Effect of Knowledge Management on Firm Competitiveness: Testing the Mediating Role of Innovation in the Small and Medium Enterprises in Kenya

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Abstract
Knowledge and innovativeness are have been recognized as the main sources of competitive advantages in the economy. Small and medium-sized firms need to increase attention on knowledge management and innovativeness so as to be competitive. The study examined knowledge management, innovativeness and firm competitiveness. The study is conducted on the results based on 252 small and medium manufacturing enterprise managers in Nairobi, Kenya. The data obtained from the questionnaires were analyzed using the SPSS statistical packaged software. The study results showed that knowledge management processes influence innovativeness positively, innovativeness enhances firm competitiveness while innovativeness is a mediator between knowledge management and firm competitiveness. The study demonstrated that knowledge management and innovation should be integrated to enhance firm competitiveness. The viewpoint proposed is that knowledge management is an important element for small and medium enterprises in today's dynamic and competitive environment.
Keywords: knowledge management, firm competitiveness, innovativeness, Kenya, SMEs.

1.0   Introduction

Firms are currently operating in a competitive environment; firms need to continua's innovate so as to be competitive (Lemon and Sahota, 2004; and Cooper *et al.,* 2008). Effective knowledge management has been found in previous studies to be an antecedent of innovation (Nonaka and Takeuchi, 1995; Dove, 1999; Carneiro, 2000; Darroch, 2005; and Liao and Wu, 2009). Knowledge management is a critical element to successful innovation since the innovation process is knowledge intensive (Gordon and Tarafdar, 2007; Maqsood and Finegan, 2009).

Firm's financial performance and its survival in the ever competitive market is determined by the speed at which they develop knowledge-based competencies. Firm's competitive advantage lies in its knowledge management competency (Bell, 1973; and Nonaka, 1994). Firms competing in the knowledge-based economy can sustain their competitive advantage by harnessing their own unique knowledge and building their capability to learn faster than their competitors (Grant, 1996b; Prusak, 2001). The type of knowledge needed by a firm must be tailored toward its own unique peculiarities. Knowledge can be distinguished from the traditional factors of production (land, labour and production) in that it is governed by what has been described as the law of increasing returns. In contrast to the traditional factors of production that were governed by diminishing returns, every additional unit of knowledge used effectively results in a marginal increase in firm competitiveness and performance (Malhotra, 2001).

Each firm must be able to accumulate certain intangible knowledge assets that are relevant to its diverse operations. The manufacturing sector is playing a crucial role in the growth of the economy of most of the developing countries, Kenya being one of them. After service and agriculture, it is the third largest sector of Kenya. The share of manufacturing sector in GDP of Kenya is 28.7%. However, it is difficult to draw conclusions on the relationship between effective knowledge management and innovation because there is a dearth of empirical research that have investigated relationships between the two constructs (Darroch, 2005; and Hall, B.H.; and Mairesse 2006). Furthermore studies have taken a unidimentsional view. Based on Resource-Based View Theory (Wernerfelt, 1984; Barney, 1991; and Peteraf, 1993), the strategic resources and capabilities available to the firm determines whether the firms will be competitive over the others. Knowledge and knowledge management resources are significant and certainly the most important (Drucker, 1993 and Liao, 2009). Therefore, the study will seek to establish the effect of knowledge management on organizational innovativeness and firm competitiveness among small and medium manufactures in Kenya putting in consideration the competitiveness and dynamic nature of the market that they operate in.

The study focused on the influence of Knowledge management and the Innovation (I) in small-sized and medium-sized enterprises (SMEs) in Kenya. SMEs are commonly recognized for their contribution to the economic activity, employment, innovation and wealth creation of any country. In Kenya, the Micro, Small and Medium enterprises fall under the popular informal sector called Jua Kali (informal sector) as they largely start in the open sun under no roof. The sector employs over 80% and is currently receiving a lot of government attention as it's seen as the solution to the crippling unemployment especially for the youth in Kenya. Developing a competitive, productive and resilient SME sector is an important part of the government's strategy

to achieve balanced economic development and higher standards of living at all levels of society. Clearly, SMEs play a vital role in a country's economic growth. Thus, the information about the relationship between Knowledge management (KM) and innovation from this study can assist SMEs in sustaining their competitiveness through improved knowledge management practices.

2.0 Literature Review and Hypotheses
2.1 Knowledge Management
The resource-advantage theory has recognized knowledge as a strategic resource of the any firm (Grant, 1996; Hunt, 1995; Hunt & Morgan, 1996; Teece, 1998). The capability to create and utilize knowledge will enable small and medium enterprises to develop a sustainable competitive advantage since knowledge possesses the characteristics of heterogeneity, uniqueness, and immobility. Knowledge management processes are part of an organization's processes (Zhou & Fink, 2003). According to Gold, Malhotra and Segars (2001), knowledge management processes are precondition for effective knowledge management in a firm.

Knowledge management has also been viewed as multidimensional and multidisciplinary concept Sutton (2008). According to Davenport (1994) knowledge management is the process of capturing, distributing, and effective use of knowledge. Knowledge management promotes and integrate approaches of identifying, capturing, evaluating, retrieving, and sharing all of an enterprise's information assets. The enterprise assets includes databases, documents, policies, procedures, and previously un-captured expertise and experience in individual workers (Duhon, 1998). Firms are required to turn personal knowledge into organization-wide knowledge that can be shared throughout the organization and applied (Skyrme, 1997). The goal is to get the right knowledge to the right people at the right time and to help people share and use information to improve firm competitiveness (O'Dell & Grayson, 1998b). For SMEs to improve their competitive advantage, they should have Knowledge management processes that will enable them to create and acquire knowledge and to apply, share and preserve knowledge.

Firms always obtain a competitive advantage over the other firms when they possess knowledge which is firm specific and if they manage knowledge in a way that is difficult to imitate (Earl, 2001). Firms need to manage knowledge, knowledge, internally and externally (Marqués and Simon, 2006; Bierly *et al.*, 2009). Knowledge management concept has been developed as management function that seeks to create and disseminate knowledge and information within the organization. According to Darroch and McNaughton (2003) they have highlighted three main activities of knowledge management: knowledge acquisition, knowledge dissemination and responsiveness to knowledge, the study looked at knowledge management as a whole because of the small size nature of SME's. The knowledge management and innovation are interrelated constructs. In other words, innovation takes place when knowledge is used in the organization and ultimately these results into creativity and innovation (Darroch and McNaughton, 2003).

Knowledge management has been come an important antecedent of innovation and firm competitiveness. For instant responsiveness to knowledge and knowledge dissemination are pivotal for creating strategic positioning such as innovation (Day, 1994). Jiménez-Jiménez & Sanz-Valle's (2011) study shows the positive relationship between organizational, innovation and firm competitiveness. The study concludes that there is a positive relationship of organization innovation capabilities with firm competitiveness. Thus, the literature exposed above would lead us to formulate the following hypotheses:

$H0_1$:   Knowledge management has no significant effect on firm competitiveness
$H0_2$:   Knowledge management has no significant effect on organization innovativeness
$H0_3$:   Innovation has no significant effect on SME's firm competitiveness

2.2 The Mediating Effect of Innovativeness
Organizational Innovativeness is the organization's overall innovative capability of introducing new products to the market, or opening up new markets, through combining strategic orientation with innovative behavior and processes (Wang and Ahmed, 2004). Five main dimensions determine an organization's innovative capability; Product Innovativeness refers to the novelty and meaningfulness of new products introduced to the market in a timely fashion. Market Innovativeness: refers to the newness of approaches that companies adopt to enter and exploit their targeted market. Process Innovativeness refers to the introduction of new production methods, new management approaches, and new technology that can be used to improve production.

Gupta (2009) asserted that the impact of knowledge management on performance relates primarily to the organization's ability to innovate either through improved processes or improved products. Organization innovativeness is an intermediate outcome of effective knowledge management (Gold, 2001). Darroch (2003) asserted that innovation might be the mediating factor between knowledge management and organization performance basing on the findings of Han, Kim and Srivastava (1998). Knowledge management then is viewed as creating firm competitiveness through organization innovation, therefore, it's hypnotized that:

$H0_4$:   Organization innovation has no mediating effect on the relationship between Knowledge

management and firm competitiveness.

3.0 DATA AND METHODOLOGY

3.1. Research Design

The study used a descriptive design since we focused on getting inferences from the findings on the impact of knowledge management on firm competitiveness of small and medium enterprise in Kenya.

3.2. Population and Sample Size

The population of the study consisted of manufacturing SMEs in Nairobi. Nairobi was chosen because the manufacturing SMEs in Nairobi County have formal procedures or processes that are documented and registered with regulatory government bodies (Gok, 2013). According to Ministry of Industrialization 2013 data base, of the 2,120 manufacturing SMEs are registered as formal enterprises. For which only 1,258 manufacturing SMEs are located in Nairobi and its selected environs.

Table 3.1 Population and Sample Size

Population Category	Target Population	Sample Size= $n_{h=}\left(\frac{N_h}{N}\right)n$
Food, Beverages and Tobacco	497	114
Metal and Allied	130	029
Building, Construction and Mining	275	063
Chemical and Allied	238	054
Leather Products and Footwear	118	026
Total	**1,258**	**286**

Source (Ministry of Industrialization, 2014)

3.3. Data Collection Instruments

The questionnaires were the main instrument of data collection. Questionnaires were issued randomly to customer at the banking hall. Each respondent was given enough time to respond to questions and any clarification was done at the same time by research assistants. The questions were divided into variables of interest. Likert scale with point 5 was used to bring variation of results, with 1- Strongly Disagree, 2-Disagree 3-Neutral, 4-Agree 5- strongly agree**.**

3.4. Data Processing and Analysis

The data collected from the respondent was coded and entered in SPSS V20 for data analysis. Before analysis was, test for normality was done so as to ascertain whether to use parametric or non-parametric test in subsequent analysis. Descriptive statistics was done to identify characteristics of demographic data of respondents while inference statistics was done for the purpose of Correlation i.e. identify the relationship between knowledge management and Firm. The model below was used to predict the firm competitiveness.

3.5. Model Specification

To test for the mediating effect Baron and Kenny (1986) four step approach was used. Several regression analyses was conducted and the coefficient significances being examined at every step of the process. The multiple linear regression models that was used for the study is as shown below;

$y = \beta_o + \beta_1 X_1 + \varepsilon$…………........………………………………………………………….. (i)

Simple regression analysis with X (knowledge management) predicting Y (Firm competeveness) to test path *c (direct effect of knowledge management on firm competeveness*) which will be the first step in testing the mediating effect.

$M = \beta_o + \beta_1 X_1$ ……..   .... (ii)

Simple regression analysis with X (knowledge management) predicting M (Organization Innovation) to test for path *a (direct effect of knowledge management on Organization Innovativeness)* which was the second step in testing the mediating effect.

$y = \beta_o + \beta_1 M_2 + \varepsilon$…………………………………………………………………….. (iii)

Simple regression analysis with M (Organization Innovation) predicting Y (Firm competeveness) to test the significance of path *b* alone

$y = \beta_o + \beta_1 X_1 + \beta_2 M_2 + \varepsilon$…………………………………………………………….……… (iv)

A multiple regression analysis with X (knowledge management) and M (Organization Innovation) predicting Y (Firm competeveness). All tests were two-tailed. Significant levels was measured at 95% confidence level with significant differences recorded at p < 0.05

3.6 .Research Model

Based on the literature review introduced earlier, knowledge management leads to innovation which also leads to the creation of firm competiveness (Smith and Meso, 2000; Armbruster, 2008; Liao, 2008; and Gupta, 2009). The major goal of knowledge management is to enhance innovation. The knowledge management is critical to successful innovation because the innovation process is, by its nature, knowledge intensive (Gloet and Terziovski, 2004), therefore, knowledge management is a contributor to firm competiveness through organization innovation. The proposed model is depicted in Figure 1. Knowledge management represents an independent variable, firm competiveness represents the dependent variable, and Organization Innovation; represents a mediating variable.
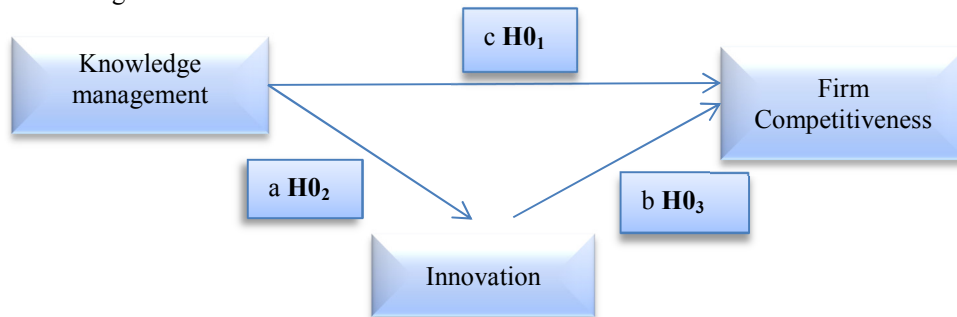

Figure 1: The research model
*notes:

The purpose of Steps 1-3 is to establish that zero-order relationships among the variables. If one or more of these relationships are not significant, researchers have concluded a mediation effect is not possible though this is not always true (MacKinnon et al., 2007). Assuming there are significant relationships from Steps 1 through 3, one proceeds to Step 4.

In the Step 4 model, some form of mediation is supported if the effect of M (path b) remains significant after controlling for X. If X is no longer significant when M is controlled, the finding supports full mediation. If X is still significant (both X and M both significantly predict Y), the finding supports partial mediation.

4.0 RESULTS AND CONCLUSION

4.1 Demographic Profile

The study targeted respondents from small and medium manufacturing sectors within Nairobi and its environs in Kenya. The five categories are as listed by the Kenya manufactures associations shown in table 4.1 below. A sample of 286 SMEs firms located in Nairobi and its selected environs were used for the study. Of those, 286 (88.11%) completed the questionnaires. Majority of the respondents (108) were from the food and beverage. Among the firms, 82% were local owned while 17% were owned by foreigners. Among the firms, 10% had been operating for less than three years, 44% for three to five years, 42% for six to ten years and 1% for more than 15 years.

Table 4.1 Respond Rate

Population Category	Sample size	Responses	Respond Rate %
Food, Beverages	114	108	94.74
Metal and Allied	029	020	68.97
Building, Construction and Mining	063	057	90.47
Chemical and Allied	054	045	83.33
Leather Products and Footwear	026	020	76.92
Total	**286**	**252**	**88.11**

Source (Survey Data, 2015)

4.2. Factor Analysis

Principal Component Analysis (PCA) was used to reduce the number of variables and to detect structure in the relationships between variables. The Kaiser Criterion of retaining only factors with eigen value greater than 0.5 was employed. To check the adequacy of the data for extraction of principal components, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity were used. Consequently, a value of 0.600 and above for the KMO statistic and a significant measure of sphericity were acceptable as suggested by Tabachnick and Fidell (2001).

Table 4.2 KMO Statistics

	FC	KM	I
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.702	0.632	0.781
Approx. Chi-Square	657.24	580.657	461.670
Bartlett's Test of Sphericity	0.000**	0.000**	0.000**
Determinant (t)	t=1.003E-006*	t=0.017*	t=0.0135*
Degree of freedom	df=15	df=10	df=10

Notes: *KMO Significant p > 0.06, **Bartlett's Test of Sphericity significant p < 0.05, t > 0.00001, df = Degree of freedom, FC= Firm competitiveness, KM= Knowledge management,   I= Innovation

Source (survey data, 2015)

Factor loading for each item, were sorted by size. All the items used for the study had loading value greater than (0.5) and hence meet the criteria recommended by Liao et al., (2007) and consequently by TohTsu and Wei (2008).

4.3. Correlation Results

The study analyzed the relationships that are inherent among the three variables. The results regarding this were summarized and presented in Table 4.4 below: the findings revealed that knowledge management was positively and significantly associated with firm competitiveness (r = 0.837, ρ<0.01) indicating that knowledge management had 69.51% variation on firm competitiveness based on coefficient of determination. Further, innovativeness was positively and significantly correlated to firm competitiveness (r = 0.800, ρ<0.01) showing that innovation has 64% variation on firm competitiveness based on their coefficient of determination. Finally the study findings also revealed that innovation had a positive and significantly effect on knowledge management (r = 0.7724, ρ<0.01) indicating 59.66% variation knowledge management based on coefficient of determination. Therefore all the variables were expected to influence firm competitiveness positively.

Table 4.4 Pearson Correlations

Variables	Y	X	M
(Y) Firm competitiveness	1.0000		
(X) Knowledge management	.8337*	1.0000	
(M) Innovation	.8967*	0.7724*	1.000

Notes: *Significant at p <0.01,*Significant at p<0.05, Sample size=252, Y= Firm competitiveness, X= Innovativeness, M= Knowledge Management

Source (survey data, 2015)

Correlation analysis is a technique of assessing the relationship between variables Tabachnick and Fidell (2001): knowledge management and innovation with firm competitiveness Tabachnick and Fidell (2001)

4.5. Assumptions of Regression Model

Multiple regression analysis makes the following assumptions:

4.5.1 Test of Normality

Normality tests are supplementary to the graphical assessment of normality. Kolmogorov-Simonov test and Shapiro Wilk was used to test normality of the data. The test statistics are shown in table 4.5. In this study, the p-value is more than 0.05 as recommended by Haire *et al*. (2006). Therefore the study rejects the alternative hypothesis and concludes that the data comes from a normal distribution.

Table 4.5 Test of Normality

	Kolmogorov-Smirnov (KS) test			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Firm competitiveness	0.243	252	0.361	0.849	252	0.841
Knowledge management	0.136	252	1.141	0.912	252	0.172
Innovation	0.158	252	0.467	0.887	252	0.205

a Lilliefors Significance Correction

Source (survey data, 2015)

4.5.2 Test of linearity

Linearity means that the amount of change or rate of change, between scores on two or more variables are constant for the entire range of scores for the variables. From figure 1 in appendix 1 is the graphical method that was used to examine linearity the scatterplots boundaries were within the trend line.

4.5.3 Test of Multicollinearity

Multicollinearity test was carried out to establish if the predictor variables in model are highly correlated so that one can linearly be predicted by the other variable. Variance Inflation Factor (VIF) and coefficient of correlation between variables was used to test Multicollinearity. The results showed that the entire variables had VIF which

were greater than 1 but not more than 10 (Haire *et al*., 2006).

4.5.4Test of Homoscedasticity

Homoscedasticity refers to the assumption that that the dependent variable exhibits similar amounts of variance across the range of values for an independent variable. The findings are as shown in figure 2 in appendix 2

4.6 Testing the Direct Relationships and the Mediating Effect of Organization Innovativeness Using Baron and Kenny (1986)

Variables in Simple Mediation Model

Y=   Firm competitiveness

X =   Knowledge management

M=   Innovation

Hypothesis 4 (H_{o4}) stated that there is no significant mediating effect of organization Innovativeness on the relationship between knowledge management and firm competitiveness. Table 5 below shows the direct total effect of the studied variables then it's followed by the indirect effect using the simple mediation procedure by Preacher and Hayes (2004). The output provides the significance tests of part "C" which tested the effect of knowledge management on firm competitiveness. The findings reveled that knowledge management had coefficients of estimate which was significant basing on $\beta_1 = 0.1520$ (p-value = 0.0234 which is less than $\alpha = 0.05$). This suggested that there was significant effect of knowledge management on firm competitiveness and thus $H0_1$ was rejected while step 1 was meet (MacKinnon *et al*., 2007).

While the test of path "a" which was the effect of organization innovativeness on knowledge management was found to be significant p =0.000 which is less than $\alpha = 0.05$). This suggested that there was significant effect of organization innovativeness on knowledge management and thus $H0_2$ was rejected while step 2 criterion for mediation analysis was meet (Baron and Kenny, 1986). While path "b" tested the effect of organization innovativeness on firm competitiveness which was also found to be significant p= 0.000 which was less than $\alpha = 0.05$. This suggested that there was significant effect of organization innovativeness on firm competitiveness and thus $H0_3$ was rejected. Therefore the model met all the criteria for mediation according to Baron and Kenny (1986). Finally path "c"" was tested controlling for organization innovativeness to test the indirect effect. The finding reveled that it was not significant (p = 0.000, $\alpha = 0.05$) which is more than $\alpha = 0.05$. Hence we conclude there is full mediation effect of innovation on the relationship between knowledge management and firm competitiveness.

Table 4.6 Direct and Total Effects

	Coeff	s.e.	t	Sig(two)
C (YX)	0.1520	0.0237	6.4135	0.0000*
a (MX)	0.7075	0.1030	6.8438	0.0000*
b (YM.X)	-0.3063	0.1385	-2.2114	0.0278*
c' (YX.M)	0.0719	0.1098	0.6457	0.5190

Notes: **Significant at p<0.05,Sample size=252,Y= Firm competitiveness, X= Innovativeness, M= Knowledge Management

Source (survey data, 2015)

4.7 Testing Mediating Effect of Organization Innovativeness Using Sobel Test

Table 4.7 below shows the test of the indirect effect using normal distribution using the Sobel test by Preacher and Hayes (2004). The sobel test is preferred to Baron and Kenny (1986) because it had a very low power (MacKinnon, Warsi, & Dwyer, 1995).

Table 4.7 Indirect Effect and Significance using Normal Distribution

	Value	s.e.	LL95CI	UL95CI	Z	Sig(two)
Effect	-0.2167	0.0981	-0.4089	-0.0245	-2.2100	0.0271*

path a = 0.3600 and path b =1.5700 So the indirect effect = 0.5652 and is significant using the Sobel test (see *Significant at p<0.05)

Source (survey data, 2015)

Table 4.6 shows the direct effect with path a coefficient = 0.7075 and while path b coefficient =-0.3063 while the indirect effect using the sobel test = -0.2167 which lies between the direct effect and it was significant at (p<0.05). Hence we conclude that organization innovativeness mediates the relationship between knowledge management and firm competitiveness (Preacher and Hayes, 2004).

4.8 Testing Mediating Effect of Organization Innovativeness Using By Boost Trapping the Indirect Effect

Table 4.8 presents findings of indirect effect and significant effect using normal distribution. The output provides the bootstrapped results at 99 and 95 percentiles confidence intervals. We were interested with 95% confident

level. Therefore we established if ZERO (0) lies within 95% confidence interval. The findings showed that the indirect effect at 95% confidence interval ranged from (-0.4089) to (-0.0245). From the bootstrap results for indirect effect was (-0.2167) which was between the indirect effect from the normal distribution interval range and hence zero does not occur between the lower limit and the upper limit at95% confident level. Therefore the indirect effect of boost trapping results is significant, and hence mediation exist and therefore we reject Hypothesis (H0$_4$) that stated there is no significant mediating effect of organization innovation on the relationship between knowledge management and firm competitiveness.

Table 4.8 Bootstrap Results for Indirect Effect

	Data	Mean	s.e.	LL99 CI	LL95CI	UL95CI	UL99CI
Effect	-0.2167	-0.2148	0.1318	-0.5439	-0.4674	0.0417	0.1289

Note: LL = Lower Limit (or the lower boundary) and UL = Upper Limit (or upper boundary) of the Confidence interval, Number of bootstrap resamples 5000,**Significant at p<0.01, *significant at p<0.05

Source (survey data, 2015)

Further boost trapping was performed to determine the mediating effect and the results are presented in Table 4.6 below:

5. Discussion and Conclusion

The present study has examined the relationships among knowledge management, innovation and firm competitiveness. It has been seen that knowledge management, leads to innovation and firm Competitiveness. Moreover, the findings show the positive and significant relationship between knowledge management and firm competitiveness in the small and medium manufactures in Kenya. The study suggests that knowledge management is antecedent of innovation, which in turn enhances firm competitiveness. Organizations managing knowledge more effective will gain a competitive position in the turbulent and dynamic business environment of the 21st century. Organization innovation process depends heavily on knowledge, and the knowledge management should be an essential element of running firms. Therefore Knowledge management is essential for the survival of any business in a competitive business sate up as organizations are forced to innovate in order to compete with other business in the sector. Therefore organizations should focus on knowledge management to improve competitiveness through innovativeness.

The findings of this study contribute in literature by providing empirical evidence of the relationship among knowledge management practice, innovation and firm competitiveness in the manufacturing sector in Kenyan. The study provides valuable information to managers of small and medium enterprises to embrace knowledge management so as to accelerating innovation and firm competitiveness which will eventually influence firm performance level. Knowledge should be managed effectively in order to bring innovation in the organization. Moreover, the innovation is prerequisite of firm performance in this dynamic environment. Managers should focus on knowledge management practices, such as knowledge acquisition, knowledge dissemination and responsiveness to knowledge, in order to improve the innovation and eventually firm performance. The limitations of this study will be focus for future research. It is a cross sectional study where data was collected at a particular time that makes it restricted to that particular time. Also, this study is limited only to small and medium manufacturing sector in Kenya; further studies may focus on other sectors in Kenya.

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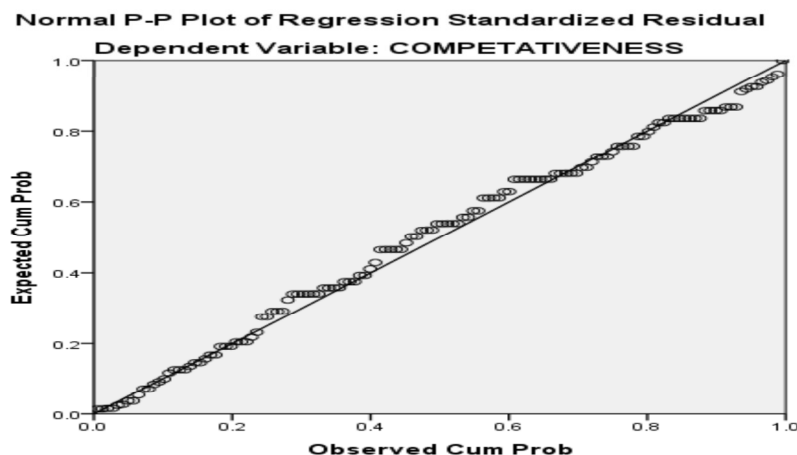
Appendix I: **Standard Residual**
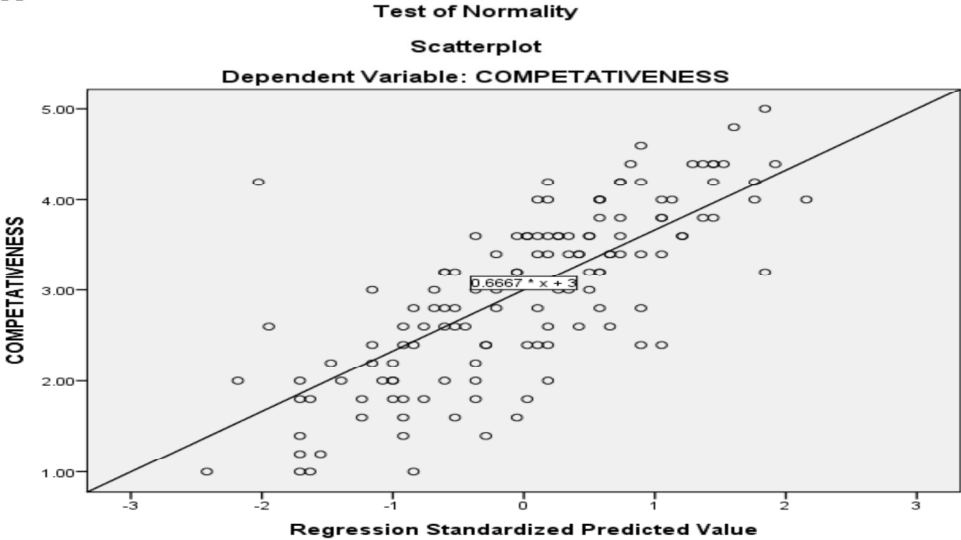

Figure 4.1: Standard Residual

Appendix II: Scatter Plot

Test of Normality

Scatterplot

Dependent Variable: COMPETATIVENESS

Figure 4.2: **Scatter Plot**