Effect of technology transfer between supply-chain partners and organizational performance in Tanzania: A case of evidence from Twiga Cement Company

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ABSTRACT

This study analyzed the impact of technology transfer on the performance of Twiga Cement Company in Dar es Salaam, Tanzania, among supply chain organizations. Although suppliers do offer manufacturers technical and equipment know-how, training and innovations, there is little empirical literature on whether this improves performance in Tanzania's capital-intensive cement manufacturing industry. Adopting a Relational View Theory basis, the study employed an explanatory cross-sectional research design. A total of 120 participants were sampled from a population of 171 respondents, comprising employees and key suppliers. Yamane's formula and proportionate stratified random sampling were used to select the sample. Questionnaires were used as the primary tool for collecting data. The data were analyzed using both descriptive and inferential statistical methods with the help of the Statistical Package for the Social Sciences (SPSS) for quantitative data analysis. Frequency distribution tables were used to present the findings. The technology transfer measure registered an aggregate mean of 3.83. Access to new technology was rated highest (M = 4.10), followed by training and skill building (M = 3.80), and joint innovation (M = 3.60). Technology transfer was strongly positively correlated with organizational performance (r = .7965). The simple regression model yielded R^2 = .6344, implying that the technology transfer variable accounted for approximately 63.4% of the variance in organizational performance perception. The model was statistically significant (F(1, 118) = 204.768, p <.001). The research indicates that technology transfer through suppliers constitutes a performance competency, but this depends on the absorptive capacity of employees and their use of acquired knowledge. Twiga Cement needs to implement supplier training, technology mentorship, joint problem solving and a technology adoption strategy, and effective co-innovation.

Keywords: Cement Manufacturing; Organizational Performance; Supplier Development; Supply-Chain Partners; Tanzania, Technology Transfer

I. INTRODUCTION

Manufacturing firms are increasingly relying on their suppliers for more than just tangible inputs; they also need technical and equipment know-how, process improvement techniques and innovation. Technology transfer between partners in the supply chain involves transferring and absorbing production knowledge, procedures, designs, technical expertise, and problem-solving capabilities from one firm to another. The Relational View explains the relevance of technology transfers, as competitive advantage can be gained through inter-firm knowledge-sharing processes and complementary assets (Dyer & Singh, 1998; Huang et al., 2022).

Technology transfer occurs through supplier training, technical mentoring, equipment commissioning, engineering support, site visits, production sharing, problem solving, exposure to new technologies, and co-innovation (Li et al., 2026; Silva de Lima et al., 2025). However, recent studies reveal that institutionalized supplier development activities only lead to better operational results in cases of efficient knowledge transfer and absorption (Sikombe & Phiri, 2022; Silva de Lima et al., 2025). It should be noted that exposure to knowledge alone does not guarantee enhanced performance. In order to enhance performance, the recipient firm must have the right skills, learning processes, management support, equipment and opportunities to apply knowledge (Florêncio & de Oliveira, 2022; Jia et al., 2022).

This issue is important to consider in the context of capital-intensive production processes involving highly advanced machinery and control systems for processes, maintenance, quality testing, energy management, and specialized supplier services. Technological learning by suppliers can enhance maintenance capabilities, process efficiency, innovation and overall performance (Florêncio & de Oliveira, 2022; Sang et al., 2024; Silva de Lima et al., 2025). Conversely, inadequate training, poor knowledge documentation, employees' limited absorptive capacity, and

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reliance on external technicians may prevent manufacturers from fully utilizing their purchased technology (Jia et al., 2022; Li et al., 2026).

Nevertheless, the findings from the research conducted in Tanzania appear positive, albeit inconsistent. Kabugumila and Ndekwa (2024) found that technological innovations had improved the performance of third-party logistics service providers. Furthermore, Kabugumila and Ndekwa (2024) found that supplier development strategies enhanced the performance of public procurement systems. However, Kisinga et al. (2024) found that knowledge transfer strategies did not enhance the performance of small-scale grape processors, though supplier development strategies were effective. As all the above studies relate to logistics services, public procurement or small-scale processors, they cannot be generalized to a large cement company.

The Twiga Cement Company (officially the Tanzania Portland Cement Public Limited Company) is an appropriate subject for this research, as it relies on certain technologies and technical assistance provided by equipment manufacturers and other strategic suppliers. The issue under consideration is whether the training provided by suppliers, innovation and the availability of new technologies are developed and implemented sufficiently to increase efficiency, improve productivity and ensure high-quality results. According to existing literature on this topic, technology can be acquired, but it may not be used to its full potential due to a lack of skills transfer, absorptive capacity, knowledge retention and collaboration management (Florêncio & de Oliveira, 2022; Jia et al., 2022; Li et al., 2026).

Thus, there is a contextual, conceptual, and methodological research gap. International research on supplier-induced learning has focused on construction firms, international production systems, sustainable supplier development programs, and small and medium-sized enterprises (Jia et al., 2022; Sang et al., 2024; Sikombe & Phiri, 2022; Silva de Lima et al., 2025). Meanwhile, research in Tanzania continues to focus on public procurement, logistics and small-scale processing (Changalima et al., 2022; Kabugumila & Ndekwa, 2024; Kisinga et al., 2024). In light of recent literature reviews, it is evident that supplier development and technology transfer research encompasses multiple developmental activities, technology transfer processes, capabilities, and performance. Consequently, isolating the impact of technology transfer is highly complicated (Jia et al., 2023; Li et al., 2026). Consequently, there is a dearth of empirical evidence, particularly at the firm level, especially in the context of cement manufacturing, with regard to the linkage between training, technology, innovation, and productivity and efficiency.

In light of the above information, the aim of this study was to explore the impact of technology transfer from suppliers to organizations on the performance of Twiga Cement Company. Organizational performance was assessed based on three indicators: productivity, efficiency and quality. These indicators have been widely used in recent performance literature in Tanzania and globally (Kabugumila & Ndekwa, 2024; Kisinga et al., 2024; Sang et al., 2024). Using one independent variable facilitates assessment of the effect of technological learning enabled by suppliers on organizational performance.

1.1 Research objective

To examine the effect of technology, transfer between suppliers' partners on organizational performance at Twiga Cement Company.

1.2 Research question

What effect does technology transfer between suppliers' partners have on organizational performance at Twiga Cement Company?

II. LITERATURE REVIEW

2.1 Theoretical Review

This study adopts the concept of competitive advantage as set out in the Relational View proposed by Dyer and Singh (1998). This theory extends the resource-based approach beyond the boundaries of the firm and proposes that superior performance can be achieved through rents generated by relational resources, knowledge-sharing routines within organizations, complementary resources and capabilities, and good governance. The recent integration of theories has confirmed the validity of this theory in the purchasing and supply chain field (Huang et al., 2022).

Technology transfer embodies the mechanism of knowledge sharing within the theory. Suppliers may possess complementary technological know-how, expertise, skills, and resources that complement Twiga Cement's production assets and routines. These complementarities generate value through training, technical support and innovation (Huang et al., 2022; Silva de Lima et al., 2025). Therefore, the theory postulates that technology transfer has a positive effect on performance.

Furthermore, the theory explains why possessing technology alone is insufficient for achieving favorable outcomes. Exploiting relational rents requires proper governance and absorptive capacity, involving sharing, understanding, customizing and internalizing knowledge (Florêncio & de Oliveira, 2022; Jia et al., 2022). When the supplier's involvement is more formal than substantive and the recipient firm's learning process is inadequate, the

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technology may not be fully utilized (Li et al., 2026; Sikombe & Phiri, 2022). This theory is therefore applicable because it considers both the performance aspect of technology transfer made possible by the supplier, and the conditions for achieving this performance.

2.2 Empirical Review

2.2.1 Technology Transfer and Organizational Performance

Empirical evidence supporting the relationship between technology transfer and supplier development comes from recent literature on the subject. In their study of the impact of institutional supplier development initiatives on operational performance, Sikombe and Phiri (2022) found that these initiatives influence operations through knowledge transfer. By analyzing knowledge transfer in multinational subsidiary firms and their suppliers, Silva de Lima et al. (2025) concluded that production knowledge specific to the multinational firm must be adapted to be relevant.

Further evidence sheds more light on the learning process. Jia et al. (2022), who conducted a longitudinal multi-case study, found that boundary objects and interactional routines facilitate the learning and assimilation of knowledge among suppliers involved in the supplier development program. Furthermore, Jia et al. (2023) found that the success of supplier development depends on context fit and the practices used to develop suppliers, based on a systematic literature review of 83 articles. Furthermore, Florêncio and de Oliveira (2022) found that absorptive capacity is important for technology transfer and organizational performance. In another review of 101 supply chain articles, Li et al. (2026) considered various types of transfer.

These innovation-based studies provide further support for the theory. As Sang et al. (2024) mentioned in their research, cooperation within the supply chain has a positive effect on the innovation performance of SMEs, a relationship that is mediated by absorptive capacity and moderated by the environment. It is important to understand that collaboration is an essential part of innovation, involving both supplier and receiver companies.

The value of technology depends not only on ability, but also on context, as illustrated by findings from Tanzania. Kabugumila and Ndekwa (2024) found a positive correlation between technological innovation and the performance of third-party logistics companies. Changalima et al. (2022) found that supplier development results in a successful public procurement process. However, Kisinga et al. (2024), who conducted research with 202 small-scale processing companies in Dodoma, found that, while supplier development was related to company performance, knowledge transfer was not statistically significant. These inconsistent findings highlight the importance of distinguishing between having and using technology. Furthermore, the above examples do not concern capital-intensive companies, such as cement producers.

While the literature agrees that supplier training, technical assistance and joint innovation can enhance capabilities and performance, it differs in its views on how such improvements occur and the circumstances in which they take place (Florêncio & de Oliveira, 2022; Jia et al., 2022; Li et al., 2026; Sikombe & Phiri, 2022). The studies have cross-sectional designs and objective measures of production outcomes; subjective measures are not used in tandem. Evidence from Tanzania is still limited to specific sectors (Changalima et al., 2022; Kabugumila & Ndekwa, 2024; Kisinga et al., 2024). This research bridges the existing gap by assessing access to new technology, training and joint innovations within a cement manufacturing firm.

2.3 Research Gap

The identified literature gap includes four related sub-gaps. Firstly, there is a contextual gap, as most research in other countries has been conducted among construction companies, multinational production networks, sustainable development initiatives and small to medium-sized enterprises (Jia et al., 2022; Sang et al., 2024; Sikombe & Phiri, 2022; Silva de Lima et al., 2025), whereas literature on Tanzania has focused on government sector procurement, small-scale processing companies and third-party logistics (Changalima et al., 2022; Kabugumila & Ndekwa, 2024; Kisinga et al., 2024). This differs from cement manufacturing in terms of capital intensity, technological specificity, processes, and the costs associated with machinery failure. Secondly, a conceptual gap exists as the concept of knowledge transfer has recently become more closely associated with broader concepts such as supplier development, cooperation, absorptive capacity and innovation (Jia et al., 2023; Sang et al., 2024; Sikombe & Phiri, 2022). Thirdly, the presence of technology is equated with technology transfer efficacy, whereas the effectiveness of technology utilization is distinguished by considerations such as training, absorptive capability, adaptation, knowledge retention and utilization (Florêncio & de Oliveira, 2022; Jia et al., 2022; Li et al., 2026). Fourthly, there is a gap in measurement, as previous studies have focused on a wide array of outcomes, including procurement, innovation and logistics, but have lacked information on productivity, efficiency and quality in cement production (Changalima et al., 2022; Kabugumila & Ndekwa, 2024; Kisinga et al., 2024; Sang et al., 2024).

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III. METHODOLOGY

3.1 Research Design

This research used an explanatory cross-sectional survey design and a quantitative approach. When a study aims to identify and measure specific variables quantitatively, as well as determine the nature, strength and statistical significance of relationships between these variables, an explanatory quantitative design is suitable (Creswell & Creswell, 2023; Kothari & Garg, 2020). The use of a cross-sectional design enabled the collection of standardized information on technology transfer and organizational performance through a single observation of employees and suppliers (Saunders et al., 2023).

3.2 Study Area

This study was undertaken at the Twiga Cement Company, which is located in Dar es Salaam, Tanzania. Twiga Cement Company was selected as a case study because, according to Kothari and Garg (2020) and Saunders et al. (2023), a case study should provide access to the processes, actors, and information related to the research problem. Twiga Cement Company is one of the largest manufacturing firms, with continuous production based on specific technologies and the technical services of suppliers. Research on the transfer of technology in the context of this study reveals that production organizations which adopt capital-intensive and knowledge-intensive production processes rely on effective learning processes and the acquisition of firm-specific knowledge from their suppliers (Florêncio & de Oliveira, 2022; Li et al., 2026; Silva de Lima et al., 2025).

3.3 Population

The sample comprised 171 Twiga Cement Company employees and key suppliers who were actively engaged in purchasing, manufacturing, technical operations, maintenance, quality control, management decision-making and supplier development. In general, a research population should comprise units with characteristics and information related to the research problem (Kothari & Garg, 2020). Therefore, the sample comprised technicians, operational staff, procurement and production staff, maintenance staff, quality staff, managers and strategic supplier representatives, as they have first-hand experience of technology transfer via suppliers and organizational performance.

3.4 Sampling Methods and Sample Size

The sample size was calculated using the finite population formula by Yamane (1967), which is $n = N/1 + N(e^2)$. Substituting N with 171 and e with 0.05, the formula becomes $n = 171/1 + 171(0.05^2)$, which equals 119.79 respondents. This was rounded up to 120. The stratified random sampling technique was employed, as stratification improves the representation of subgroups in the case of a heterogeneous population (Kothari & Garg, 2020; Saunders et al., 2023).

3.5 Data Collection Technique

The primary data collection technique involved the use of a structured questionnaire consisting of closed questions with answers measured on a five-point Likert scale. Respondents were asked to indicate whether they strongly disagreed (1) or strongly agreed (5) with each statement. Structured questionnaires facilitate standardization of the process, numerical scoring, comparison between respondents and statistical testing in quantitative research methodology (Creswell & Creswell, 2023; Kothari & Garg, 2020; Saunders et al., 2023). The transfer of technology was gauged through training and skill development, access to technology, and joint innovations, in line with recent studies focusing on learning, access to technology, supplier participation, and absorptive capacity (Jia et al., 2022; Li et al., 2026; Silva de Lima et al., 2025). Organizational performance was assessed in terms of productivity, efficiency and quality achievement.

3.6 Data Analysis

The questionnaires collected were validated, coded, entered, cleaned and analysed using the Statistical Package for the Social Sciences (SPSS). This was in line with the belief that data should be prepared and screened before any statistical tests are conducted (Kothari & Garg, 2020; Pallant, 2020). Frequencies and percentages were used to describe respondent characteristics, while means and standard deviation were used to describe responses to the research variables. Pearson's correlation showed the degree and nature of the relationship between the variables, while simple linear regression tested the impact of technology transfer on organisational performance (Hair et al., 2019; Pallant, 2020). The linear regression model was $Y = \beta_0 + \beta_1 X + \varepsilon$. Model fitness was measured by R^2 and adjusted R^2, while the significance of the F-test was assessed at a 95% confidence interval ($p < .05$). Cronbach's alpha was used to test the consistency of the measures, with coefficients greater than 0.70 being considered acceptable (Cronbach, 1951; Hair et al., 2019; Pallant, 2020).

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3.7 Ethical Considerations

Research ethics were observed throughout the research process. In quantitative research involving people, consent is required, as well as adequate information about the research, the safety of participants, confidentiality, and the proper handling of collected data (Creswell & Creswell, 2023; Saunders et al., 2023). Formal permission was sought from Twiga Cement Company prior to data collection. Participants were given information about the research and were free to refuse or withdraw at any time; their identities were not revealed in the dataset or report.

IV. FINDINGS & DISCUSSION

4.1 Demographics Characteristics of the Respondents

Table 1 shows the demographic characteristics of the study's respondents.

Table 1

Demographic Characteristics of the Respondents

Characteristic	Category	Percentage
Gender	Male	56
	Female	44
Age	21-29 years	10
	30-39 years	25
	40-49 years	64
	50-59 years	1
Work experience	Less than 1 year	10
	1-3 years	9
	4-7 years	27
	Over 7 years	54
Education	Secondary	8
	Certificate	14
	Diploma	23
	Bachelor's degree	49
	Master's degree	5
	Doctorate	1

The sample included 120 participants, selected proportionately from among employees and key suppliers involved in technology transfer and operations. The majority (56%) were male, with women making up the remaining 44%. Most of the respondents were aged between 40 and 49 (64%), followed by those aged 30–39 (25%), 21–29 (10%), and 50–59 (1%). Around half of the respondents (54%) had over seven years' experience; 27% had between four and seven years; 9% had between one and three years; and 10% had less than one year. The largest educational group was diploma graduates (49%), followed by degree holders (23%), certificate holders (14%), those with secondary education (8%), those with a master's degree (5%), and those with a doctorate (1%).

4.2 Descriptive Statistics Analysis

The descriptive data presented is based on the research objective. For each table, the levels of agreement, mean scores and standard deviations are shown first, followed by an immediate interpretation.

4.2.1 Technology Transfer and Organizational Performance

Table 2 presents the descriptive statistics of the data collected via the questionnaire distributed to respondents involved in the study. Positive aggregate means were reported for technology transfer (M = 3.83, SD = 0.94). The availability of new technology received the highest mean score (M = 4.10, SD = .790), with 75% of respondents agreeing or strongly agreeing that this aspect influences performance. Training and skills development were also viewed positively (M = 3.80, SD = 0.980) by 70% of respondents. Joint innovation received a positive but less favourable rating (M = 3.60, SD = 1.050), with 30% of participants disagreeing or strongly disagreeing. The findings suggest that people perceive the impact of acquiring proven technology as more challenging than innovation. This is because innovation requires certain conditions to be met and is a cooperative process (Jia et al., 2022; Sang et al., 2024).

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Table 2

Technology Transfer and Organizational Performance

Statement	SA %	A %	N %	D %	SD %	Mean	Std. Dev.
Training and skills development related to technology transfer improve organizational performance.	37	33	0	17	13	3.80	.980
Access to new technology improves organizational performance.	49	26	2	23	0	4.10	.790
Joint innovation in new technology improves organizational performance.	44	26	0	19	11	3.60	1.050
Aggregate result	**43.3**	**28.3**	**.7**	**19.7**	**8.0**	**3.83**	**.940**

Source: Research data (2026). SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree.

4.2.2 Organizational Performance

The perceived organizational performance was found to be moderate (M = 3.51, SD = .955). The highest-rated variables were efficiency (M = 3.96, SD = .881) and productivity (M = 3.54, SD = .958), while planned quality was the lowest variable (M = 3.04, SD = 1.025). It can be suggested that changes related to technology will be more evident in terms of efficiency than quality, since the latter also depends on factors such as process management, maintenance, and the skills and knowledge of employees (Florêncio & de Oliveira, 2022; Li et al., 2026; Silva de Lima et al., 2025).

Table 3

Organizational Performance

Statement	SA %	A %	N %	D %	SD %	Mean	Std. Dev.
The organization consistently meets its productivity targets.	38	19	15	21	7	3.54	.958
The organization achieves its intended level of efficiency.	41	29	9	13	8	3.96	.881
The organization regularly maintains its planned quality.	37	23	6	20	14	3.04	1.025
Aggregate result	**38.7**	**23.7**	**10.0**	**18.0**	**9.7**	**3.51**	**.955**

Source: Research data (2026). SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree.

4.3 Reliability Test

The reliability of the questionnaire items that measure technology transfer was tested using Cronbach's alpha. According to Cronbach (1951) and Hair et al. (2019), reliability is considered high if Cronbach's alpha values are equal to .70 or more.

Table 4

Cronbach's Alpha Reliability Coefficient

Variable	Number of items	Cronbach's alpha	Decision
Technology Transfer	5	.880	Highly reliable

The technology transfer measure had a Cronbach's alpha value of .880, surpassing the minimum value of .70. Thus, the reliability of the measure was considered high.

4.4 Sampling Adequacy

The Kaiser-Meyer-Olkin measure and Bartlett's test of sphericity are generally used to establish whether the correlations at item level are strong enough to conduct factor analysis. These measures cannot be computed using aggregate means, standard deviations, or construct-level correlations. Therefore, if factor analysis is to be included in the final article submission, these two tests should be performed on the item-level dataset.

4.5 Testing the Assumptions of Simple Linear Regression

A simple linear regression model was tested based on the assumptions of normality, linearity, homogeneity, and the independence of errors. As only one predictor was included in the simple regression model, the assumption of multicollinearity did not apply.

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4.5.1 Test of Normality

The statistics on the distribution of technology transfer showed that it had a skewness of 0.275 and a kurtosis of -1.136. These values were within the acceptable range of -2 to +2. However, ordinary least-squares regression requires approximate normality of residuals rather than the predictor variable (Hair et al., 2019; Pallant, 2020).

4.5.2 Test for Linearity

There was a positive and significant correlation between the level of technology transfer and organizational performance (r = .7965); therefore, initial evidence of linearity exists. However, a scatter plot should be examined to ensure there is no curvilinearity or influential cases, in line with the recommended procedures for assessing regression assumptions (Hair et al., 2019; Pallant, 2020).

4.5.3 Test for Homoscedasticity

For homoscedasticity to be observed, the variance of residuals must be consistent regardless of the predicted organizational performance value. To check for homoscedasticity, a scatter plot of standardized residuals against standardized predicted values is required, as is an appropriate test such as the Breusch-Pagan test (Hair et al., 2019; Pallant, 2020). As the residual plot was not included in the summary statistics, it should be retained alongside the other statistics generated during the final analysis.

4.5.4 Test for Independence of Errors

The independence of errors should be checked using Durbin-Watson statistics, as a value near 2 indicates that errors are not serially correlated (Hair et al., 2019; Pallant, 2020). As the archived output did not contain this test, it should be checked directly in the final SPSS model summary.

Table 5

Summary of Simple Linear Regression Assumption Tests

Assumption	Diagnostic	Finding	Conclusion
Normality	Skewness and kurtosis	.275 and -1.136	Preliminary support
Linearity	Correlation and scatterplot	r = .7965; plot required	Preliminary support

Based on the available data, there is initial evidence in favour of the assumptions of normality and linearity. Multicollinearity does not apply, as there is only one predictor variable. Homoscedasticity and independent errors need to be verified using the residual plot and the Durbin–Watson statistic.

4.6 Inferential Statistics Analysis

Inferential statistics were employed to analyze the correlation between technology transfer and organizational performance.

Table 6

Correlation between Technology Transfer and Organizational Performance

Independent variable	Dependent variable	Pearson r	Relative strength
Technology transfer	Organizational performance	.7965	Strong positive

A significant positive correlation was found between technology transfer and organizational performance (r = .7965). This suggests that higher levels of supplier training, new technology and innovation are linked to high levels of productivity, efficiency and quality.

4.7 Simple Linear Regression and Model Summary

A simple linear regression analysis was conducted to examine the impact of technology transfer on organizational performance. A summary of the model can be found in Table 7.

Table 7

Model Summary for the Simple Linear Regression Analysis

Model	R	R Square	Adjusted R Square
1	.7965	.6344	.6313

Predictor: Technology transfer. Dependent variable: Organizational performance. Source: Computed from the reported correlation and sample size (research data, 2026).

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As shown in Table 7, the relationship between technology transfer and organizational performance is positive and significant (R = .7965). The coefficient of determination (R^2 = 0.6344) shows that technology transfer explains approximately 63.4% of the variance in organizational performance. The adjusted R^2 of 0.6313 indicates that a significant amount of explanatory power remains even when adjusting for sample size.

4.7.1 Coefficient of Determination

As shown in Table 7, the relationship between technology transfer and organizational performance is positive and significant (R = .7965). The coefficient of determination (R^2 = 0.6344) shows that technology transfer explains approximately 63.4% of the variance in organizational performance. The adjusted R^2 of 0.6313 indicates that a significant amount of explanatory power remains even when adjusting for sample size.

4.8 Analysis of Variance

Analysis of variance was used to examine the significance of the simple regression model. Given an R^2 value of 0.6344 and a sample size of 120 subjects, the F-test statistic value was calculated as $F = [R^2/1] / [(1 - R^2) / (n - 2)]$.

Table 8

ANOVA Test for the Simple Linear Regression Model

Model	df1	df2	F	Sig.	Decision
Regression model	1	118	204.768	< .001	Statistically significant

Dependent variable: Organizational performance. Predictor: Technology transfer. Source: Computed from R^2, sample size, and number of predictors.

As shown in Table 8, the simple regression model is significant at $F(1, 118) = 204.768$, $p < .001$. Consequently, the null hypothesis, which asserts that there is no linear relationship between technology transfer and organizational performance, is rejected. Technology transfer significantly accounts for variance in organizational performance.

4.9 Discussion

4.9.1 Technology Transfer and Organizational Performance

The study analysed the effect of technology transfer between supply chain partners on organisational performance. Based on the descriptive findings and the high correlation (r = .7965), it can be concluded that supplier-assisted training, access to technology and joint innovations contribute to improved organisational performance at Twiga Cement Company. The analysis revealed that access to technology is the most valuable factor, indicating that participants recognise the importance of using modern technologies, know-how, and technological innovations to improve performance. Conversely, joint innovation was assessed as less valuable than other factors, indicating that the organisation benefits more from acquiring technology than from generating innovations with suppliers. This conclusion is consistent with contemporary literature, which states that knowledge acquisition is easier and more effective than innovation, the latter of which also demands absorptive capacity, interactions, and proper governance (Florêncio & de Oliveira, 2022; Jia et al., 2022; Li et al., 2026; Sang et al., 2024).

The results support the Relational View Theory, which states that knowledge-sharing processes and complementary resources between organisations create relational rents that cannot be created by any organisation in isolation (Dyer & Singh, 1998). Technology transfer enables Twiga Cement to integrate the suppliers' technological knowledge and the company's production knowledge. This is consistent with the findings of foreign research by Sikombe and Phiri (2022) in Zambia, where knowledge transfer has mediated the impact of institutionalised supplier development on operational performance. It is also consistent with manufacturing evidence provided by Silva de Lima et al. (2025).

Further evidence supporting this significant correlation comes from Florêncio and de Oliveira (2022), who revealed absorptive capacity to be a mediator between technology transfer and performance, and from Jia et al. (2022), who revealed the learning mechanisms used to transfer knowledge to suppliers. The lower correlation with joint innovation studies is also consistent with Sang et al.'s (2024) results, which suggest that innovations are formed through collaboration and absorptive capacity rather than interaction alone. According to Li et al. (2026), the effect of technology transfer depends on multiple factors.

The finding in Tanzania is consistent with that of Kabugumila and Ndekwa (2024), who found that technological innovation helped improve the performance of third-party logistics firms. This finding also aligns with that of Changalima et al. (2022), who found that supplier development improves the performance of public procurement. However, this contradicts the findings of Kisinga et al. (2024), who found that knowledge transfer does not enhance the performance of small-scale grape processors, whereas supplier development does. These differences could be due to

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varying absorptive capacity, production technologies, firm size and logistics capability. Thus, the current research extends local and international findings by incorporating a capital-intensive cement manufacturing company, as well as separating technology transfer from other supplier management strategies.

V. CONCLUSIONS & RECOMMENDATIONS

5.1 Conclusions

The study concludes that, at Twiga Cement Company, questions regarding technology transfer, particularly the availability of new technology and supplier-based training, were answered positively, albeit with relatively low scores, indicating that the organization is more successful in utilizing existing technologies than in collaborating with suppliers to develop new solutions. The findings support the Relational View, suggesting that inter-organizational knowledge management processes and a complementary technical resource base can generate performance benefits. However, the cross-sectional design demonstrates association and statistical explanation rather than causality.

5.2 Recommendations

Twiga Cement Company must formalize processes such as supplier-driven training, mentoring, commissioning of equipment knowledge, operating procedure documentation, troubleshooting and technology adoption assessment, because, according to the results, the benefits of technology transfer require learning and absorptive processes. A joint innovation strategy should include clear objectives, multidisciplinary teams, protection of intellectual property, and performance measures. In future research, it will be necessary to conduct survey research alongside rates of machinery breakdown, maintenance costs, energy consumption, productivity, and product quality.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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