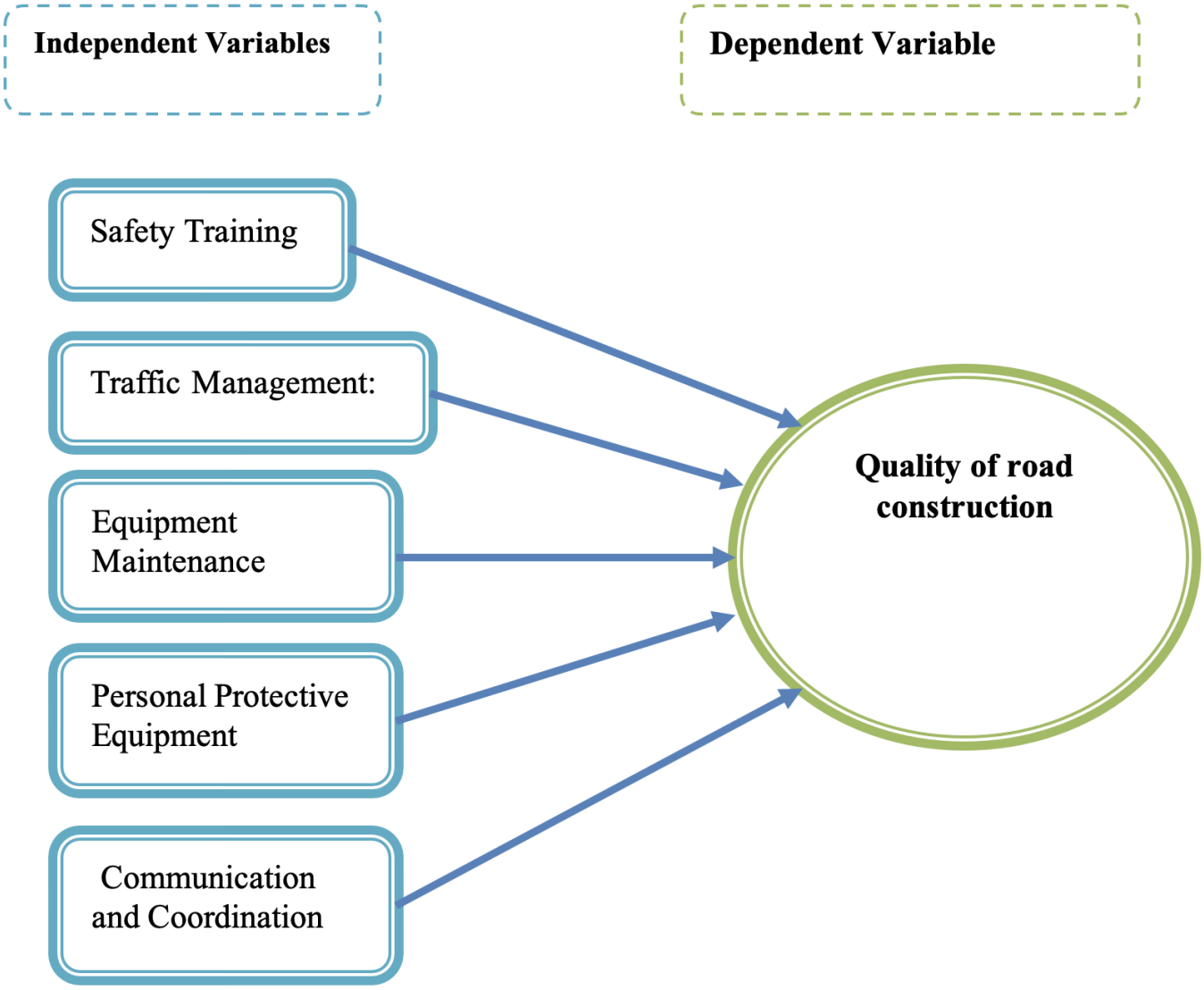

Figure 1. Conceptual Framework of the Study

3. Materials and Methods

3.1. Research Philosophical Assumptions

Using a mix of social constructivism and positivism research philosophical assumptions is of utmost importance as it provides a balanced and comprehensive approach to research. By incorporating social constructivism, which highlights the significance of social and cultural context in shaping knowledge and understanding, researchers can gain insights into how individuals interpret and construct reality. Simultaneously, positivism offers a scientific and empirical foundation for research, ensuring objectivity, generalizability, and the ability to test hypotheses. This combination allows researchers to not only understand the subjective meanings individuals attribute to their experiences but also to analyze and explain phenomena in a rigorous and systematic manner. By embracing a mix of assumptions, researchers are able to harness the strengths of both approaches, leading to a more robust and nuanced understanding of the phenomena under

investigation.

3.2. Research Design and Approach

Once the research topic was identified and defined clearly, the next step was to design the research method because the research design provides guidelines for data collection and analysis. A quantitative approach is best if a researcher tests hypotheses by specifying narrow hypotheses and makes statistical tests to support them (Creswell, 2003), and the second approach (qualitative) deals with the subjective assessment of attitudes, opinions, and behavior in non-quantitative analysis (Kothari, 2004). In this study, the researcher adopted a cross-sectional design with a mixed research approach in order to achieve the stated research objective and to answer research questions properly.

3.3. Data Type and Sources

In this study, both primary and secondary data were used. The primary data sources were employees from the Sidama region's road construction and transport authority. The secondary data sources were published and unpublished materials available in libraries and on internet websites related to the impact of employees' motivation on organizational performance.

3.4. Sampling Design

The target population for this study was a total of 321 employees from the road construction and transport bureau of the Sidama region. To select a sample size from the 321 employees, a simple random sampling technique was used by the researcher to give an equal chance to all employees and save resources. To determine the sample size for this study, the researcher used the mathematical formula of Yamane (1967), taking into account the total population, the sampling error, and the level of reliability, and it was assumed that the sample would have 95% reliability about the population and a sampling error of 5%. This simplest formula is:

$$n = \frac{N}{1 + \left(0.05^2\right) * N}$$

Where

- n = sample size
- N = target population
- $n = \frac{N}{1+N(\alpha)^2}$
- $n = \frac{321}{1.8025} = 178$

Therefore, the maximum sample size for this study is**178** employees who were selected from the Sidama region road and transport bureau. The logic behind using the **simple sampling technique** to select a sample from the Sidama region road

and transport bureau was to give an equal chance to all employees and to select a representative sample for the study.

3.5. Methods of Data Collection

In this research, self-administered questionnaires and direct personal interviews were used to collect primary data. The self-administered questionnaires were used to get detailed information from sample employees of the tax authority, and interviews were organized with the human resource coordinator of the organization.

3.6. Methods of Data Analysis

After the accomplishment of the data collection procedure, it was classified as per each variable; the qualitative data were coded to be measured quantitatively. In this research, data were analyzed with the help of SPSS version 21.0.

3.7. Econometrics Model Specification

When it comes to model specification, employees' motivation in the public sector was measured through a**Likert scale**questionnaire. The multiple linear regression model was employed by the researcher to measure the motivation of public sector employees. The dependent variable, quality of road construction, is a linear function of safety training, traffic management, equipment maintenance, personal protective equipment, and the following equation:

$$\begin{aligned}&\text{Quality of road construction}\\&= \beta 0 + (\beta 1 * \text{safety training}) + + (\beta 2 * \text{traffic management})\\&+ (\beta 3 * \text{equipment Maintenance}) + (\beta 4 * \text{Personal Protective Equipment})\\&+ (\beta 5 * \text{communication andcoordination}) + U\end{aligned} \$\$$$

Whereas:

- β0 = Constant term
- β1, β2, β3, β4…β7 refers to coefficients
- U = Error term

3.8. Reliability Test

To measure the consistency of the questionnaire, particularly the Likert-type scale, reliability analysis is essential in reflecting the overall reliability of the constructs that it was measuring. The test of reliability is another important aspect of sound measurement. A measuring instrument is reliable if it provides consistent results. A reliable measuring instrument does contribute to validity, but a reliable instrument need not be a valid instrument. If the quality of reliability is satisfied by an instrument, then while using it, we can be confident that transient and situational factors are not interfering with the data and that the data collected before making regression analysis is reliable. In current research, the researcher employed Cronbach's Alpha (α), which is the most common measure of scale reliability, and a value greater than 0.7 is considered very acceptable.

3.9. Ethical Considerations

The following ethical considerations were given attention by the researchers and enumerators while conducting the research: voluntary participation, no harm to participants, anonymity and confidentiality, not deceiving the subjects, and privacy of participants. Conserving the voluntary participation of respondents, no participants were forced to take part in the research, and participants were free to withdraw from the research at any moment. With regard to harm to participants, the researcher ensured that there was no physical or psychological harm done to the participants as a result of the study. When it comes to anonymity and confidentiality, all information gathered during the study is being handled confidentially, and permission from the participants was obtained for all information to be shared publicly. Not deceiving the subjects, since participants were informed clearly about the aim, purpose, and procedures of the study and would not be deceived in any way. Finally, regarding the privacy of participants, the privacy of the participants was respected.

3.10. Operational Definitions of Variables

Quality of road construction: Road construction is the process of installing soil stabilizers, asphalt, concrete, and other materials on a defined path to create a smoothed or paved surface that vehicles can move on between two destinations. This is a complex venture that involves paving, rehabilitation, and/or reclamation of degraded pavements to create a motorable roadway. It can take months or years of planning before work can begin, depending on the size and type of the envisioned road.

Safety training: Participants' actual encounters with dangerous traffic situations are discussed, and safe driving techniques (proper sitting, handling curves, braking, obstacle avoidance, etc.) are practiced.

Traffic Management: Traffic management (also known as road traffic control) refers to the act of directing vehicles and pedestrians around some form of disruption.

Equipment Maintenance Regular maintenance and inspection of construction equipment, such as excavators, bulldozers, and dump trucks, are vital to ensure their safe operation.

Personal Protective Equipment (PPE) refers to protective clothing for the eyes, head, ears, hands, respiratory system, body, and feet. It is utilized to protect individuals from the risks of injury and infection while minimizing exposure to chemical, biological, and physical hazards. PPE serves as the final line of defense when engineering and administrative controls are insufficient to reduce or eliminate risks.

Communication is the process by which information and ideas are exchanged between users. Communication helps users develop a shared understanding, communicate their goals and objectives, and come to a consensus. Effective communication, collaboration, and coordination are the main contributing factors for success in agile methods.

4. Results

4.1. Response Rate

The researchers distributed 178 questionnaires, out of which 170 were correctly responded to, making the response rate 95%. This implies that almost all respondents were involved in the data collection process to make the research findings reliable.

4.2. Summary of Descriptive Statistics

While the mean value is a commonly used statistical measure in research data analysis, it does have some limitations and weaknesses. It is essential to be aware of these weaknesses when interpreting research findings. Here are a few weaknesses of the mean value: Sensitivity to extreme values: The mean is sensitive to outliers or extreme values in the data. If there are a few observations that differ significantly from the rest, they can greatly influence the mean, skewing it away from the central tendency of the majority of the data points.

Table 1. Summary of Descriptive Statistics for All Variables Incorporated in the Model

	N	Minimum	Maximum	Mean	Std. Deviation
Quality of road construction	170	1.00	5.00	2.8235	1.18847
Safety training	170	1.00	5.00	2.7647	1.16301
Traffic Management	170	1.00	5.00	2.9647	1.28668
Equipment Maintenance	170	1.00	5.00	2.9665	1.11607
Personal Protective Equipment	170	1.00	5.00	2.7706	1.20662
Communication and Coordination	170	1.00	5.00	2.8706	1.28522
Valid N (listwise)	170				

Sources: Survey data, 2023

Quality of road construction was the dependent variable of this study. As indicated in the table above, the quality of road construction shows that the Sidama region road and transport bureau authority has an overall mean of the variable of 2.8235 (neutral), with a maximum of 5 and a minimum of 1 on the Likert scale values. The standard deviation value is 1.18847, which indicates there was variation in the actual responses from the mean. With regard to other variables, Safety training had a mean of 2.7647 (neutral) with a standard deviation (SD) of 1.16301, Traffic Management had a mean of 2.9647 (neutral) with an SD of 1.28668, Equipment Maintenance had a mean of 2.9665 with an SD of 1.11607, Personal Protective Equipment (R) had a mean of 2.7706 (neutral) with an SD of 1.20662, and communication and coordination had a mean of 2.8706 (neutral) with an SD of 1.28522. In summary, all variables incorporated in the model have a moderate contribution to the response variable, employee motivation. As the result of Table 4.3 indicates, the ranges of values were presented as disagreeing if the mean score is between 1.00 and 2.60, neutral if the mean score is between 2.60 and 3.40, and agree if the mean score is above 3.4. Based on these classifications, the interpretations of all Likert

scale items that were included in the study, such as Safety training, traffic management, Equipment Maintenance, Personal Protective Equipment, and communication and coordination items and responses obtained, were presented as follows. The table below shows the cumulative result of each item under a given set of independent variables. The mean value of all variables incorporated in the model ranges with a (neutral) mean score.

4.3. Inferential Analysis

Inferential analysis in this study was conducted using correlation and regression analysis.

Table 2. Correlation Matrix for Dependent and Independent Variables

		1	2	2	3	4	5
Safety training	Pearson Correlation	1					
Traffic Management	Pearson Correlation	.629**	1				
Equipment Maintenance	Pearson Correlation	.522**	.588**	1			
Personal Protective Equipment	Pearson Correlation	.626**	.552**	.491**	1		
Communication and Coordination	Pearson Correlation	.496**	.299**	.235**	.304**	1	
Safety training	Pearson Correlation	.306**	.086	-.157*	.126	.172*	1

***. Correlation is significant at the 0.01 level (2-tailed).*

**. Correlation is significant at the 0.05 level (2-tailed).*

Source: Survey data, 2023

Table 2 shows the relationship between the dependent variable, which is the quality of road construction, and independent variables, with a coefficient of correlation of 1 indicating that each variable is perfectly correlated with each other. The results show that variables such as Safety training, traffic management, Equipment Maintenance, Personal Protective Equipment, and communication and coordination have a positive and significant relationship with the quality of road construction and are statistically significant at the 1% level because the p-value is less than the 5% level of significance. The correlation coefficient of salary with the quality of road construction was 0.629 (strong), traffic management and quality of road construction 0.522 (moderate), Safety training and quality of road construction 0.626 (strong), Personal Protective Equipment and quality of road construction 0.496 (moderate), and communication and coordination and quality of road construction 0.306 (weak), respectively. To sum up, safety training has a strong correlation coefficient, while communication and coordination have a weak correlation coefficient.

4.4. The Regression Results

Ordinary Least Squares (OLS) is the most common estimation method for linear models, and that's true for a good reason. As long as your model satisfies the OLS assumptions for linear regression, we can rest easy knowing that we're

getting the best possible estimates. The most common assumptions that have been tested before running the final regression result are normality, multicollinearity, autocorrelation, and heteroscedasticity.

Table 3. Regression Results (QRC) through SPSS

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-.668	.221		-3.025	.003	-1.104	-.232		
	Safety training	.262	.065	.257	4.044	.000	.134	.390	.544	1.839
	Traffic Management	.202	.058	.219	3.493	.001	.088	.316	.559	1.788
	Equipment Maintenance	.290	.063	.272	4.593	.000	.165	.415	.623	1.606
	Personal Protective Equipment	.240	.050	.243	4.822	.000	.141	.338	.860	1.163
	Communication and Coordination	.224	.046	.242	4.856	.000	.133	.315	.878	1.138

R.801a , R Square.641, Adjusted R Square.630, Std. Error of the Estimate 0.72295, F Change 58.543, Sig. F Change.000, Durbin-Watson 1.884

Source: Survey data, 2023

Fitted Model

Quality of road construction = -0.668 + 0.262 * Safety Training + 0.202 * Traffic Management + 0.290 * Equipment Maintenance + 0.240 * Personal Protective Equipment + 0.224 * Communication and Coordination + E...

The model result was presented in the above Table 3. R-squared was used to measure the goodness of fit of the explanatory variables in explaining the variations in the quality of road construction. R-squared and the Adjusted R-squared statistics of the model were 64.1 percent and 63 percent, respectively. The result indicates that 64.1 percent of the variation in the dependent variable was jointly explained by the explanatory variables in the model. Whereas, the remaining 35.9 percent of the variation in the quality of road construction (as measured by the Likert scale) is explained by other variables not included in the model. The coefficients of explanatory variables such as safety training (0.262), traffic management (0.202), equipment maintenance (0.290), personal protective equipment (0.240), and communication and coordination (0.224) imply that a 1% increase in the variables leads to a 26.2%, 20.2%, 29%, 24%, and 22.4% increase in the dependent variable, respectively. Besides, the F-statistic (58.543) in the model summary and ANOVA with a p-value of 0.000, which is used to test the overall significance of the model, was presented and indicates the reliability and validity of the model at a 1 percent level of significance. This tells us that the model as a whole is statistically significant.

5. Discussion of Results

In order to provide a more detailed explanation of the model used in this research, let us discuss each variable incorporated in the model one by one as follows: The results of this study show that support from improved safety training, with an unstandardized coefficient of regression [b= 0.262], has a positive and statistically significant effect at the 1% level of significance since the p-value is 0.000 (< 0.01). Hence, hypothesis H1 is accepted. This finding is consistent with the idea of the study result by Grinerud (2022), who evidenced that there is a positive relationship between salary and employees' motivation. This implies that more safety training positively contributes to the quality of road construction.

Regarding traffic management, [β=0.202] is positive and statistically insignificant with a p-value of 0.001 (> 1% level of significance). Therefore, hypothesis HA2 is accepted by the researcher. Hence, traffic management has a positive effect on the quality of road construction. In contrast to the above discussion, this finding is consistent with the empirical finding of Beura & Bhuyan (2018), who found out that traffic management is positively influenced by the quality of road construction. This quality of road construction, if promoted, is more advisable for the organization to promote the quality of road construction.

With regards to Equipment Maintenance, the regression result showed [b=0.290] is positive and statistically significant at the 1% level of significance because the p-value is 0.000 (< 0.01). Therefore, hypothesis HA3 is not rejected by the researcher. This finding is inconsistent with the empirical evidence from Muriithi & Mwenda (2021), which found that Equipment Maintenance has a positive effect on motivation.

The result of this study also shows that the coefficient of regression for Personal Protective Equipment [b= 0.24] is positive and statistically significant at the 1% level of significance, affecting the quality of road construction since the p-value is 0.00 (< 0.01). Hence, hypothesis HA4, as stated, is accepted. This finding is similar to the findings of Chong et al. (2022), which showed that the existence of recognition, starting from a simple thank you, has a positive and statistically significant effect on the quality of road construction.

When it comes to communication, the coefficient of regression of the variable is [b=0.224], which is positive and statistically significant with a p-value of 0.000 (< 1% level of significance). Therefore, hypothesis HA5 is accepted by the researcher. This finding is consistent with the empirical result of a safe environment by Willar et al. (2023), who found out that good communication has a positive impact on the quality of road construction.

6. Conclusion

In summary, road construction is important for the public as it provides essential connectivity, supports economic growth, enhances safety and efficiency, promotes social integration, and aids emergency response. Investing in well-planned and well-maintained road infrastructure is essential for the overall development and well-being of the public. The study has shown a clear understanding of the factors affecting the quality of road construction in the public sector. The findings of this research demonstrated that salary, promotion, job satisfaction, recognition, and work conditions have a positive and

statistically significant effect on employees' motivation. Hence, the recommendation was forwarded to the Hawassa city revenue authority based on statistically significant variables as follows. The first hypothesis is verified that an increase in safety training has a positive and statistically significant effect on road construction quality in the Sidama region. This implies that more safety training positively contributes to the employees' motivation in the public sector. It is recommended that the Sidama region road construction and transport work on safety training improvement to enhance road construction in achieving an organizational goal. The second hypothesis was proved that an increase in the value of traffic management leads to an increase in road construction quality. Hence, the Hawassa city Sidama road authority should work on improving fringe benefits more than the current status due to the fact that it has a positive influence on employees' motivation. The third hypothesis was proved that an increase in the value of maintenance equipment leads to an increase in road construction quality. Hence, the Sidama region authority should work on traffic management more than the current status due to the fact that it has a positive influence on road construction. The conclusion that can be drawn from the fourth hypothesis suggested that personal protective equipment has a positive and statistically significant effect on road construction. Hence, the Hawassa city administration revenue authority should recognize more than the current status due to the fact that it has a positive influence on road construction. Also, the conclusion drawn from the fifth hypothesis shows the existence of good communication in road construction projects. Hence, it can be recommended that the Sidama region road authority should improve communication more than the current status due to the fact that it has a positive influence on the quality of road construction. The narrative analysis result of the interview suggested that budget constraints, poor design considerations, material quality problems, construction techniques problems, weather conditions, quality control and supervision weaknesses, lack of training on management in construction activities, and environmental considerations were key challenges to the quality of road construction in the Sidama region. Therefore, the researcher forwarded the possible recommendations for the Sidama road administration bureau to address these challenges, which require proper planning, adequate investment, a skilled workforce, adherence to standards, and effective quality control measures throughout the construction process.

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