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Effect of continuous improvement on performance of public universities in Kenya

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Abstract: Continuous improvement (CI) plays a central role in contemporary management research. CI is a general term that acquired many of its attributes from quality initiatives such as TQM. Continuous improvement, customer focus and other related TQM practices lead organisations to fulfil customer needs and adapt to changes that provide improved OP, such as better employee attitudes and increased ability to learn and think creatively at the workplace. Quality initiatives from which CI is derived conceptualise the relationship between OL and OP in market orientation/ customer focus; continuous improvement; teamwork, employee empowerment and management. The purpose of this study was to examine the effect of CI on OP of Kenyan Public Universities. The study used cross-sectional descriptive survey research design to ascertain the moderating effect of CI on OP in Kenya's Public Universities. A census survey was used since all 22 Kenyan Public Universities in Kenya were studied. The overall results indicated a significant linear relationship between CI on OP of Public Universities in Kenya. The study is expected to assist policy makers in formulating guidelines to improve overall firm performance. It is recommended that Public Universities in Kenya should fully adopt and embrace CI to promote and enhance performance. The study proposes a model that could be further tested to assess the overall influence of CI on OP of Kenya's public universities. These findings could also be put into practice in Government, Quasi-Government, industrial and other general business settings in Kenya.

Keywords: Continuous improvement, Total Quality Management, organisational performance

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I. INTRODUCTION

Continuous improvement (CI) plays a central role in contemporary management research (Honarpour *et al.,* 2012). CI is a general term that acquired many of its attributes from quality initiatives such as TQM and lean manufacturing. Continuous improvement, customer focus and other related TQM practices lead organisations to fulfil customer needs and adapt to changes that provide improved OP, such as better employee attitudes (Chin & Saudah, 2011) and increased ability to learn and think creatively at the workplace (Feng *et al.* 2006; Pinho, 2008). Quality initiatives from which CI is derived conceptualise the relationship between OL and OP in aspects: market orientation/ customer focus (Hung *et al.,* 2011; Fuentes *et al.,* 2006; Hoang *et al.,* 2006; Perdomo-Ortiz *et al.,* 2006); continuous improvement (Perdomo-Ortiz *et al.,* 2009; Satish & Srinivasan, 2010; Prajogo & Sohal, 2003); teamwork, employee empowerment and people management.

II. STATEMENT OF THE PROBLEM

There is a growing interest in examining how CI improves performance (Saru, 2007). Public Universities across the globe are facing a slow but unrelenting worsening of financial conditions due to cutbacks in government funding (Sporn, 1999). While past studies on OL examine continuous improvement (Pedler et al., 1991); knowledge management (Lyles, 1992); individual learning (Argyris & Schön, 1996); creativity and innovation (Drew & Smith, 1995); organisational memory (Hastie et al., 1984); technologies, beliefs, procedures and cultures (Glynn et al., 1992), the effect of TQM on OP in Kenyan Public Universities remains a relatively novel perspective.

2.1 Objectives of the study

Specific objectives of the study were to assess the relationship between continuous improvement and performance of Public Universities in Kenya.

III. LITERATURE REVIEW

Lillrank and Kano (1989) refer to CI, or kaizen, as the "principle of improvement". While the term kaizen is often considered synonymous with CI, Imai (1986) proposes that three types of kaizen exist: management, group and individual-oriented kaizen. Management-oriented kaizen focuses on the company strategy and involves everyone in the company. Group-oriented kaizen is best represented by quality management circles, which require employees to form teams or circles with the goal of finding and solving problems faced in day-to-day work without interference from management. The individual-oriented kaizen is a bottom-up concept in which the worker recommends solutions to the problems faced. This has been very successful in the Japanese industry since workers on the shop floor typically know the best solution to existing problems. Certain industries even have incentive programs where, depending on the problem and the solution provided, the worker is rewarded, thus encouraging the workers to concentrate on finding the best solution to problem areas at work.

In their survey of the literature, Jha *et al.* (1996) found a close link between CI and quality. Imai (1986) defines total quality control (TQC) as "organised kaizen activities involving everyone in a company - managers and workers, in a totally integrated effort toward improving performance at every level". The link between CI and quality has been expressed by Berger (1996), who asserts that CI should rightfully be regarded as a general development perspective, applicable with or without the context of TQM. Yet, from the large number of researchers who associate CI with TQM and from the mere implication that CI seeks to improve, it appears that there exists a link between CI with TQM, in some form or another.

Implementing CI enables organisations improve their relationships with suppliers and customers by acquiring more knowledge about them, leading to acquiring knowledge from outside the organisation (Colurcio, 2009). In addition, firms must disseminate knowledge acquired from within the organisation to their suppliers, thus modifying existing and applying new knowledge to respond to customer needs (Colurcio, 2009). To fulfil the aims of the relationship with suppliers and customers, firms have to solve problems in order to improve organisational processes by creating teams, encouraging employee collaboration and training of personnel (Colurcio, 2009).

All of these actions comprise acquiring, sharing and applying knowledge. Alternatively, formal and informal practices that lead to knowledge acquisition from inside and outside the organisation make the organisation aware of environmental changes and the potential to respond to these changes. A better understanding and knowledge of customer and supplier needs lead to improved ability to manage the relationship amongst them. Furthermore, greater awareness of the knowledge capability of the organisation results in solving the problems and improving processes. By acquiring knowledge from outside the firm, organisations are able to effectively amend their operating procedures and principles to accommodate knowledge from outside the firm (Chang & Tzeng, 2010) leading to improved OP.

IV. RESEARCH METHODOLOGY

4.1 Research paradigm

The underlying epistemology of this research was positivist, which focused on examining earlier established theories under the assumption that reality is objectively given and can be described by measurable properties independent of the observer and instruments. Thus, the study seeks to create knowledge by developing hypotheses and propositions, gathering and analysing data then testing hypotheses and propositions against external reality represented by the data generated.

4.2 Research design

The study adopted a blend of descriptive cross-sectional survey design. According to Creswell (2009), descriptive and cross-sectional survey research designs are used to gather information, summarize, present and interpret the data for the purpose of clarification. This design was hence chosen since the study sought the personal views, opinions, attitudes and perceptions about effect of CI on OP in Public Universities in Kenya.

4.3 Target population

The target population comprised senior managers in all 22 Public Universities in Kenya. A census survey was used since all the listed 22 Public Universities in Kenya were targeted. The sample population was made up of a total of 220 respondents, comprising 10 participants from each of the 22 Kenyan Public Universities. The study collected both primary and secondary data. Primary data were collected using survey questionnaires, although interviews and observations were also employed where necessary. Secondary data sources included journals, books and articles addressing the objectives of the study. The sample population comprised: the Vice Chancellor/ CEO, Deputy Vice Chancellor (Administration), Head of Quality Assurance, Registrar (Admin), Finance Officer, Human Resource Manager, Dean of Students' and one representative each

from the University's Academic Staff Union (Uasu), Kenya University Staff Union (Kusu) and Kenya Union of Domestic, Hotels, Educational Institutions, Hospitals & Allied Workers (Kudheiha).

4.4 Data analysis

Data analysis and presentation was both qualitative and quantitative in nature. Qualitative data that was obtained from the questionnaires was edited/cleaned and classified into classes or groups with common characteristics or themes. The content within the themes was then analysed guided by the research objectives. Inferential data analysis (regression and factor analysis) were used to analyse quantitative data. Descriptive Statistics (frequencies and percentages) were used to show inherent relationship between the variables in the study. The findings of the study were reported in frequency tables before being interpreted and conclusions being made.

V. RESULTS AND DISCUSSIONS

A sample population of 220 Public Universities was used for the study. Out of the total number of 220 questionnaires distributed, 172 questionnaires (78.18% response rate) were returned.

5.1 Descriptive statistics

5.1.1 Continuous improvement

Continuous improvement factors were measured using 9 statements. Most of the respondents collectively agreed with the statements that their institutions enhance continuous monitoring, review and improvement; that their institutions implement the quality policy by using adequate resources, and; that their institutions had set up structures to monitor, review and improve performance. The mean scores were 4.32, 4.31 and 4.31, respectively as shown in Table 1.

Table 1: Descriptive Statistics of continuous improvement

	Mean	Std. Dev.
Sharing info from external sources	4.15	.94
New approaches to improve work	4.02	1.00
Continuous monitoring, review and improvement	4.32	.85
Resources/training to implement Quality Policy	4.31	.79
Monitoring, review, improve performance	4.31	.84
Identifying the root cause of errors	4.27	.84
Preventative action	4.22	.96
Focus on stakeholder requirements	4.23	.97

5.1.2 Performance of Public Universities in Kenya

The performance factors were measured using 8 statements. Respondents collectively agreed with the statements that student enrolment and admission rates had increased and that their institutions attract qualified and capable employees. Mean scores in Table 4 for increased student enrolment and admission rates and attracting qualified and capable employees were: 4.45 and 4.39, respectively.

Table 2: Descriptive Statistics of Performance

	Mean	Std. Dev.
Increased student enrolment rates	4.45	.86
Qualified & capable employees	4.39	.89
Revenue base has grown	3.58	1.19
Improved career paths	3.77	1.14
Improved job clarity	3.91	1.10
Carry out employee satisfaction surveys	3.79	1.18
Improved job security	3.98	.99
Improved working conditions	3.78	1.10
Better promotion opportunities	3.57	1.25

5.2 Factor Analysis

5.2.1 Continuous improvement measures

Principal Component Analysis (PCA) with Varimax rotation was performed on the eight (8) measures to assess CI. This was done to reduce large number of variables into few core factors that have the greatest influence on CI. The KMO test for CI of 0.872 in Table 3 showed factor analysis could be carried out because the KMO value was in the range of 0 to 1 and greater than 0.5 (Cerny & Kaiser, 1977). Bartlett's test of sphericity (Chi-square 599.381, $p<0.001$) was within acceptable levels for factor analysis. CI was subjected to variance test using principal component analysis to identify factors that explained most of the variation in CI. Principal component analysis simplified interpretation of results and formulating generalisations on the overall CI construct.

Table 3: Total Variance of continuous improvement measures

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.254	53.175	53.175	3.193	39.916	39.916
2	1.023	12.790	65.966	2.084	26.050	65.966
3	.712	8.904	74.870			
4	.554	6.924	81.794			
5	.448	5.606	87.400			
6	.416	5.201	92.601			
7	.318	3.973	96.574			
8	.274	3.426	100.000			

Extraction Method: Principal Component Analysis.

Continuous improvement was subjected to a variance test using the component analysis to identify factors that explain the variation in CI. As shown in Table 3, PCA identified two factors that explained most of the variation in CI. Table 3 showed that two (2) factors with Eigenvalues of more than 1.0 explained most of the variation in CI. The highest loading was 4.254 which accounted for 39.916% of the variance and the second had a loading of 1.023 which accounted for 26.050% of the variance which accounted for 65.966% of the cumulative variance in CI.

5.2.2 Performance measures

Principal Component Analysis (PCA) with Varimax rotation was performed on the nine (9) measures used to assess performance. This was carried out to group the large number of variables into a few core factors that have the greatest influence in measuring performance. The KMO test for performance of 0.854 showed factor analysis on performance could be carried out because the KMO value was in the range of 0 to 1 and greater than 0.5 (Cerny & Kaiser, 1977). Bartlett's test of sphericity (Chi-square 698.704, $p<0.001$) was within the acceptable level to carry out factor analysis. Principal component analysis was carried out to simplify interpretation of results and to formulate generalisations on the overall performance construct. Table 4 shows the variances, Eigenvalues and cumulative percentages for the performance measure.

The analysis of variance in Table 4 is the variance for all the measures of performance. The analysis of variance also included percentage of variance & cumulative percentages before and after the analysis. The 9 performance measures were subjected to factor analysis which showed one critical factor accounted for 40.687% of the total variance.

Table 4: Total Variance of Performance Measures

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.427	49.194	49.194	3.662	40.687	40.687
2	1.241	13.786	62.980	2.006	22.294	62.980
3	.934	10.378	73.359			
4	.572	6.358	79.717			
5	.491	5.450	85.167			

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
6	.447	4.967	90.134			
7	.394	4.379	94.514			
8	.272	3.027	97.541			
9	.221	2.459	100.000			

5.3 Linear Regression Analysis

Linear regression analysis between performance and continuous improvement was carried out. The coefficient of determination (R2) showed that 48.0% of the variation in performance was explained by CI. Moreover, the Durbin Watson statistic of 2.062 indicated that the model did not suffer significantly from autocorrelation since the value was between 1 and 3.

5.4 Analysis of Variance (ANOVA) Model

ANOVA test was carried out to test the overall significance (R^2) of the predictor variables in influencing the level of performance of Kenya's Public Universities. Table 5 exhibits the F statistic result for the models which showed goodness of fit.

Table 5: Analysis of Variance (ANOVA[b])

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	46.780	1	46.780	156.815	.000a
	Residual	50.714	170	.298		
	Total	97.494	171			

a. Predictors: (Constant), Continuous improvement

b. Dependent Variable: Performance

Table 6 presents the unstandardised and standardized coefficients of the model, the t-statistic for each coefficient and associated p-values. The results indicate that CI had a significant positive relationship with performance. This implies that every increase in the level of CI lead to a subsequent increase in the level of performance as shown by the equation:

Y (Performance) = .521 + .803 X_1 (Continuous improvement).

Table 6: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.521	.274		1.899	.059		
	CI	.803	.064	.693	12.523	.000	1.000	1.000

a. Dependent Variable: Performance

The regression coefficients show that the outcome variable had a significant positive relationship with continuous improvement. The findings verify that CI had a statistically significant influence on performance of Kenya's Public Universities. Thus, every additional unit increase in CI increased the level of performance.

VI. CONCLUSION

The key findings of the study indicate that continuous improvement had a positive influence on the level of performance of Kenya's Public Universities. The overall results indicated that CI positively and significantly influences OP of Kenya's Public Universities.

VII. RECOMMENDATIONS

In view of the findings, the researcher recommended that Public Universities in Kenya should fully adopt and embrace continuous improvement as a management strategy to promote, facilitate and enhance performance of Kenya's Public Universities.

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