
Linking Productivity and Competitive Advantage: The Mediation of Quality Results

Tryson Yangailo

University of Zambia

Corresponding Author*: ytryson@yahoo.com

ABSTRACT

Purpose: Most studies have shown that there is a significant relationship between productivity and competitive advantage, but none have attempted to include a contingency variable to provide more insight into the nature of this relationship. To fill this gap, this study was conducted to empirically verify this relationship by including 'quality results' as a contingency variable.

Design/methodology/approach: Quantitative research approach was employed and primary data was collected from TAZARA management employees. Model fit, reliability and validity were tested using regression analysis, factor analysis and principal component analysis using Jamovi software.

Findings: The results show that there is a positive and significant relationship between productivity and competitive advantage, and between quality results and competitive advantage. The results also show that quality results partially mediate the relationship between productivity and competitive advantage.

Practical implications: The study provides insights on the nature of the relationship between productivity and competitive advantage. The study proves that quality results is critical to improving and sustaining productivity to promote competitiveness in an organisation. As organisations relentlessly seek to maintain and gain competitiveness through productivity, managers and employees need to understand how quality results can be integrated into all operations.

Paper type: Research paper

Keyword: *Productivity, Quality Results, Competitive Advantage, Mediation*

Received : July 12th

Revised : October 18th

Published : November 30th

I. INTRODUCTION

In today's 21st century, each and every organisation is making every effort to survive in this competitive market environment (Yadav, 2022), as organisations are aware of the fact that providing quality products and services is the key to achieving higher levels of customer satisfaction (Yangailo,2022b). The 21st century is the century that is uniquely focused on quality, unlike the 20th century which was focused on productivity (Juran, 1993). Meeting requirements is called quality. As quality improves, so does productivity. This is because waste and rework are reduced and resources are used more efficiently. When productivity is improved, an organisation is able to reduce the price and become competitive on both quality and price. Customers are also satisfied because they get value for money. The quality results include increased customer satisfaction, reduced costs, increased profitability and increased customer loyalty and retention.

A. Purpose of the study

Some previous studies that have examined the nature of the relationship between the concept of productivity and competitive advantage have presented that the two concepts are significantly related to each other, with other studies concluding that productivity is one of the important elements in determining the competitiveness of firms (Dresch et al., 2018).

On the other hand, very few studies have empirically tested the nature of this relationship, and none have attempted to include a contingency variable to provide more insight into the nature of this relationship. To fill this gap, this study was conducted to empirically test this relationship by including 'quality results' as a contingency variable. This study was conducted in the context of the railway sector, a sector that has received little research attention (Yangailo, 2022a; Yangailo et al., 2023).

B. Research Objectives

In order to address the gap identified in the literature, this study developed the following objectives:

1. To relate productivity with competitive advantage
2. To determine whether quality results mediate the relationship between productivity and Competitive advantage.

C. Literature Review

1. Competitive Advantage

Competitive advantage is defined as the ability of an organisation to conduct its activities in a way that is different from the other competitors (Kotler, 2000). Competitive advantage allows a firm to consistently perform better than its rivals and generate significant profits from the good share of its market (Yangailo, 2023).

2. Productivity

Productivity is referred to as a measure of efficiency in the production of goods and services. It is also expressed as success in terms of efficiency, performance and effectiveness. Productivity is the relationship between the amount of output produced and the amount of input required to produce it (Yangailo 2022b). "Productivity is a multidimensional term whose meaning can vary depending on the context in which it is used" (Prasad et al., 2015).

3. Quality Results

This element ensures that production measures and production costs are emphasised together with the evaluation of employee success (Ang et al., 2000). Quality results include reduced costs, increased customer satisfaction, increased profitability and increased customer retention and loyalty. Raynor (1992) predicted that the 21st century would focus on quality and that those companies that failed to apply quality would fail to retain customers (p.3).

4. Productivity and Competitive advantage

Productivity is the only relevant measure of competitiveness (Schwab & Sala-i-Martin, 2016). Therefore, increasing productivity implies improving competitiveness, though Buckley et al. (1988) contend that that productivity is just one of the elements of competitiveness.

Dresch et al. (2018) attempted to comprehend the concept of competitiveness at firm level and its association with productivity through a system thinking of literature. The results affirm the relevance of productivity in determining competitiveness of the firm.

Carayannis and Grigoroudis (2014) examined the linkage among productivity, innovation, and competitiveness. The presents that an inherently relationship among the concepts of productivity, innovation, and competitiveness.

It is evident from some previous studies that there is a significant relationship between productivity and competitive advantage, thus:

Hypothesis 1: Productivity has a significant impact on competitive advantage.

5. Quality Results and Productivity

Nanda et al. (2022) conducted a study to understand the co-associations of variables and how product quality improves productivity of DRI in rotary kiln. The results showed that quality improves productivity.

Yangailo (2022b) conducted a study to determine the moderation effect of quality results on the relationship between important innovations and productivity. The study presents that quality results moderates the relationship between important innovations and productivity.

Lee et al. (2007) examined the relationship between quality and productivity in the manufacturing industry. The results of the study supported the belief that quality and productivity are indeed related and lead to increased profits.

Based on the recent previous empirical studies, it is evident that quality results positively relate with productivity, thus:

Hypothesis 2: Quality results has a positive significant relationship with productivity.

6. Quality Results and Competitive Advantage

Yangailo (2023) investigated the influence that transformational leadership has on competitive advantage through quality results and important innovations. The study presents that transformational leadership style, important innovations and quality-results have positive significant effects on competitive advantage. The results also present that quality-results partially mediate the association between transformational-leadership and competitive advantage.

Chaniago and Mudjiardjo (2021) examined the impact of logistics service quality and service differentiation on competitive advantage in the freight forwarding companies in Jakarta. The study found a significant influence of quality on competitiveness.

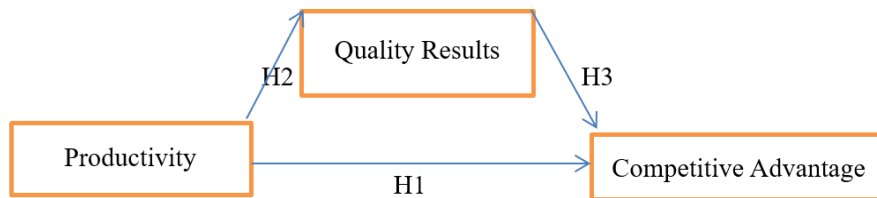
Kusumadewi and Karyono (2019) examined the influence of innovation and quality on competitive advantage in retailing. The study presents that innovation and quality have a positive significant impact on competitive advantage.

Based on the recent previous empirical studies, it is evident that quality results has a positive significant effect on competitive advantage, thus:

Hypothesis 3: Quality results has a positive significant impact on competitive advantage.

C. Conceptual Framework

The following model in Figure 1 was developed based on the relationship between the variables used in this study and the literature review.



Source: Author (2023)

Figure 1. Hypothesised Model

D. Hypotheses

The following hypotheses are based on the aim of this study, the findings of the literature review and the hypothesised model.

1. Hypothesis 1: Productivity has a significant impact on competitive advantage.
2. Hypothesis 2: Quality results has a positive significant relationship with productivity.
3. Quality results has a positive significant impact on competitive advantage.
4. Hypothesis 4: Quality results has a mediating effect on the relationship between productivity and competitive advantage.

II. METHODS

This study was carried out on an organisation called the Tanzania Zambia Railway Authority (TAZARA). TAZARA is owned by two state (Zambia and Tanzania) on the (50/50) basis and has been operating since it was constructed from 1975. The questionnaire was distributed to 200 respondents who are management staff against a target population of 240. One hundred and fifty-eight (158) respondents completed the questionnaire, representing a response rate of 79%. The quantitative method was used to analyse the data collected using Jamovi software. The sample size of 158 against the target population of 240 met the required threshold recommended by Krejcie and Morgan (1970) to conduct scientific research (see Table 1).

Table 1. Sample Size determination

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	1000000	384

Note.—*N* is for population size.

S is for sample size.

Krejcie and Morgan (1970)

A. Measures

Five-point Likert scales were used to measure the constructs, with strongly agree being (5) and strongly disagree being (1).

III. RESULTS AND DISCUSSION

The analysis was based on the quantitative research method using Jamovi software. The results of the study are presented in the form of descriptive statistics, tables, figures and hypothesis tests.

A. The Response Rate

Two hundred (200) questionnaires were distributed to participants out of a target population of 240. Of the 200 respondents, 158 respondents completed the questionnaire, giving a response rate of 79%.

B. The Demographic Characteristics

The demographic profile of the 158 respondents who participated in the study by gender and experience is presented in Table 2.

Table 2. Demographic Profile

<i>Description</i>	<i>Frequency</i>	<i>Percentage (%)</i>
<i>Gender</i>		
<i>Female</i>	26	16.5
<i>Male</i>	132	83.5
<i>Total</i>	158	100
<i>Experience in Years</i>		
< 10	46	29
10-20	58	37

> 20	54	34
<i>Total</i>	158	100

Source: Author (2023)

Of the 158 respondents, 132 (83.5%) were male and 26 (16.5%) were female. In terms of experience with the company, 46(29%) of the 158 respondents had less than ten (10) years of work experience, 58(37%) had between 10 and 20 years of work experience, and 54(34%) had more than 20 years of work experience.

C. Descriptive Statistics

Table 3 shows the mean, standard deviation, skewness and kurtosis for the constructs used in this study.

Table 3. Mean, Standard Deviation, Skewness, & Kurtosis of Constructs (N = 158)

	CA	P	QR
<i>N</i>	158	158	158
<i>Mean</i>	2.89	2.90	3.17
<i>Median</i>	3.00	2.89	3.20
<i>Standard deviation</i>	0.757	0.731	0.718
<i>Minimum</i>	1.00	1.00	1.00
<i>Maximum</i>	5.00	4.89	5.00
<i>Skewness</i>	-0.0399	0.0159	-0.324
<i>Std. error skewness</i>	0.193	0.193	0.193
<i>Kurtosis</i>	-0.0177	0.273	0.525
<i>Std. error kurtosis</i>	0.384	0.384	0.384

Source: Jamovi computation

The mean values of the constructs show that participants responded positively. Skewness and kurtosis were within the threshold range of -2 to +2, indicating that there was no serious deviation from normality.

D. Reliability and Validity

1. Assumptions of Study Variables

The data collected from this study was subjected to validity and reliability testing to ensure that the data collected could be analysed using Factor Analysis (FA). In order to use Principal Component Analysis, the data should fulfil four (4) assumptions in order to produce valid results (Landau & Everitt, 2003). These assumptions

are linear relationship between variables, multiple variables assessed at either ordinal or continuous levels, no significant outliers, and sampling adequacy. The sample data collected met all four assumptions after examination. In order to perform principal component analysis (PCA), the data must have a minimum of 150 cases (Fan et al., 2008). Therefore, the 158 cases met the minimum data requirement to conduct PCA. A reliability test was carried out to provide reliable measures to determine the good consistency and appropriateness of the measures used. The Cronbach alpha for all three construct scales was calculated by conducting a reliability analysis with the minimum recommended by Hair et al. (2006) and Nunnally (1978) of 0.7.

2. Reliability and Validity Test Results

The factorability of all 19 items in the instrument was assessed and it was found that they all correlated at least 0.3 with another item that showed adequate factorability. The KMO, which is the Kaiser-Meyer-Olkin measure of sampling adequacy, was 0.879 above the value of 0.6. Bartlett's sphericity test was significant ($\chi^2(171) = 1198, p < .001$). PCA was considered appropriate for the 19 items shown in Table 4.

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

<i>Barlett and Kaiser-Meyer-Olkin's Test Results</i>			
<i>KMO Measure of Sampling Adequacy.</i>			<i>.879</i>
<i>Bartlett's Test of Sphericity</i>	<i>Approx. Chi-Square</i>		<i>1198</i>
	<i>Degrees of freedom</i>		<i>171</i>
	<i>Significance</i>		<i>.000</i>

Source: Jamovi computation

The results of this analysis show that the Cronbach's alpha of the instrument was well above the required minimum threshold of 0.7 (Nunnally, 1978; Hair et al., 2006). The alpha coefficient of the instrument ranged between .765 and .855. The alpha coefficient for the productivity scales was .855, the alpha coefficient for the quality results scales was .765 and the alpha coefficient for the competitive advantage scales was .786. The Cronbach alpha coefficients for all constructs met the minimum acceptable threshold of 0.7 as shown in Table 5.

Table 5. Test Results of the Cronbach Alpha

<i>Items</i>	<i>Cronbach's Alpha</i>	<i>McDonald's Mega</i>	<i>Number of Items</i>	<i>Comment</i>
<i>Overall</i>	<i>.904</i>	<i>.905</i>	<i>19</i>	<i>Accepted</i>
<i>Productivity</i>	<i>.855</i>	<i>.857</i>	<i>9</i>	<i>Accepted</i>
<i>Quality Results</i>	<i>.765</i>	<i>.773</i>	<i>5</i>	<i>Accepted</i>
<i>Competitive Advantage</i>	<i>.786</i>	<i>.787</i>	<i>5</i>	<i>Accepted</i>

Source: Jamovi computation

3. The Linearity

There is a linear relationship between the independent and dependent variables. This assumption was verified by calculating the correlation coefficients, as shown in Table 6.

Table 6. The Construct Correlation Matrix

		<i>QR</i>	<i>P</i>	<i>CA</i>
<i>QR</i>	<i>Pearson's r</i>	—		
	<i>Spearman's rho</i>	—		
	<i>N</i>	—		
<i>P</i>	<i>Pearson's r</i>	0.625 ***	—	
	<i>Spearman's rho</i>	0.592 ***	—	
	<i>N</i>	158	—	
<i>CA</i>	<i>Pearson's r</i>	0.530 ***	0.593 ***	—
	<i>Spearman's rho</i>	0.441 ***	0.531 ***	—
	<i>N</i>	158	158	—

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

QR = Quality Results

P = Productivity

CA= Competitive Advantage

Source: Jamovi Computation

The results show significant positive correlations between quality results, productivity and competitive advantage. Quality results and CA show a positive significant correlation coefficient of .530. Quality results and productivity have a significant positive correlation coefficient of .625. Productivity and CA have a positive significant correlation coefficient of .593. The correlations show that there were no collinearity problems as they were all below the cut-off of 0.85. The multicollinearity problem doesn't occur (Hair et al., 2010).

E. Model Fit

Regression model testing was performed separately before estimating the proposed model.

1. Overall Regression Model Test

The significance of the regression model was tested with the following hypothesis.

H0 : $\beta_1 = \beta_2 = \dots = \beta_i = 0$

Ha : at least one of the regression coefficients is $\neq 0$.

Table 7. Summary of the Regression Model Fit

				Overall Model Test		
Model		R	R ²	Adjusted R ²	F	P
1	QR predicting P	0.625	0.391	0.387	100	< .001
2	QR predicting CA	0.530	0.281	0.276	60.9	< .001
3	P predicting CA	0.593	0.352	0.348	84.7	< .001

CA = Competitive Advantage

QR=Quality Results

P= Productivity

Source: Jamovi computation

The regression analysis carried out showed the existence of a strong significant relationship between the constructs. The first model in Table 7, which shows the effect of QR on P, shows a good fit and significant values of R(0.625), R²(0.391) and an F-value of 100. The model suggested that QR explained 39% of the variation in P. The second model, showing the effect of QR on CA, showed a good fit and a significant value of R(0.530), R²(0.281) and a significant F-value of 60.9. The model suggested that QR accounted for 28% of the variation in CA. The last model showing the relationship between P and CA showed a reasonable fit with R(0.593), R²(0.352) and a significant F-value of 84.7. The model suggested that P explained 35% of the variation in CA.

F. Hypothesis Testing

The study tested four hypotheses regarding a direct association and an indirect effect. Tables 8 and 9 present the results of the hypotheses tested:

Table 8. The Model Path and Mediation Estimates

The Mediation Estimates						
Effect	Label	Estimate	SE	Z	p	% Mediation
Indirect	$a \times b$	0.169	0.0541	3.13	0.002	27.5
Direct	C	0.445	0.0822	5.41	< .001	72.5
Total	$c + a \times b$	0.614	0.0664	9.26	< .001	100.0

Path Estimates

	Label	Estimate	SE	Z	P
P → QR	a	0.614	0.0610	10.07	< .001

Table 8. The Model Path and Mediation Estimates

The Mediation Estimates

<i>Effect</i>		<i>Label</i>		<i>Estimate</i>	<i>SE</i>	<i>Z</i>	<i>p</i>	<i>% Mediation</i>
<i>QR</i>	→	<i>CA</i>	<i>b</i>	0.275	0.0837	3.29	0.001	
<i>P</i>	→	<i>CA</i>	<i>c</i>	0.445	0.0822	5.41	< .001	

QR=Quality Results

CA=Competitive Advantage

P= Productivity

Source: Jamovi computation

Table 9. Summary of Hypothesis

<i>No</i>	<i>Hypothesis</i>	<i>Results</i>
1.	<i>Hypothesis 1: Productivity has a significant impact on competitive advantage.</i>	<i>Supported</i>
2.	<i>Hypothesis 2: Quality results has a positive significant relationship with productivity.</i>	<i>Supported</i>
3.	<i>Quality results has a positive significant impact on competitive advantage.</i>	<i>Supported</i>
4.	<i>Hypothesis 4: Quality results has a mediating effect on the relationship between productivity and competitive advantage.</i>	<i>Supported</i>

Source: Author (2023)

The model path coefficients and significance results are presented in Table 8. All four relationships hypothesised in the study are supported.

Hypothesis 1, which concerns the effect of productivity on CA, shows that it is significant ($\gamma = 0.614$, $p < 0.001$), so H1 is supported. When the mediation of quality results takes place, the relationship (direct effect) remains statistically significant at ($\gamma = 0.445$, $p < .001$). This implies that quality results partially mediate the relationship between productivity and competitive advantage. Hypothesis 4 is therefore supported.

Quality results have a positive and significant relationship with productivity ($\gamma = 0.614$, $p < .001$). Therefore, H2 is supported. Quality results has a positive significant effect on CA ($\gamma = 0.275$, $p < .001$). Therefore, H3 is supported.

1. The Analysis of mediating effect

The indirect effect of productivity on CA through quality results is positive and statistically significant ($p < 0.05$, $\gamma = 0.169$; ratio effect = 0.275). This indicates a partial mediation effect of quality results, thus supporting Hypothesis 4.

G. Discussion

The results of the study have provided strong support for the theoretical model of the links between productivity, quality results and competitive advantage.

The results show that the majority of TAZARA managers are male. The results also show that the majority of management employees have 10 to 20 years of work experience, followed by employees with more than 20 years of work experience. This indicates that TAZARA's management is composed of employees with extensive work experience in the railway sector.

The first objective of the study was to determine whether productivity has a significant positive impact on competitive advantage. This study confirms and also supports the previous studies that presented that productivity has a positive significant impact on CA (see Schwab & Sala-i-Martin, 2016; Buckley et al., 1988; Dresch et al., 2018; Carayannis & Grigoroudis, 2014).

The results of the study have also presented that quality results has a positive significant relationship with productivity. This is consistent with the previous research studies that have presented that quality results has a positive significant relationship with productivity (see Nanda et al., 2022; Yangailo, 2022b; Lee et al., 2007).

The study results also showed that quality results have a positive and significant effect on CA. This confirms and is consistent with previous studies that have presented similar results (see Yangailo, 2023; Chaniago & Mudjiardjo, 2021; Kusumadewi & Karyono, 2019).

The second and final objective of this study was to determine whether quality results has a mediating effect on the relationship between productivity and CA. The results showed that quality results partially mediate the relationship between productivity and CA. This is the first study to empirically test the mediating effect of quality results on the relationship between productivity and competitive advantage. Further research is needed to verify the validity of these findings.

A. The Theoretical Managerial Implications

The results of this research provide some critical useful insights for both decision makers and practicing managers. The partial mediation effect of quality results on the relationship between P and CA implies the need for organisations to invest in training employees on quality scores. This would help to establish a common language of quality production in a company and also ensure behavioural change and commitment to quality improvement. Competitiveness would then be achieved and maintained.

V. CONCLUSION

This study is the first to empirically examine the relationship between productivity, quality outcomes and competitive advantage. The study shows that quality outcomes partially mediate the relationship between productivity and competitive advantage. This study provides empirical evidence on the nature of the relationship between productivity and competitive advantage and also contributes to a good understanding of the relationship.

The study has provided evidence that quality results is critical to improving and sustaining productivity to promote competitiveness in an organisation. As organisations relentlessly seek to maintain and gain competitiveness through productivity, managers and employees need to understand how quality results can be integrated into all operations.

A. Limitation and Future Research

The study was conducted in one organisation, which limits the generalisability of the findings to other sectors. A replication of this study in other sectors is strongly recommended. Future studies are also recommended to consider the inclusion of other moderating and/or mediating variables.

ACKNOWLEDGEMENT

This article was not preliminary sponsored by any organisation and there is no conflict of interest to disclose. A special thanks goes to the editor and reviewers for their valuable time in reviewing this paper.

REFERENCES

- Ang, C. L., Davies, M., & Finlay, P. N. (2000). Measures to assess the impact of information technology on quality management. *International Journal of Quality & Reliability Management*, 17 (1), 42-66.
- Buckley, P. J., Pass, C. L., & Prescott, K. (1988). Measures of international competitiveness: a critical survey. *Journal of marketing management*, 4(2), 175-200.
- Carayannis, E., & Grigoroudis, E. (2014). Linking innovation, productivity, and competitiveness: implications for policy and practice. *The Journal of Technology Transfer*, 39(2), 199-218.
- Chaniago, Y. M. Z., & Mudjiardjo, L. A. (2021). The Effect of Service Difference and Logistic Service Quality on Competitive Advantage and Impact on Marketing Performance. *International Journal of Innovative Science and Research Technology*. 6(8).

- Dresch, A., Collatto, D. C., & Lacerda, D. P. (2018). Theoretical understanding between competitiveness and productivity: firm level. *Ingeniería y competitividad*, 20(2), 69-86.
- Fan, K., O'Sullivan, C., Brabazon, A., and O'Neill, M. (2008). Non-linear principal component analysis of the implied volatility smile using a quantum-inspired evolutionary algorithm. In *Natural computing in computational finance* (pp. 89-107). Springer, Berlin, Heidelberg
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Canonical correlation: A supplement to multivariate data analysis. *Multivariate Data Analysis: A Global Perspective, 7th ed.; Pearson Prentice Hall Publishing: Upper Saddle River, NJ, USA.*
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). Structural equation modeling: An introduction. *Multivariate data analysis. 6th Edition. New Jersey: Pearson Prentice Hall, 752-753.*
- Juran JM (1993) Made in U.S.A.: a renaissance in quality. *Harvard business review*, 71 4, 42-7, 50.
- Kotler, P. (2000). *Marketing Management*, New Jersey: Prentice Hall.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, 30(3), 607-610.
- Kusumadewi, R. N., & Karyono, O. (2019). Impact of Service Quality and Service Innovations on Competitive Advantage in Retailing. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*, 2(2), 366-74.
- Landau, S., & Everitt, B. S. (2003). *A handbook of statistical analyses using SPSS*. Chapman and Hall/CRC.
- Lee, W. R., Beruvides, M. G., & Chiu, Y. D. (2007). A study on the quality–productivity relationship and its verification in manufacturing industries. *The Engineering Economist*, 52(2), 117-139.
- Nanda, P. K., Sahai, A. K., & Das, S. K. (2022). Understanding the co-relationships of variables and improving product quality and productivity of DRI in rotary kiln. *Materials Today: Proceedings*, 56, 1538-1541.
- Nunnally, J.D. (1978). *Psychometric Theory* (2nd ed), New York: McGraw-Hill.
- Prasad, K. D., Jha, S. K., & Prakash, A. (2015). Quality, productivity and business performance in home based brassware manufacturing units. *International Journal of Productivity and Performance Management*, 64(2), 270-287.
- Raynor, M. E. (1992). Quality as a strategic weapon. *Journal of Business Strategy*, 13(5), 3-9.
- Schwab, K., & Sala-i-Martin, X. (2016, April). *The global competitiveness report 2013–2014*: Full data edition. World Economic Forum.
- Yadav, R. N., Kumar, D., Sharma, A. K., & Virmani, N. (2022). Analysing human and system related barriers of TQM in automobile industries using fuzzy DEMATEL approach. *International Journal of Productivity and Quality Management*, 35(2), 193-219.
- Yangailo, T. (2022). Globalization on The Railway Transport Sector. *International Research Journal of Business Studies*, 15(3).
- Yangailo, T. (2022). The Impact of Quality Results and Important Innovation as TQM Practices on Organisational Productivity: The case of Railway Sector. *Proceedings on Engineering Sciences*, 4(3), 327-336 DOI:10.24874/PES04.03.010
- Yangailo, T. (2023). Assessing the influence of transformational leadership on competitive advantage through important innovations and quality results: Case of railway industry. *Management Science Letters*, 13(1), 41-50.
- Yangailo, T., Kabela, J., & Turyatunga, H. (2023). The Impact of Total Quality Management Practices on Productivity in the Railway Sector in African Context. *Proceedings on Engineering*, 5(1), 177-188.