Factors Influencing Core Quality Management Practice: Evidence from the Selected Colleges of Ethiopian Ministry of Agriculture

Abel Dula Wodajo
Lecturer, College of Business and Economics
Wolkite University, Ethiopia

Admasu Abera Lalisho
Lecturer and Dean, College of Business and Economics
Dilla University, Ethiopia

Abstract
The main objective of this study was to investigate factors influencing core quality management practice of selected Colleges of Ethiopian Ministry of Agriculture namely Ardaita, Alage and Agarfa. To achieve the intended objective, survey and mixed approaches of a research were employed. Both primary and secondary sources of data were used. Questionnaire was distributed to 120 functional managers across the three Colleges using stratified sampling technique. Factor analysis using confirmatory factor analysis was performed to assess 35 survey items designed to measure 7 dimensions of Colleges' quality management practices. The major findings of the study identified that, out of 21 relationships only ten correlation results are statistically significant at (p=0.05) level. Also Structural Equation Modeling was employed to confirm the thirteen hypothesized relationships but only five relationships were significant at (p=0.05) level. It can then be concluded that the crucial role played by top management commitment and clarify the relative importance and the interplay between process management, employee management, suppliers' quality management, information analysis and core quality management practices. Thus, it is recommended that the managers and/or leaders of these Colleges should focus more on the critical factors which are top management commitment and information technology responsiveness to promote and influence quality improvement. In addition, the quality promoters, particularly government and development partners should give special attention to agricultural Colleges and they have to work more to develop teams of quality consultants among the institutions.

Keywords: Amos, Factor analysis, Quality Management Practices, Latent variables.

Introduction
In today's competitive academic environment where students have many options available to them, factors that enable educational institutions to attract and retain students should be seriously studied. Higher education institutions, which want to gain competitive edge in the future, may need to begin searching for effective and creative ways to attract, retain and foster stronger relationships with students (Teo, C. L., 2001).

From a managerial philosophy viewpoint, the elements of quality management (QM) are varied and this is very apparent in higher education (Gavin & Juan, 2013). Defining quality in educational institutions has proved to be a challenging task. According to Cheng & Tam (1997), "quality management in educational organization is a rather vague and controversial concept" and argues that quality is a "notoriously ambiguous term". As a result of the difficulty in defining quality, the measurement of quality has also proved to be contentious. There have been various attempts to draw on industry models such as the quality dimensions of SERVQUAL (Parasuraman et al., 1988) and the balanced scorecard to develop quality assessment models for educational institutions (Cullen et al., 2003). Difficulties in defining customer requirements, while there is a variety of stakeholders (e.g. students, parents, employers, faculty members, government, and general society) having different interests, adds to the complexity. This has led to the emergence of a debate on the applicability of quality management principles, methodologies and tools to education sector (Sangeeta et al., 2004).

The aim and philosophy of quality management is not the measurement of quality performance as an end in itself, but the continual improvement of quality through a process of cultural and organizational change (Tesema, 2008). It is people-driven and results are evidenced in terms of improved teamwork, company morale and organizational climate, resulting in improved productivity and profitability (Birhanu, 2011).

Living behind the debate on applicability of quality management practices in all the sectors now it is understandable by most of the stakeholders in any organization that quality related problems are the stumbling block for the majority of the industries. Moreover, quality related problems were apparent in all the sectors (Birhanu, 2011). Thus, the aim of this research was to investigate factors influencing core quality management practice of Ardaita, Alage and Agarfa (AAA) Colleges. Specifically the following objectives have been achieved: to investigate the underling structure of quality management practices constructs, to explain the relationship between quality management practices constructs and to examine the influence of quality management constructs on core quality management practice construct.

Statements of the Problem

According to Engelkemever (1993), QM can be applied as a means for improving student/ staff morale, increasing productivity, and delivering higher quality services to both internal and external customers. This proposes the possible adoption of commercially based approaches such as TQM, ISO Series, BPR and kaizen in a service sector like technical, vocational, educational and training colleges (Richard et al., 2010). Although Educational Institutions are able to adopt many of the principles of QM, it is reasonable to expect some problems when applying them to a different organizational structure to that of the commercial environment (Tam, 2002).

According to Daniel and Fasika (2003), most literatures are revolved around manufacturing organizations and there are only few empirical researches available in Ethiopia concerning the study of factors influencing QM practices in service sector particularly an educational institutions. A research conducted by Birhanu (2011), confirmed that the literature on quality management practice in educational institutions in Ethiopia is insufficient.

Important aspect to be recognized here is that although studies on factors influencing QM practice were conducted for companies of all sizes in other countries, there is none actually focused on studying factors influencing core QM practices in Ethiopia particularly in Agricultural Technical Vocational Education and Training (ATVAT) Colleges. In addition, the study emphasized on factors that are considered to be a success factors in many other researches for successful implementation of core quality management practice in a way that fits the study area where clear failure of quality management implementation is observed. The colleges are rendering service through training development agents to the country as a whole by engaging themselves simultaneously in production, which pose a big difficulty in coordinating quality management efforts designed to achieve customer orientation. So the researchers attempts to bridge the aforementioned empirical gap and mitigate the prevailing problems encountered by ATVET Colleges by investigating factors influencing core management practice (customer orientation).

Research Methodology

In order to achieve the intended objectives, survey strategy and cross sectional study have been employed. Both primary and secondary data have been used to make the study fruitful. A structured questionnaire was designed to gather primary data from senior and functional mangers of AAA Colleges. In the questionnaire close-ended questions format with five points Likert scale was used: strongly disagree, disagree, undecided, agree and strongly agree indicating 1, 2, 3, 4 and 5 respectively. To maintain the reliability of the data, the researchers provided proper insight about the purpose of the study to the individuals from whom data was collected. In order to assure the validity of the instrument a pilot survey was conducted by distributing the instrument to academicians and practitioners knowledgeable about the management of quality.

In addition, the study employed stratified sampling technique to determine the appropriate sample size from AAA Colleges. According to the information accessed from the human resource department of each colleges the total population of the study was 175. The following sample size formula has been used to determine an appropriate sample:

$$n = \frac{t^2 * s^2}{d^2}$$

Where, n is the required sample size, t is the value for selected alpha level of 0.05, s is estimate of standard deviation in the population = 1.25 (estimate of variance deviation for 5 point scale calculated by using 5 [inclusive range of scale] divided by 4 [number of standard deviations that include almost all (approximately 98%) of the possible values in the range]), d is acceptable margin of error for mean being estimated as 0.25 (number of points on primary scale * acceptable margin of error; points on primary scale = 5; acceptable margin of error = .05.

Taking into account previous research on this line of study area and as suggested by Cochran (1977) the researchers assumes 80 percent response rate and the researchers determine the drawn sample size required to produce the minimum sample size as 96/0.80 which results a 120 sample size. After identifying the sample size using the above equation the researchers need to allocate the estimated sample size to each strata college under the study to maximize the predictive power of the model. The proportional allocation was done using the following formula as suggested by Kothari (2004). Where, N_h is proportional sample to the strata and N is target population.

Table 1: Sample Size Determination for each stratum

ATVET Colleges’	Number of managers	Proportional size
Ardaita	43	30
Alage	74	50
Agarfa	58	40
Total	175	120

Source: Field Survey, 2014

The data were analyzed using Statistical Package for Social Sciences (SPSS V 20) and Amos version 20. In all cases alpha (significance value) is set at 0.05, to test at 95 percent confidence level. Using this software, analysis was performed by employing factor analysis.

Results and Discussion

In this part, analysis was performed through providing distinct explanations with regard to the measurement and structural model of the study. Assessment of reflective measurement models includes composite reliability to evaluate internal consistency, individual indicator reliability, and Average Variance Extracted (AVE) to evaluate convergent validity. In addition, the Fornell-Larcker criterion and cross loadings are used to assess discriminant validity. Each criterion for the assessment of reflective measurement models used, and then the hypothesized relationship between the constructs have been addressed.

Measurement model Analysis

Reliability Analysis

For this study reliability of scales measuring the constructs of latent variables were tested by means of the internal consistency method. According to Peterson (1994), this can be estimated by means of a reliability coefficient, such as Cronbach's alpha. This is the most widely used reliability estimate in empirical research. In this respect, the minimum advisable level is 0.7 (Nunnally, 1978), although it may be reduced to 0.6 in exploratory research or even to 0.55 (Hair J.A., 2010).

Table 2: Internal Consistency of Latent Variables

Factors	Cronbach's alpha	Cronbach's alpha based on Standardized Items	Number of items
Top Management	0.686	0.688	5
Employee Management	0.809	0.803	5
Process Management	0.710	0.714	5
Information and Analysis	0.883	0.888	5
Supplier’s Quality Management	0.856	0.869	5
Customer Orientation	0.911	0.911	5
Information technology Responsiveness	0.926	0.929	5

Source: Field Survey, 2014

As the above table depicts, after performing a reliability analysis using alpha the researchers confirmed that all the instruments employed in this study were above the minimum level of 0.7 with the exception of top management commitment which have 0.68.

Factorability test

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.790
Bartlett's Test of Sphericity	Approx. Chi-Square	3617.818
	Df	630
	Sig.	.000

Source: Survey Data, 2014

Perusal of table above helps to assess the factorability of the data set using Bartlett's test of sphericity and the Kaiser Meyer Olkin (KMO) measure of sampling adequacy. As the table indicates Bartlett's test of sphericity is significant ($p<0.05$), which indicates the appropriateness of factor analysis. Also as it was suggested in different statistical books KMO measure of sampling adequacy should be greater than 0.07 (Tabachnick & Fidell, 2007). In this study the measure indicates a value of 0.790 which indicates the achievement of the minimum suggested value for good factor analysis. So the researchers specified all this latent variables as it was suggested in William et al. (2009).

Initial Specification

Amos Graphics follows the conventions of Structural Equation Modeling (SEM) diagrams. The ovals represent latent (or unobserved) variables, in this case, Top Management Commitment (RML1-RML5), Employee Management (EM1-EM5), Process Management (PM1-PM5), Information and Analysis (IA1-IA5), Supplier Quality Management (SQM1-SQM5), Information Technology Responsiveness (ITR1-ITR5) and Customer Orientation (CO1-CO5) represent the seven subscales of the quality management practices construct.

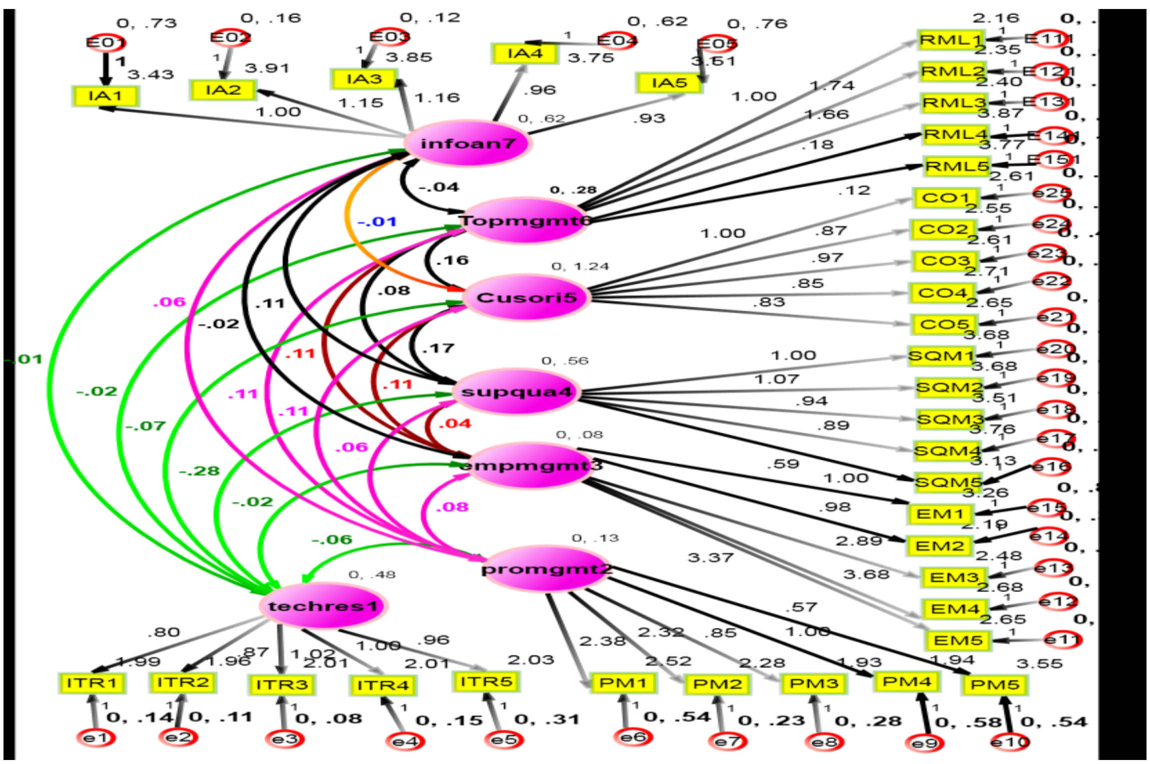
The rectangles represent observed variables, which are the actual QM practices construct items indicated above in bracket. The curved double-headed arrows represent the correlations or covariance's among the latent variables (for the standardized and unstandardized solutions, respectively), and the straight single-headed arrows represent the factor loadings of the observed variables on the latent variables. The small circles with arrows pointing from the circles to the observed variables represent errors or unique factors that each latent variable has a 1 next to the path from it to one observed variable (e.g., from top management commitment to RML1). This serves to constrain the parameter and define the scale of the latent variable as it was suggested by Arbuckle (2012). So, all the procedures are performed with due consideration pertinent to the quality management literatures and analysis.

The figure below depicts the initial graphical input used for specification search, where yellow colored rectangles represent observable variables, pink colored circles represent latent variables and red circles represent measurement error for each observable variable. Here the researchers want to stress that the specification of the model at this time have no implications to the order of the latent as well as the observable variables. Generally in this study, there are 35 loading estimates, 35 error estimates, 7 variance and 21 correlation estimates between construct. The estimate for each arrow linking a construct to a measured variable is an estimate of a variable's loading-the degree to which that item is related to the construct. So totally there are 99 parameters to be estimated. But for the purpose of identification, one parameter was fixed at one, this results estimation of 98 free parameters.

The model does not deny the existence of variables such as organizational context, organizational structure and culture, which may play an important role in the explanation of quality management practices. Despite that, these variables are not included in this model explicitly. Their effects will be considered by the error terms specified in the structural model. According to Hair J.A. (2010), the SEM program used for this analysis has the capability to compute a model solution directly from raw data, without the researchers computing a correlation or covariance matrix separately. Also they pointed out that, the alternatives between correlations versus covariance matrix used is a statistical and interpretation issue.

Amos results of estimated means among indicators

Figure 1: Mean estimation (unstandardized Amos graphics result)



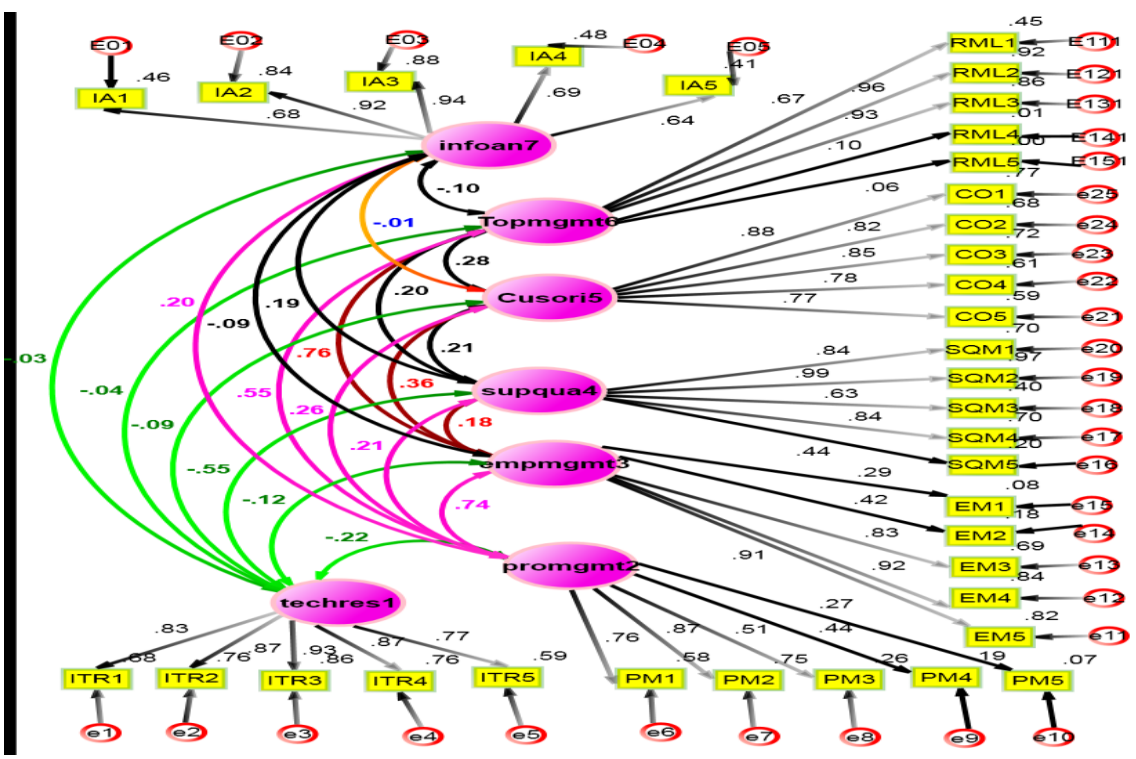
Source: Survey Data, 2014

Figure 1 above shows estimated population mean for all the indicators. This results are shown at the right top corner of each small rectangle boxes, where almost all the indicators of customer orientation, employee management, process management and information technology responsiveness constructs are rated by respondents as disagree, strongly disagree or undecided options on the five point likert scales. On the other hand indicators associated with information analysis, suppliers quality management are rated as agree strongly agree or undecided options on the five point Likert scales. Since sample mean is recognized as unbiased estimator of the population mean, the researchers becomes 95% confident to infer that all the sample mean results of each indicators exhibited lower rating. So as the literatures for assessing the level of quality management practices suggested that each construct indicators scored below average requires managerial attention for successful implementation and realization of quality management initiatives.

Amos Results of Correlation and Factor Loading

The standardized estimates output provided by Amos 20.0 using ML estimation is presented in the figure below.

Figure 2: Standardized Result, Amos Graphics



Source: Survey Data (2014)

The above figure shows the correlations among the latent variables next to each double arrow. These correlations suggest that the latent variables are somewhat related, as would be expected given that they are all hypothesized to be aspects of one construct, but the correlations are not so high as to suggest that they are all measuring the same construct.

The factor loadings are shown on the arrows from the latent variables to the observed variables in figure 2. Accordingly, Amos do the Algorithm to come up with the standardized regression weight where it indicates the direct relationship between each observed variables and the construct it was supposed to measure as indicated by a single arrow. The loadings for the five variables on customer orientation range from 0.769(CO5) to 0.877 (CO1). The loadings for the five variables on suppliers' quality management from 0.443 (SQM5) to 0.986 (SQM2), the loadings for the five variables on employee management are 0.290 (EM1) to 0.917 (EM4), the loadings for the five variables on top management commitment ranges from 0.100 (RML4) to 0.959 (RML2), the loadings for the five variables on information technology responsiveness ranges from 0.768 (ITR5) to 0.925 (ITR3), the loadings for the five variables on process management ranges from 0.272 (PM5) to 0.869 (PM2) and the loadings for the five variables on information and analysis ranges from 0.643 (IA5) to 0.937 (IA3). Indicators with weaker outer loadings are sometimes retained on the basis of their contribution to content validity. Indicators with very low outer loadings (below 0.40) should, however, always be eliminated from the scale (Hair et al., 2014).

The researchers are 95 percent confident to say that all loadings and correlations among the latent variables are significant ($p< 0.05$). Most have a loading to be considered as above excellent and very good with the exception of PM4, PM5, RML4, RML5, EM1, SQM5 and EM2. According to Tabachnick & Fidell (2007) in general, the higher the factor loading the better, and typically loadings below 0.30 are not interpreted. Also according to Donna (2009) general rules of thumb, loadings above 0.71 are excellent, 0.63 very good, 0.55 good, 0.45 fair, and 0.32 poor. These rules of thumb are based on factor analyses, where factor loadings are correlations between the variable and factor, so squaring the loading yields a variance accounted for as the researchers performed in the next section. According to Hair J. A. (2010), the size of path estimate and statistical significance confirmed that the indicators are strongly related to their associated constructs and are one indication of construct validity.

Discriminant and Convergent Validity

Discriminant validity is the extent to which a construct is truly distinct from other constructs by empirical standards, thus, establishing discriminant validity implies that a construct is unique and captures phenomena not represented by other constructs in the model (Hair, G. et al., 2014). In this study, Fornell-Larcker criterion which is more conservative approach to assessing discriminant validity was used. The researchers compare the square root of the AVE values with the latent variable correlations. As they pointed out specifically, the square root of each construct's AVE should be greater than its highest correlation with any other construct (Note: This criterion can also be stated as the AVE should exceed the squared correlation with any other construct).

The numbers at the upper right hand corner of each observed variable in figure 2 are the squared multiple correlations for each observed variable. A common measure to establish convergent validity on the construct level is the average variance extracted (AVE) (Hair, G. et al., 2014). Also they defined this criterion as the grand mean value of the squared loadings of the indicators associated with the construct (i.e., the sum of the squared loadings divided by the number of indicators).

The AVE values of RML (0.743702), ITR (0.7304166), EM (0.782988), SQM (0.69308), PM (0.533326), IA (0.61463) and CO (0.7471) are well above the required minimum level of 0.50. Thus, the measures of the seven reflective constructs have high levels of convergent validity. Overall, the square roots of the AVEs for the reflective constructs, RML (0.862381), ITR (0.854644), EM (0.884866), SQM (0.832515), PM (0.7302917), IA (0.7839) and CO (0.8210) are all higher than the correlations of these constructs with other latent variables as shown in figure 2. According to Hair J.A., (2010) an AVE of 0.5 or higher is a good rule of thumb suggesting adequate convergence. So in this study the result shows that the measurement model has adequate convergence validity.

Model Fit

The initial seven-factor CFA model did not fit well, with $\chi 2= 1442.705$, df= 539, and p less than 0.0005. For this study, all fit indices provided by Amos 20 are shown in Table 4. In addition to the fit indices recommended by Brown (2006), Amos provides a number of additional fit indices; although not all fit indices are recommended. According to Brown using, RMSEA close to 0.06 or less; CFI close to 0.95 or greater and TLI close to 0.95 or greater are recommended. This model does not fit well, with RMSEA = 0.119, CFI = 0.728, and TLI = 0.7. These fit indices suggest that the model needs to be modified.

According to Donna (2009) an additional benefit of having a data set without missing data in Amos 7.0 is that can obtain normality checks, including skewness and kurtosis indexes. In this study Mardia's coefficient is 137.226 and critical ratio is 14.769. So according to the criteria provided in the methodology part of this study kurtosis and skewness do not appear problematic for this study.

Structural Model Analysis

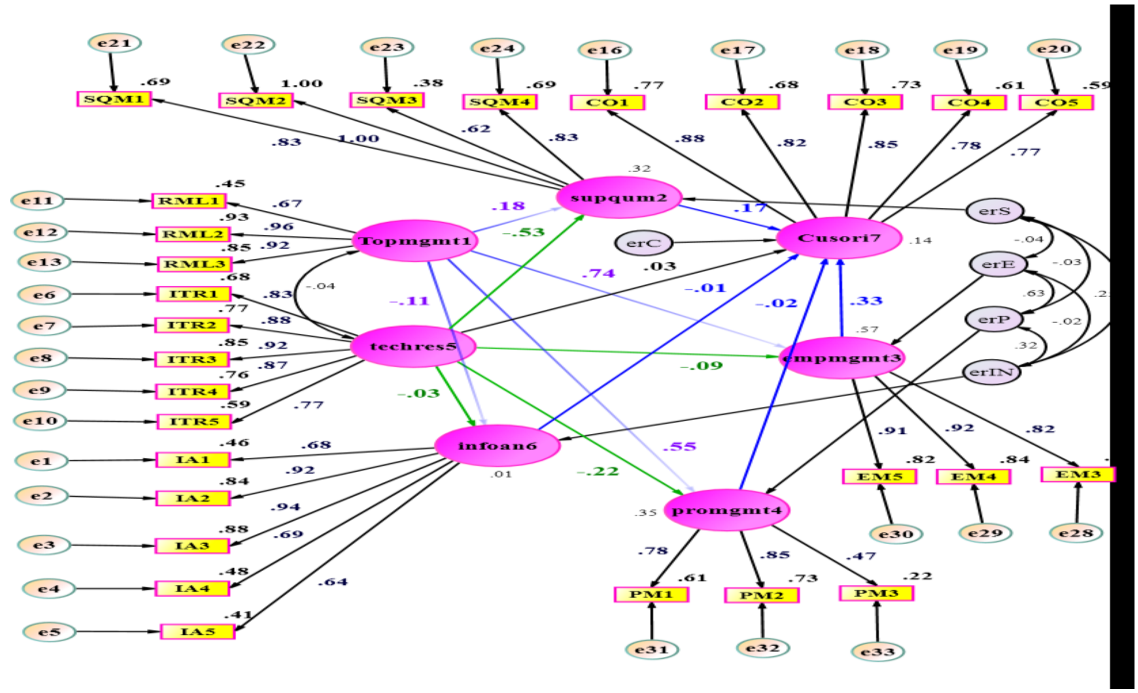
Structural model specification

This section continues the analysis and focuses on the structural model that represents the underlying theory/concept of the path model used in this study. Assessment of the structural model results enables the researchers to determine how well empirical data support the theory/concept and therefore to decide if the theory/concept has been empirically confirmed (Hair et al., 2014). Here the researchers used the term cause with great care in SEM in line with the suggestion given by Hair J.A. (2010), where dependency relationships can sometimes be theoretically hypothesized as causal. However, simply thinking that a dependence relationship is caused doesn't make it so. In addition, bearing in mind the suggestions given by Tabachnick & Fidell (2007) the researchers deleted items that exhibits lower loading below 0.45, to investigate the structural model for the latent variables used in this research.

The specification of the model consists of the translation of the verbal hypotheses into a series of equations previously represented in the form of a causal or a path diagram. The path diagram shows the causal relationships among all variables in the system. It should be based upon a priori knowledge of such relationships which are ultimately related to previous experience or theoretical basis (Hair et al., 2014). Thus, the path diagram represents the working hypothesis about the causal relationships among variables.

Here constraints are added to the measurement model by replacing the correlations between constructs for each hypothesized relationships constructs. With the exception of correlational relationships among exogenous, this was done in line with the suggestion given by (Hair et al., 2010). The following figure shows not only the complete set of constructs and indicators in the measurement model, but also imposes the structural relationships among constructs. The model is now ready for estimation. This becomes the test of the overall theory, including both the measurement relationships of indicators to constructs, as well as the hypothesized structural relationships among constructs.

Figure 3: Structural model standardized estimate Amos graphic output result



Source: Survey data, 2014

According to Rencher & Christensen (2012), for sample sizes of up to about 1,000 observations, path coefficients with standardized values above 0.20 are usually significant and those with values below 0.10 are usually not significant. Nevertheless, making definite statements about a path coefficient's significance requires determining the coefficient estimates' standard error, which is part of more detailed structural model results evaluations (Hair et al., 2014).

In this study the hypothesized relationship between constructs representing the paths from RML→EM, RML→PM, RML→SQM, ITR→SQM, ITR→PM are supported with a significance value of p=0.01, p=0.01, p=0.05, p=0.01 and p=0.05 respectively. While all the other hypothesized relationships are not significant at either 5 percent or one percent level of significance.

Model Fit

Structural Equation Modeling (SEM) with Amos version 20 was used to test and analyze the hypothesized relationships of the research model (Arbuckle, 2012). SEM aims to examine the inter-related relationships simultaneously between a set of posited constructs, one measure each of those or more observed items (measures). As they pointed, the goodness of fit of a statistical model describes how well it fits a set of observations. Measures of goodness of fit typically summarize the discrepancy between observed values and the values expected under the model in question. Such measures can be used in statistical hypothesis testing (Arbuckle, 2012). Generally, to assess the goodness of fit of the entire model, measures such as χ2/df, RMR, GFI, AGFI, RMSEA, NFI and CFI has been used. The relative chi-square (chi-square over degree of freedom; χ2/df), standardized root mean square residual

(RMSEA), goodness-of-fit index (GFI), adjusted goodness of- fit index (AGFI), normed fit index (NFI), and comparative fit index (CFI) were used as goodness-of-fit measures. Due to the sensitivity of the chi-square test to sample size, the relative chi-square was used (it should be 3 or less for an acceptable model (Tabachnick & Fidell, 2007), Standardized RMSR should not be greater than 0.10 and GFI, AGFI, NFI, and CFI should exceed 0.90 to be acceptable (Hair J.A. 2010). The rate of each index has come in the Table 4. The measurement model with all seven constructs was using confirmatory factor analysis.

Table 4: The Result of Goodness of Fit tests

	Absolute				Parsimony	Incremental	
	χ^2/df	RMR	RMSEA	GFI	AGFI	NFI	CFI
Parent Measurement model (CFA)	1442.705/539 =2.432	.112	.11	.611	.545	.63	.72
Structural model	619.1/330 = 1.876	.07	.08	.738	.679	.79	.89

Source: Survey data, 2014

The figure above depicts that all of these measures are within a range that would be associated with good fit.

Conclusions

Based on the data analysis, interpretation and major findings, the following conclusions have been drawn:

- It was demonstrated that quality management practices could be assessed in ATVET Colleges utilizing a valid and reliable instrument which was developed from a previous survey conducted by many researchers which measured business quality management practices. The findings of this study support for previous theory as to the underlying factors of quality management practices, by operationalizing it as a multiple construct.
- The results highlight the crucial role played by top management commitment and clarify the relative importance and the interplay between process management, employee management, suppliers' quality management, information analysis and core quality management practices.
- The result highlighted the relationship between information technology responsiveness with all the other constructs suggests inverse relationships or logically by examining the underling indicators of this construct the researchers identified that functional managers of the college argued that their organizations level of being responsive towards information technology influences their level of managing the employees, process and suppliers.
- The most fascinating result of the study is information technology responsiveness has both direct and indirect influences on core quality management practice which is customer orientation.

Recommendations

Based on the findings, the following possible recommendations were forwarded:

- The information obtained through this study could be of primary assistance especially for EMoA ATVET Colleges that plan to stimulate or foster the kinds of organizational development strategy such as customer orientation in their organizations at individual, group and organizational level.
- The managers, as leaders in these Colleges, should focus more on the critical factors which are top management commitment and information technology responsiveness employed in this study to

promote and influence quality improvement.

- The quality promoters, particularly government and development partners should give special attention to ATVET Colleges and they have to work more to develop teams of quality consultants among the institutions.
- Finally, the focus of this study was only the Colleges; the results should not be generalized beyond what is reasonable, given the nature of the sample. It is the researchers' view that the future studies should consider substantially larger samples including greater representation of industries and Universities. Given the cross-sectional nature of the data, the researchers should exercise caution in drawing causal inferences from the findings of this study. Despite this caveat, the researchers observes an association between top management, information technology responsiveness, process management, suppliers' quality management, information analysis, employee management and customer orientation. More detailed longitudinal studies may be appropriate for assessing causality. This contribution enables researchers to use similar methodologies to measure quality management practices in other industries.

References

Arbuckle, J. L. (2012). *IBM SPSS Amos 21 User's Guide.* Chicago, USA: IBM Software Group.

Birhanu, B. (2011). *Quality Management and Engineering Practices and Challenges in Ethiopia*. Addis Abeba, Addis Abeba, Ethiopia.

Cheng, T., & Tam, W. (1997). Multi Models of Quality in Education. *Journal of Education, 5*(1), 22-31.

Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). New York: Jhon Wiley & Sons.

Cullen, J., Joyce, J., Hassall, T., & Broadbent, M. (2003). "Quality in higher education: from monitoring to Management. *Quality Assurance in Higher Education, 11*(1), 30-34.

Daniel, K., & Fasika, B. (2003). Efforts and Problems in Ethiopian Manufacturing Industries. *ZEDE Journal of EAEA, 20*.

Engelkemever, S. (1993). TQM in Higher Education. *The Center for Quality Management Journal, 2*(1), 28-33.

Gavin, D., & Juan, J. T. (2013). A Review of Quality Management Research in Higher Education Institutions. *Working Paper Series University of Kent*, 1-37 Retrieved from http://www.kent.ac.uk/kbs/research-information/index.htm

Hair, J. A. (2010). *Multivariate data analysis* (4th ed.). Englewood-Cliffs: Prentice Hall.

Hair, J. F., G, T. H., Christion, M. R., & Marko, S. (2014). *A Primier on Partial Least Squares Structural Modeling (PLS-SEM)* (1st ed.). Thousand Oaks, California, United States of America: SAGE Publications, Inc.

Kothari, C. R. (2004). *Research Methodology (Methods and Techniques)* (2nd ed.). New Delhi: New Age International Publishers. Retrieved from www.newagepublishers.com

Nunnally, J. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw-Hill.

Parasuraman, A. Z. (1988). SERVQUAL:-A Multiple Item Scale for Measuring Consumer Perceptions of Service Quality. *Journal of Marketing, 64*(1), 12-40.

Peterson, R. (1994). A Meta Analysis of Cronbach's Coefficient alpha. *Journal of Consumer Research, 21*(2), 381-391.

Richard, B. N., Onserio , N., Richard, N. O., Thomas , O. O., & Prof.Isaac , M. M. (2010). Quality

Management Practices In Kenyan Educational Institutions: The Case of The University of Nairobi. *African Journal of Business & Management (AJBUMA), 1*, 15. Retrieved from http://www.aibuma.org/journal/index.htm

Sangeeta, Sahney, D., & Banwe, K. (2004). "Conceptualizing total quality management in higher education". *The TQM Magazine, 16*(2), 145-159.

Tabachnick & Fidell. (2007). *Using Multivariate Statistics* (5th ed.). Boston: Pearson Education.

Tam, M. (2002). University Impact on Student Growth a Quality Measure? *Journal of Higher Education Policy and Management, 24*(2), 211-218.

Tesema, B. (2008). Quality Related Problems in Large Ethiopian Manufacturing Firms. Implications for Competency. *South African Journal of Indestrial Engineering*.

Teo, C. L., (2001). "*Realities of private institution,"* NewStrait Time, 4.

William, J. M., Andrew, T. S., & Richard, H. D. (2009). Assessment of Quality Management Practices within the Healthcare Industry. *American Journal of Economics and Business Administration, 1*(2), 105-113.

APPENDIX

Section 1: Introduction

Dear Respondents,

This questionnaire is intended to collect data on "*Factors Influencing Quality Management Practices: Evidence from the Selected Colleges of Ethiopian Ministry of Agriculture.* We kindly request you to give correct and complete information to present a representative finding. Your participation is entirely voluntary and the questionnaire is completely anonymous. Finally, we confirm you that the information that you share us will be kept confidential and only used for the academic purpose. No individual's responses will be identified as such and the identity of persons responding will not be published or released to anyone. Thank you in advance for your kind cooperation.

Section 2: Factors Influencing Quality Management Practices

Please indicate the degree to which the following statements influence the level of your quality management implementation. After you read each of the statements, evaluate them in relation to your college and then put a tick mark (√) under the choices below. Where, 5 = strongly agree, 4 = agree, 3 = undecided, 2 = disagree and 1= strongly disagree.

Code	*Factors*	*5*	*4*	*3*	*2*	*1*
RML1.	Leaders are role models of a culture of quality management.					
RML2.	Leaders reinforce a culture of quality management within the organization.					
RML3.	Leaders identify and champion organizational change.					
RML4.	Performance evaluation incorporates quality.					
RML5.	Top management considers quality as first priority.					
EM1.	Employee participation in decision making is encouraged.					
EM2.	Employees are recognized for superior quality improvement performance.					
EM3.	Training is provided in basic statistical techniques to support employees in managing quality.					
EM4.	Quality related training is given to employees.					
EM5.	Feedback is provided to employees on quality performance.					

PM1.	Processes are designed systematically.					
PM2.	The structure of the organization can easily adapt new changes.					
PM3.	Clarifying the job instructions are easy in our process.					
PM4.	Customer needs and expectations are considered while designing the process.					
PM5.	The work process of our department is Flexible to make change easily.					
IA1.	Information and analysis are used to enhance the quality of service delivery					
IA2.	Quality related data are available for decision making.					
IA3.	Quality related data are available to staffs.					
IA4.	Using quality data in evaluation of supervisor and managerial performance.					
IA5.	Concise, complete and easy to understand information output are available concerning quality.					
SQM1.	Selection of suppliers based on quality rather than price.					
SQM2.	Technical assistance is provided to suppliers.					
SQM3.	Suppliers are involved in product development process.					
SQM4.	Long term relations are offered to suppliers.					
SQM5.	Specifications provided to suppliers are clear.					
CO1.	Feedback on quality and delivery performance is timely acquired.					
CO2.	Products and Services are designed and developed based on customer needs and expectations.					
CO3.	Complaint disposal time is available.					
CO4.	Field investigation is conducted for improving Service					
CO5.	Customers are easily identified.					
ITR1.	Technological resources are utilized for quality management.					
ITR2.	Necessary information technology resources are available for decision making.					
ITR3.	Gaining the expected result from Technological resource.					
ITR4.	Top management creates an expectation that all employees will use information technology resources for decision making.					
ITR5.	Computers available in our department are Equipped with important applications for managing quality.					