



THE IMPACT OF TOTAL QUALITY MANAGEMENT PRACTICES ON PRODUCTIVITY IN THE RAILWAY SECTOR IN AFRICAN CONTEXT

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ABSTRACT

Total quality management (TQM) has become acceptable generally as an approach for improving productivity in organisations in this 21st century. Whereas some studies have argued that implementation of TQM practices improve organisational productivity, others have failed to find the linkage between the two. This study, therefore, was conducted to determine and validate whether implementation of TQM practices increase productivity in railway transport sector. The study evaluated effect of TQM practices on productivity in Tanzania Zambia Railway Authority (TAZARA). Data were collected from 177 TAZARA managers through structured questionnaires and correlation and regression analysis were employed to analyse data. Results of the study show that practices of TQM have a positive significant effect on productivity. Results of regression analysis show that important innovations, customer-focus, transformational leadership and commitment, have significant positive effect on productivity in TAZARA. However, education and training, and employee responsibility and involvement have no significant effects on productivity.



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1. INTRODUCTION

The volatility and dynamism of 21st century environment has made managers to be alert, cautious and mindful of any changes faced in the fierce competitive market environment in order to ensure that their organisations survive and remain productive. The adoption of total quality management has now become a prerequisite for high productivity and competitiveness in the 21st century. Lori and Fallahnejad (2015) contend that in the last twenty years quality management has proved to have a positive effect on the performance of

any organization. Total quality management is an improvement to the traditional way of running business in today's modern world by the application of tools and techniques.

According to Nelldal (2000), the freight traffic volume in the last few decades has been increasing even when the railway transport sector has been losing market shares to other mode of transport. In Sub Sahara Africa for instance, thirty years ago, the railway systems were dominating the transportation sector by having high freight and passenger traffic market shares compared to

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other modes of transport. The high performance and monopoly of the railway sector in Africa enjoyed could be attributed to poor road infrastructure at that time (Bullock, 2009). Could it be concluded that the railway sector especially in Africa has not been adopting and employing total quality management?

1.1 Purpose of Study

Even when most and recent literature indicate that the adoption and implementation of total quality management practices has a positive effect on organisation's productivity (Chauhan and Nema, 2017; Siregar et al., 2017; Putri et al., 2017; Mitreva et al., 2016), some studies have failed to find the positive association between TQM and productivity (Yeung et al., 2006; Powell, 1995; Beaumont and Sohal, 1999). This inconsistency in results necessitated the need to conduct this study.

Despite the fact that studies relating to TQM have for the past few decades been increasing, little attention has been given to the railway transport sector. The railway sector has received little attention in research despite contributing much to the world economy (Talib and Rahman, 2010). For instance, for the last decade, only one study in the railway sector relating to TQM was conducted by Mitreva et al. (2016) in the Republic of Macedonia, Europe. This also prompted us to conduct this research in the African context.

Literature has also shown that the success of TQM practices depends on the sector and the particular company (Dow et al., 1999; Powell, 1995), hence it becomes also illogical to generalise the practices that yield better results in one sector to a different one, thus, the relevance of this study.

2. LITERATURE REVIEW

2.1 Total Quality Management

Total quality management is an approach for continuously and consistently detecting, eliminating or better still reducing errors in product manufacturing, designing supply chain management, improving satisfaction levels of customers and also ensuring that employees are well equipped with relevant skills.

Literature has grouped the critical success factors of TQM into soft and hard (Ho et al., 2001; Powell, 1995; Vouzas and Psychogios, 2007; Leavengood et al., 2014; Abdullah et al., 2009). According to Vouzas and Psychogios (2007), the hard critical success factors refer to the quality techniques, technical aspects, tools and production. These hard critical success factors or better still practices include: quality results, process management, product or service design among others. The soft critical success factors or practices refer to the human aspects and are related to top leadership

commitment, employee relations, customer focus, and others.

Based on some studies (Coşkun, 2011; Prajogo and Sohal, 2006; Claver et al., 2003; Aquilani et al., 2017; Terziovski, 2006; Ang et al., 2000), five practices, (critical success factors) were identified as relevant to this study for successful implementation of total quality management in the railway transport sector. These practices are important innovations; top leadership commitment; customer focus; education and training; and employee responsibility and involvement.

2.1.1 Customer Focus

This is one of the most relevant elements of TQM (Aquilani et al., 2017) as it addresses the issues of customer retention and satisfaction in an organisation. Customer satisfaction is regarded as the life blood of a firm because without customers, a firm cannot exist.

2.1.2 Top Leadership Commitment

The involvement and commitment of top leadership is relevant if the demands of the customers are to be met as well as achieving the mission and vision of the organisation. It is also a mandate of top leadership to create a conducive work environment, motivate and encourage the workforce on quality commitments. Committed top leadership creates TQM organization-wide direction, culture and mechanisms necessary for the implementation of the commitments (Beer, 2003).

2.1.3 Employee Responsibility and Involvement

Whenever employees are involved in decision making or any activity in an organisation, they become motivated and involved thereby owning results. Wilkinson et al (1992) assert that increased employee involvement and responsibility motivate employees to be more accountable for quality. Ultimately, employee involvement, enables top managers to concentrate on and sort out other critical issues and become aware of what is reflected on the ground. Increased employee involvement and responsibility motivates them to be more accountable and responsible for quality.

2.1.4 Education and Training

This practice, through equipping employees with skills and knowledge, helps to establish uniform quality language in a company and also secure change in behaviour and commitment on quality improvements (Mosadeghrad, 2014). According to Porter (2008), education and training are the key drivers of differentiation that create competitiveness.

2.1.5 Important Innovations

This is a relevant practice that is one of the driving factors of quality improvement (Ang et al., 2000). Raynor (1992) predicted that there would be no market share in future for firms that would not adopt quality. Important innovations are very critical especially in today's volatile dynamic environment where demand and tastes of customers change frequently.

2.2 Productivity

Productivity is defined as a measure of efficiency in the production of services or goods. "Productivity is a multidimensional term, the meaning of which can vary, depending on the context within which it is used" (Prasad et al., 2015, p.274). According to Innocent and Levi (2017) productivity is a summary measure of quantity and quality of work performance, with resources usage put into account. Productivity may be expressed as being successful using the dimensions of performance, effectiveness and efficiency. According to Chauhan and Nema (2017) anything that affects total revenue positively or affects annual cost negatively enhances productivity.

2.3 Total Quality Management and Productivity

TQM was presented not only to improve service quality but also improve productivity and quality in the Macedonian railway when Mitreva et al. (2016) assessed the application of TQM in the Macedonian railway transport.

Similarly, TQM was found to have a positive effect on productivity by Chauhan and Nema (2017) in insurance sector when attempts to investigate how TQM enhances productivity were carried out.

Putri et al. (2017) investigated the influence that TQM implementation has on employee productivity in rubber industry. The results indicated that TQM does influence employee productivity. Yassine et al. (2019) also found similar results when investigating the effect of TQM on employee productivity in hotel industry.

Terziovski (2006) tested the association strength between TQM practices and productivity and customer satisfaction. The results revealed that TQM increases quality, customer satisfaction, and productivity.

The association between TQM and productivity has been presented to be statistically significant by a lot of other studies (see Siregar et al., 2017; Rachmat, 2015; Musa and Alawad, 2011).

On the contrary, the study by Yeung et al. (2006) failed to find the difference in performances between firms practicing TQM and those that were not practicing TQM. Relatedly, the study conducted by Beaumont and Sohal (1999) in Australia found no correlation between

TQM practices and improved success of the service industries. Redman (1995) in United Kingdom also found similar results when investigating if TQM was working in UK.

On the other hand, the study by Dow et al. (1999) revealed that some TQM practices contribute to good quality performance while others do not when all practices of TQM were investigated. The findings of Dow et al. (1999) are consistent with Powell (1995)'s results that indicated that some practices do not lead to any advantage and made him conclude that the ideology of TQM is not necessarily needed to outperform rival competitor.

2.4 Research Hypotheses

For the purpose of this study and based on literature review, the following hypotheses were adopted:

1. Hypothesis 1: Important innovations have a positive significant effect on productivity
2. Hypothesis 2: Customer focus has a positive significant effect on productivity
3. Hypothesis 3: Education and training has a positive significant effect on productivity
4. Hypothesis 4: Transformational leadership and commitment has a positive significant effect on productivity
5. Hypothesis 5: Employee responsibility and involvement has a positive significant effect on productivity

3. CONCEPTUAL FRAMEWORK

The association between the independent variables and dependent variable utilized in this study acted as a conceptual framework, as presented in Figure 1. This conceptual framework was formulated based upon literature review.

4. METHODOLOGY

For the purpose of this study, Tanzania Zambia Railway Authority (TAZARA) was picked. TAZARA is owned by two states (Tanzania and Zambia) on a 50/50 basis and has been in operation since its construction in 1975. A questionnaire was distributed to 208 respondents who are in TAZARA management against a target population of 240 managers. One hundred and seventy seven (177) respondents completed and submitted back the questionnaire. Quantitative approach was employed to analyse data collected. The 177 sample size of the study was adequate against population target of 240 based on Morgan and Krejcie (1970) formula for determining the sample size required to conduct a scientific research. Refer to Table 1 and formula below for verifications regarding sample size based on Morgan and Krejcie (1970) formula:

$$n = X^2 NR (1 - P) \div d^2 (N - 1) + X^2 R(1 - R)$$

s = sample size required.

X^2 = table value of chi-square for one degree of freedom at the confidence level 3.84(1.96 x 1.96 = 3.842).

N = size of population

R = population proportion with 0.50 assumption to provide maximum sample size.

D = degree of accuracy at 0.05 proportional.

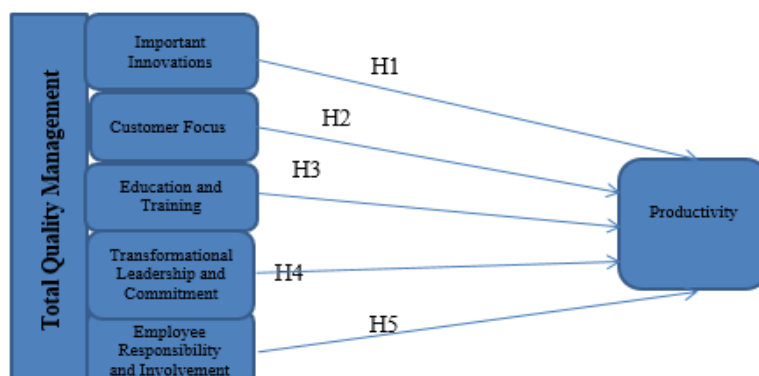


Figure 1. Hypothesized Model
Source: Authors (2022)

4.1 Measures

Table 1. Determining Sample Size of a given Population by using Krejcie and Morgan (1970) formula

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	100000	384

Source: (Krejcie & Morgan, 1970)

A Five-point Likert scales was utilised to measure all the constructs with (1) referring to strongly disagree and (5) referring to strongly agree. This study’s TQM critical success factor or practices measures namely, important innovations, top leadership commitment, customer focus, education and training and, employee responsibility and involvement) were adopted from some studies conducted by Coşkun (2011), Prajogo and Sohal (2006), Claver et al. (2003), Aquilani et al. (2017), Terziovski (2006), Ang et al. (2000). Productivity measures were adopted from Grayson et al. (2016).

5. DATA PRESENTATION AND ANALYSIS

Jamovi software was used in this study to analyse data. The results of this study are shown and discussed in various terms of descriptive statistics, hypothesis tests, figures and tables.

5.1 Response Rate

Two hundred and eight (208) questionnaires were distributed to the population target of 240 TAZARA managers. Out of two hundred and eight (208) distributed questionnaires, one hundred and seventy seven (177) completed and returned the questionnaire, representing 85%. The sample size of this study met the minimum recommended sample size based on the target of 240 using the formula of Morgan and Krejcie (1970) elaborated in the methodology section.

5.2 Demographic Characteristics

Table 2 presents the demographic profile of the 177 respondents who participated in this study based on experience and gender.

Table 2. Demographic Profile

Description	Frequency	Percentage (%)
Gender		
Female	31	17.5
Male	146	82.5
Total	177	100
Years-Experience		
< 10	49	27.7
10-20	68	38.4
> 20	60	33.9
Total	177	100

Source: Survey

Out of 177 participants, 82.5% were male and 17.5% were female. On experience, out of 177 participants, 33.9% have experience of over 20 years with TAZARA, 38.4% have between 10 to 20 years, while 27.7% have below 10 years.

5.3 Descriptive Statistics

Table 3 below shows constructs of mean, standard deviation, skewness and kurtosis for all the six constructs used in the study. Table 3 also shows that TAZARA managers perceived customer focus with highest mean of 3.36 to be the dominant TQM practice followed by employee responsibility and involvement, then transformational leadership and commitment, important innovations, and education and training, respectively.

Table 3. The Mean, standard deviation, kurtosis and skewness constructs (N = 177)

	P	II	CF	ET	TL	ERI
N	177	177	177	177	177	177
Missing	42	42	42	42	42	42
Mean	2.93	2.98	3.36	2.78	3.07	3.13
Median	2.89	3.00	3.40	3.00	3.00	3.20
Standard deviation	0.722	0.787	0.723	0.911	0.831	0.772
Minimum	1.00	1.00	1.00	1.00	1.00	1.00
Maximum	4.89	5.00	4.80	4.75	5.00	5.00
Skewness	0.00313	-0.07	-0.55	-0.07	0.0551	-0.09
Std. error skewness	0.183	0.183	0.183	0.183	0.183	0.183
Kurtosis	0.230	0.261	0.295	-0.47	-0.120	-0.02
Std. error kurtosis	0.363	0.363	0.363	0.363	0.363	0.363

Source: Survey

The mean values for the six constructs indicate that respondents responded favourably. The skewness and kurtosis are both in the recommended range of -2 to +2 showing no serious deviation from normality for each of the construct. Table 3 also indicates the means of participants' perception of degree of the practices of TQM ranging from 2.73 to 3.36. This shows that the company (TAZARA) implements the practices of TQM. The overall average mean of TQM practices is 3.064 showing that agreement on practice implementation is good.

5.4 Reliability and Validity

5.4.1 Testing Assumptions of Study Variables

Data from the sample met the four assumptions (linear relationship between variables, multiple variables measured either at continuous or ordinal levels, no significant outliers, and sampling adequacy) of running principal component analysis (Laundau and Everitt, 2004). The sample size of 177 respondents was also

adequate and satisfied the minimum required 150 to conduct a principal component analysis (Fan et al., 2008). The test of reliability was carried out in order to get the measures that are reliable in determining good internal consistency and suitability of measures utilised.

5.4.2 Test Results of Reliability and Validity

The factorability of 39 items in the instrument's measurement was evaluated. It was seen that the 39 items correlated all at least 0.3 with atleast one item showing reasonable factorability. The Kaiser Meyer Olkin (KMO) measure of sampling adequacy was 0.882 above the value of 0.6. The Bartlett's test of sphericity was significant ($\chi^2 (741) = 3157, p < .001$). Therefore, the principal components analysis was suitable for the 39 items based on the above indicators.

Table 4. Kaiser-Meyer-Olkin and Barlett's Test result

Source: Survey

Kaiser-Meyer-Olkin and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy:		.882
Bartlett's Test of Sphericity	Approx. Chi-Square	3157
	Degrees of freedom	741
	Significance	.000

Cronbach Alpha for the scales for each construct was carried out using reliability analysis. Cronbach alpha is widely used to determine the reliability of measurements. The analysis indicates that Cronbach's alpha for the instrument met the acceptable recommended threshold of 0.6 (Cresswell, 2010; Pallant, 2001; Sekaran, 1992). Alpha coefficients of the instrument ranged between 0.777 and 0.846. The alpha coefficient for productivity scales was 0.846, while the alpha coefficient for important innovations scales was 0.777. The alpha coefficient for customer focus was 0.842 while the alpha coefficient for education and training scales was 0.797. The alpha coefficient of employee responsibility and involvement scales was 0.739 while the alpha coefficient for transformational leadership and commitment scales was 0.807. The Cronbach alpha coefficients for all the constructs did exceed the acceptable threshold of 0.6.

Table 5. Cronbach Alpha Test Results

Items	Cronbach's Alpha	McDonald's Mega	Number of Items	Comment
Overall	.937	.938	39	Accepted
Productivity	.846	.847	9	Accepted
Important Innovations	.777	.780	5	Accepted
Customer Focus	.842	.846	10	Accepted
Education and Training	.797	.799	4	Accepted
Transformational Leadership and Commitment	.807	.813	6	Accepted
Employee Responsibility and Involvement	.739	.743	5	Accepted

Source:Survey

5.4.3 Linearity

There was linearity between the association between predictor variables and dependent variable. This linearity assumption was verified by the correlation coefficients presented in Table 6.

Table 6. Correlation Matrix of Total Quality Management Practices and Productivity

		P	CF	ERI	ET	TL	II
P	Pearson's r	—					
	p-value	—					
	Spearman's rho	—					
	p-value	—					
	N	—					
CF	Pearson's r	0.538 ***	—				
	p-value	<.001	—				
	Spearman's rho	0.515 ***	—				
	p-value	<.001	—				
	N	177	—				
ERI	Pearson's r	0.400 ***	0.472 ***	—			
	p-value	<.001	<.001	—			
	Spearman's rho	0.350 ***	0.408 ***	—			
	p-value	<.001	<.001	—			
	N	177	177	—			
ET	Pearson's r	0.446 ***	0.441 ***	0.426 ***	—		
	p-value	<.001	<.001	<.001	—		
	Spearman's rho	0.403 ***	0.401 ***	0.372 ***	—		

Table 6. Correlation Matrix of Total Quality Management Practices and Productivity

		P	CF	ERI	ET	TL	II
	p-value	<.001	<.001	<.001	—		
	N	177	177	177	—		
TL	Pearson's r	0.557 ***	0.652 ***	0.690 ***	0.473 ***	—	
	p-value	<.001	<.001	<.001	<.001	—	
	Spearman's rho	0.488 ***	0.617 ***	0.661 ***	0.428 ***	—	
	p-value	<.001	<.001	<.001	<.001	—	
	N	177	177	177	177	—	
II	Pearson's r	0.652 ***	0.540 ***	0.486 ***	0.519 ***	0.570 ***	—
	p-value	<.001	<.001	<.001	<.001	<.001	—
	Spearman's rho	0.603 ***	0.467 ***	0.398 ***	0.463 ***	0.495 ***	—
	p-value	<.001	<.001	<.001	<.001	<.001	—
	N	177	177	177	177	177	—

Note. * p < .05, ** p < .01, *** p < .001

Source: Survey

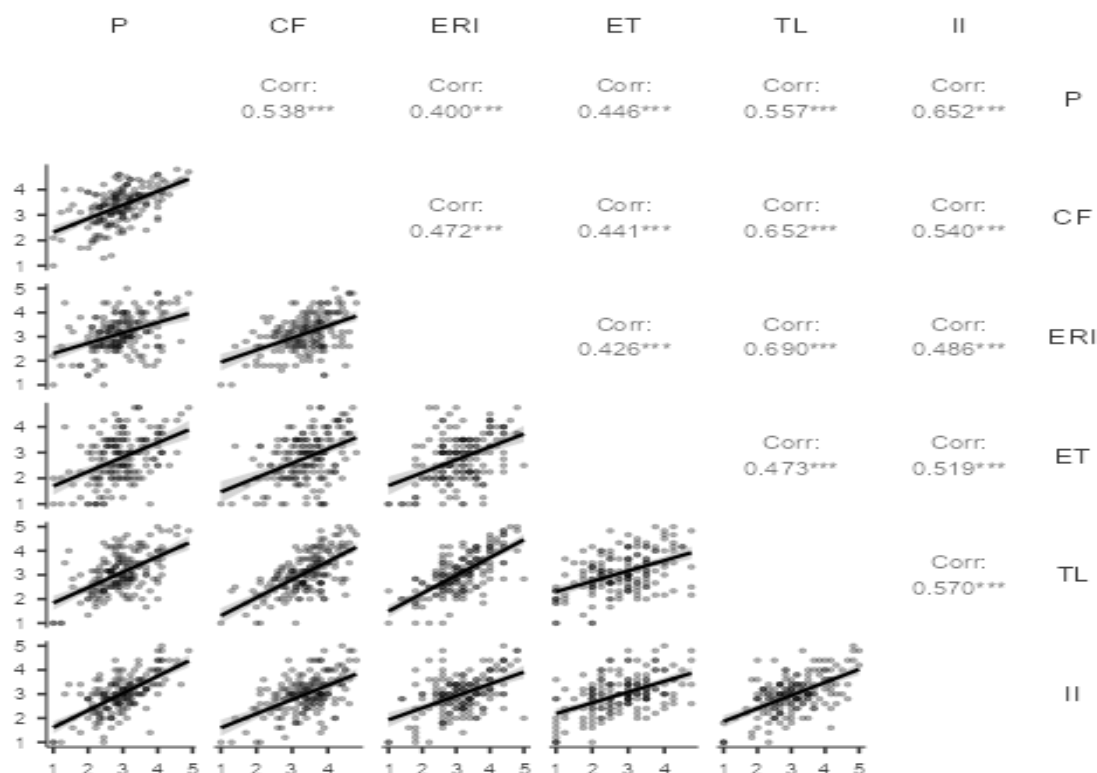


Figure 2. Correlation matrix plot

Source: Survey

The results indicate positive significant and moderate correlations between TQM practices and productivity with highest correlation coefficient of between TQM

practices and productivity being 0.690 below the cut off of 0.9 for collinearity problem. Thus, no multicollinearity issues (Hair et al., 1998). This result also supports the

validity and reliability of scale measurements of the study.

Table 6 shows that there was significant correlation between customer focus (CF) and productivity ($r=0.538$, $n=177$, $p\leq 0.01$). There was a positively significant correlation between employee responsibility and involvement, and productivity ($r=0.400$, $n=177$, $p\leq 0.01$). There was a positive significant correlation between productivity and education and training ($r=0.446$, $n=177$, $p\leq 0.01$). Transformational leadership and commitment, and productivity had a positive correlation ($r=0.557$, $n=177$, $p\leq 0.01$). Productivity and important innovations recorded a strong positive correlation ($r=0.652$, $n=177$, $p\leq 0.01$). Customer focus and employee responsibility and involvement had a positive significant correlation ($r=0.472$, $n=177$, $p\leq 0.01$). Customer focus and education and training, recorded a positive significant correlation ($r=0.441$, $n=177$, $p\leq 0.01$). Customer focus and transformational leadership and commitment, also positively correlated ($r=0.652$, $n=177$, $p\leq 0.01$). Customer focus and important innovation recorded a positive significant correlation ($r=0.540$, $n=177$, $p\leq 0.01$). There was a positive correlation between employee responsibility and involvement, and education and

training ($r=0.426$, $n=177$, $p\leq 0.01$). There was a strong positive correlation between employee responsibility and involvement, and transformational leadership and commitment ($r=0.690$, $n=177$, $p\leq 0.01$). There was a positive correlation between employee responsibility and involvement, and important innovations ($r=0.486$, $n=177$, $p\leq 0.01$). There was positive correlation between education and training, and transformational leadership and commitment ($r=0.473$, $n=177$, $p\leq 0.01$). Education and training positively correlated with important innovations ($r=0.519$, $n=177$, $p\leq 0.01$). Transformational leadership and commitment, and important innovations positively and significantly correlated ($r=0.570$, $n=177$, $p\leq 0.01$).

5.4.4 Multiple Regression Analysis

Hypotheses in this study test five practices of total quality management as independent variables to determine if there is an effect on productivity : Important innovations, customer focus; education and training; transformational leadership and commitment and; employee responsibility and involvement. Regression analysis was employed to carry out this test.

Table 7. Model Fit Measures of the Impact of Total quality management Practices on Productivity (N= 177)

Model	R	R ²	Adjusted R ²	Overall Model Test			
				F	df1	df2	P
	0.705	0.497	0.482	33.8		171	< .001

Source: Survey

Table 8. Model Coefficients – Productivity

Predictor	Estimate	SE	T	P
Intercept	0.6552	0.2084	3.145	0.002
II	0.3997	0.0665	6.012	< .001
CF	0.1624	0.0746	2.176	0.031
ET	0.0602	0.0526	1.144	0.254
TL	0.1844	0.0776	2.375	0.019
ERI	-0.0632	0.0713	-0.886	0.377

Source: Survey

Table 9. Hypothesis Results

	Hypothesis	Outcome
1.	Hypothesis 1: Important innovations have a positive significant effect on productivity	Supported

2.	Hypothesis 2: Customer focus has a positive significant effect on productivity	Supported
3.	Hypothesis 3: Education and training has a positive significant effect on productivity	Not Supported
4.	Hypothesis 4: Transformational leadership and commitment has a positive significant effect on productivity	Supported
5.	Hypothesis 5: Employee Responsibility and Involvement has a positive significant effect on productivity	Not Supported

Source:Survey

Table 7 above shows that the model was very much adequate as F-statistics was statistically significant (p -value < 0.001) with coefficient of determination (R^2) being 0.497 representing that 49.7% of productivity can be explained by the five practices of TQM. This implies that overall model was significant.

Table 8 shows the results of regression analysis that have presented that: Important innovations has a positive significant effect on productivity ($p < 0.001$; $\gamma = 0.3997$), thus, Hypothesis 1 supported; Customer focus has a positive significant effect on productivity ($p = 0.031$; $\gamma = 0.1624$), hence, hypothesis 2 supported; Education and training has no significant effect on productivity ($p > 0.05$; $\gamma = 0.0602$), therefore hypothesis 3 not supported; Transformational leadership and commitment has a positive significant effect on productivity ($p = 0.019$; $\gamma = 0.1844$), thus, hypothesis 4 supported; Employee responsibility and involvement had no positive significant effect on productivity ($p > 0.05$, $\gamma = -0.0632$), therefore, hypothesis 5 not supported.

Considering the values, important innovations has highest effect on productivity, followed by transformational leadership and commitment, then customer focus respectively. TQM practices have an impact on productivity.

6. DISCUSSION

The study findings indicate that male managers in Tanzania Zambia Railway Authority are the majority accounting for 82.5% while female account for 17.5%. The study indicates that employees with work experience between 10 to 20 years are the majority with 38.4%, followed by those employees with the work experience of over 20 years accounting for 33.9%, then employees with below 10 years work experience accounting for 27.7%.

The study results also show that TAZARA implements practices of TQM and managers are aware on the importance of implementing practices of TQM. This shows that managers are aware of the relevance of implementing TQM practices. The study shows that customer focus has the highest implementation followed employee responsibility and involvement, then transformational leadership and commitment, important innovations, and education and training, respectively.

The study main objective was to examine the effect of total quality management practices on productivity in the railway transport sector in the case of TAZARA. The results of the study indicate that important innovations,

customer focus, education and training, transformational leadership and commitment, and employee responsibility and involvement were all found to be good predictors of productivity in TAZARA ($R^2 = 0.497$, $F = 33.8$, $p < 0.001$). The study results are consistent with studies that have presented that practices of TQM have a positive effect on productivity (Chauhan and Nema, 2017; Siregar et al., 2017; Putri et al., 2017; Mitreva et al., 2016).

The results of multiple regression analysis have shown that three TQM practices out of five adopted in this study (important innovations, customer focus and transformational leadership and commitment) have a positive significant effect on productivity in TAZARA whereas, the two other TQM practices (education and training, and employee responsibility and involvement) have no significant effect on productivity. This result does not negate the importance of education and training, and employee responsibility and involvement, and is consistent with some studies that have shown that some practices of TQM do not lead to advantage in some companies/industries (Powell, 1995; Dow et al., 1999).

7. CONCLUSION

The study is among the very few empirical studies that have explored the relationship between practices of TQM and productivity in railway sector. The study is actually the very first in Africa. The results of the study also give a theoretical support for the association between the practices of TQM and productivity. The study has revealed that there is a significant positive implementation of TQM practices in TAZARA and that the employees are aware of the practices.

The multiple regressions analysis shows that total quality management practices together have a positive significant effect on productivity. However, not all TQM practices have a significant effect on productivity in TAZARA. Important innovations, customer focus, and transformational leadership and commitment, have significant positive effect on productivity. Meanwhile, education and training, and employee responsibility and involvement have no positive significant effect on productivity. Important innovations has highest effect, followed by transformational leadership and commitment, customer focus respectively.

The study has proved that total quality management practices enhance productivity and that the effect of TQM practices is of the utmost importance. Since the TQM practices are not one size fit for all companies, it is

important that decision makers/managers know the practices of TQM that have significant impact on their companies' productivity.

7.1 Limitations and Recommendations for Further Study

7.1.1 Limitations

The study applied a quantitative methodology just like most of the studies on TQM have done before. The conclusions are therefore based on quantitative findings and devoid of the information that would have been captured had qualitative methods been applied also. Furthermore, this study involved only one railway, namely TAZARA. Moreover, it was the very first in Africa on TQM in the railway sector. Generalizing the results of the study may therefore not be so accurate unless another study has been conducted.

7.1.2 Recommendations for Further Study

Railway companies are strongly recommended to adopt and employ TQM practices for increased productivity. Customer focus, transformational leadership and commitment and important innovations are important factors of practices of TQM and, according to the degree of implementation in Tanzania Zambia Railway Authority they are on first, third, and fourth positions respectively, hence, management in TAZARA should give attention to these three practices and collectively implement them. The insignificant results of TQM

practices namely, education and training, employee responsibility and involvement call for more investigations to determine why these practices have no effect on productivity in the railway sector. Furthermore, studies are recommended to be carried out in other railway transport companies in other African countries to avoid generalising the results of this study and to bridge the gap in literature. Qualitative research approach is also recommended because most studies that have investigated the association between TQM practices and productivity have been employing quantitative approach only.

7.2 Contribution and Relevance of the Study

This study is the first to investigate the effect of TQM practices on productivity in the railway sector. The study is of utmost importance to TAZARA and other railway transport companies. It is not only beneficial to railway practitioners but also to other practitioners in other sectors and scholars.

The findings of this study are very useful to Tanzania Zambia Railway Authority as well as other railway companies as it would help decision makers to develop and implement strategic directions that would improve productivity. Moreover, strategy is very important whenever, an organisation wants to achieve its objectives.

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