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Total Quality Management in Public Sector Higher Education Institutions

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Abstract

This study attempts to measure the extent to which Total Quality Management (TQM) is being implemented in Public Sector Higher Education Institutions of Pakistan. The study following a quantitative approach is based on data collected through a questionnaire. The Cronbach's Alpha for this instrument was above 0.80 for almost all dimensions of TQM considered in the study. After meeting its pre-requisites (Kaiser-Meyer-Olkin (KMO) and Bartlett's test of Sphericity), the statistical tool of Exploratory Factor Analysis (EFA) was used to meet the main objective of this research. This study identifies areas of improvement as far as Total Quality in Public Sector Higher Education Institutions (HEI's) is concerned. Main conclusion of the study is that TQM is being adopted in higher education institution but at a slower pace. Whereas, areas of improvement include Leadership, Vision Ownership, Evaluation Standardization, Process and Continuous Improvement, Employee Training and Student Focus. Decision and policy makers in Higher Education Institutions can use the findings of this study and opt for affirmative actions in order to bridge the gaps in TQM implementation.

Key Words:

Total Quality Management (TQM), quality, Higher Education Institutions, Exploratory Factor Analysis (EFA), public sector, implementation.

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1. Introduction

The basic philosophy of public sector started to change in the 1980's, when reforms and structural changes were being suggested and advocated in this sector around the globe. The new management philosophy was labeled as New Public Management and the major reasons for expansion of this idea were the basic problems of efficiency and effectiveness associated with the public sector (Boston et al. 1996).

The new public management approach involved the idea of quality and Total Quality Management. This idea has gained success in the corporate or business environment and is now being worked upon in the public sector. TQM is about continuous improvement, not just one time change in a system (Ünal, 2011); it is a holistic approach to operations and management.

The Public Education sector could not remain isolated from the changing public sector environment and it is also started to adopt quality management practices (Christensen, 2011). Reforms in higher education have been implemented across the globe and with these reforms, the idea of accountability, customer orientation, responsibility, responsiveness and quality came into the limelight.

As far as Pakistan is concerned, the issue of quality education is widely debated and remains to be addressed at large. Major changes in this sector were brought as a result of a task force that was formed to suggest measures for improvement in higher education. Therefore, after its establishment in 2002, Pakistan's Higher Education Commission (HEC) started working on improving the quality of education to pursue the agenda of knowledge based economy. It developed quality standards and established quality enhancement cells in several universities. Today major stress is being laid by HEC on the implementation and monitoring of quality standards (Ahmed, 2012). TQM being a new term in higher education also entails a pay for performance i.e. grants and resources are to be allocated to higher education institution on the basis of their performance (HEC Medium Term

Development Framework, 2005-2010).

In 2012 there were 135 HEC recognized universities in Pakistan, out of which 74 universities were in the public sector and the remaining 61 universities belonged to the private sector (LID, 2012). It is noteworthy that although the total number of universities in Pakistan doubled from 59 in 2011 to 118 in 2006, of these only three universities are ranked among the world top 700 universities. Whereas, only one of these universities is ranked among the world top 500 universities but has dropped few positions. These rankings are released by the UK based Quacquarelli Symonds (QS). It simply indicates that improvement in the quality of higher education remains a tall order and challenge for majority of the higher education institutions in Pakistan.

Therefore, the purpose of this study is to first explore the extent to which TQM elements are practiced in the public sector higher education institutions. Second, identify those elements of TQM which have so far been ignored or less attention have been paid to them. In other words which areas should be focused on more in order to achieve the goals of quality education.

1.2 Significance of this study

Since the implementation of Higher Education Reforms in different countries, stress on quality of education has increased. Similarly, since the establishment of Higher Education Commission in Pakistan several changes have occurred in the higher education structure. More emphasis is laid on quality instead of quantity and emphasis is laid on the implementation of idea of pay for performance and quality. The Medium Term Development frameworks (2005-2010 and 2011-2015) developed by HEC has given high importance to the issue of quality and performance in higher education institutions. Establishment of "Quality Assurance Agency" and "Quality Enhancement Cells" were another step towards bringing in the idea of improved quality and improvement in teaching and academic standards.

This study aims to explore one aspect of quality in this important service sector i.e. Total Quality Management. This is one concept that is taught in almost all educational institutions, in some cases it is studied as a course in business and engineering schools, where as in other cases a major degree is also allotted in this field of study.

Following are some of the advantages identified by "The Certified Manager of Quality/Organizational Excellence Handbook", these can be helpful for any organization:

- Improved competitive position
- Adaptability to changing environment
- Increased levels of productivity
- Increased efficiency
- Improved Cost Management
- Higher customer orientation and satisfaction
- Increased job security
- Higher stakeholder value
- Better and innovative processes

Above mentioned advantages of TQM can also be identified in policies and guidelines given to universities by HEC Pakistan. It is important to know that whether HEI are using this quality philosophy or not, this idea will not just provide what Selznick (1957) referred to as legitimacy to these Institutes but also help them in achieving their goals and improving their processes. Importantly, when specific areas of improvement are identified through this study, it will be easy for these institutions to focus on those areas and divert more resources on lacking areas rather than allocating resources on the same old patterns.

After setting a background, the paper highlights past TQM research conducted in the domain of higher education. Following the literature review, research methodology has been discussed to meet the objectives of this study.

2. Literature Review

According to Fynes and Voss (2002) researchers interested in studying TQM are usually faced with the issue of a precise universal definition which is not available. A huge number of definitions are available for TQM ranging from Crosby's (1967) very basic definition to Edward Deming's (1982) main idea. Table 1 states TQM definition of different scholars.

Table1
Definitions of TQM

Definition	Scholar
"Total Quality is defined as conformance to requirements."	Crosby (p.2,1967)
"A Total approach to put Quality in every aspect of Management."	Creech (p.6, 1995)
"TQM is the integration of all functions and processes within an organization in order to achieve continuous improvement of the quality of goods and services."	Omachonu and Ross (p.3, 2004)
"Quality is fitness for use."	Juran (p.2-2,1974)

Source: Total Quality Management by Suganthi & Samuel (2011)

Deming regarded as the father of TQM, provided fourteen points of management theory for quality enhancement, productivity improvement and to gain competitive advantage.

In today's dynamic environment and fast paced world, public sector or even the education sector is vastly influenced by management practices of the corporate or business world (Amin, 2006) and TQM is one such example that has entered the public sector. It is an integrated management philosophy that is required to be applied at all organizational levels (Oakland, 2003) i.e. it will not be effective if implemented in bits and pieces.

TQM is naturally relevant to higher education, because it is a process focused approach that is aimed at increasing productivity, decreasing costs and improving quality (James and James, 1998). Many Higher Education Institutions in United States of America have adopted TQM approach but

there are several incidents where the academic quality has not improved much, yes the infrastructure has improved, administrative processes have become speedy and student and staff satisfaction might have also increased but more importantly education or academic quality needs improvement (James and James, 1998).

Going through the literature, following are the most cited 11 dimensions of Total Quality Management. These constructs have been used by researchers in higher education related studies as well as in TQM studies on manufacturing industries.

Table 2
Constructs of TQM and Their Evidence from Literature

Constructs	**Evidence in Literature**
Leadership(L)	Zhang (2000); Lim et al., (2004); Rosa et. al, (2007), Bayraktar et al., (2008) and Asif et.al, (2013).
Vision (V)	Zhang (2000); Aspinwall (1997); Venkatraman, (2007); Bayraktar et al.,(2008) and Asif et.al (2013).
Measurement and Evaluation (M)	Zhang (2000); Bayraktar et al., (2008) and Asif et.al, (2013).
Process Control And Improvement (PI)	Zhang (2000); Lim et al., (2004); Rosa et. al (2007); Bayraktar et al., (2008) and Asif et.al, (2013).
Program Design (PD)	Zhang (2000); Bayraktar et al., (2008) and Asif et.al, (2013).
Quality System Improvement (QI)	Zhang (2000); Bayraktar et al., (2008) and Pandi et. al. (2009)
Employee Involvement(E)	Zhang (2000); Venkatraman, (2007) and Bayraktar et al., (2008)
Recognition And Reward (R)	Zhang (2000); Bayraktar et al., (2008) and Ooi, (2009)
Education And Training (ET)	Zhang (2000); Bayraktar et al., (2008) and Asif et.al, (2013).
Student Focus (S)	Zhang (2000); Bayraktar et al., (2008) and Asif et.al, (2013).
Other Stakeholders' Focus (OS)	Bayraktar et al., (2008) and Asif et.al, (2013).

This above mentioned list is not exhaustive, these 11 (eleven) dimensions are not final or universal ones used in the TQM literature. Some researchers have come up with more of them and some have used lesser ones depending on the nature of study and analysis; On the basis of studies of aforementioned scholars, each one of these constructs is briefly explained as below:

Leadership (L)

Leadership in any sub discipline of management is considered to be an important aspect. Similarly, in TQM commitment of key decision makers or top management has been identified as an important construct for implementation of TQM. Knowledge of any concept, support and involvement of top management helps in implementation of any idea in an organization.

Vision (V)

A Vision or Vision Statement is a description of how an organization wants others to see it (Zhang et al. 2000). Vision is the aim or objective of an organization of where it wants to go. A quality oriented vision will surely guide the university to achieve excellence in terms of quality standards. There was a time when some of the HEIs had no vision or mission statements, but since existence of a vision is amongst the evaluation criteria by HEC, more institutions have developed them.

Measurement and Evaluation (M)

Whenever and wherever resource and investment are involved, evaluation must be given serious importance. Benchmarking, quality audits and employee performance evaluation are examples of evaluation in TQM. Before evaluation itself, there must exist some reliable measurement tools or standard dimensions against which a person or service is to be evaluated. In the higher education sector in Pakistan HEC has adopted certain dimensions against which institutes are evaluated and then rated.

Process Control and Improvement (PI)

Process Control and Improvement are terms that initially make one think about machines and their working. Process control and Improvement in HEI's refers to day to day operations and management of an institute and provision of certain basic services. As for this study, these include provision and maintenance of modern facilities such as laboratories and multimedia to enhance effectiveness of education. Provision of a conducive environment to students is included in this construct.

Program Design (PD)

Program Design is the most important dimension of quality. Development of a structured, relevant and modern curriculum is the foremost duty of a university. The higher education reforms in Pakistan had one key theme i.e. to convert conventional education system into a more productive system that contributes to the country's economy in the true sense.

Quality System Improvement (QI)

An explicitly written and available quality system can act as a guide in implementation of TQM strategy. Quality system referred to in this study is ISO 9000.

Employee Involvement (E)

Similar to involvement and commitment by top management, involvement and commitment of employees that are responsible for implementation of policies and strategies at operational level is also important. A TQM oriented organization promotes employee's involvement and values their suggestions.

Recognition and Reward (R)

In order to encourage positively contributing behavior and discouraging

malpractices, rewards and penalties are an important tool. Rewards are given for reinforcement of desired actions. But it is important in TQM to have a transparent mechanism for rewarding and punishing employees.

Education and Training (ET)

We live in a dynamic world, where new research, new knowledge and new practices are always knocking at our doors, therefore it is important to train the workforce to keep them at par with these new practices around the globe. Theoretically speaking, the higher education commission it-self and the universities are also spending huge amounts to train their academic (mostly) and non-academic staff, several scholarships and faculty development programs are an example of these initiatives.

Student Focus (S)

Satisfaction of customers is another important aspect of Total Quality Management philosophy and in Higher Education Institution students are referred to as customers. TQM expect a proper system of feedback from students as far as teacher performance and university support is concerned.

Other Stakeholders' Focus (OS)

Apart from students, families (of these students), societies and industry are also the key stakeholders. Since many years we are hearing that a gap exists between what is being taught in the universities and what is usually required in the field. The purpose of education reforms was also to make sure that this issue is addressed.

2.1 TQM in Higher Education

On the basis of a review of literature about theory and application of Total Quality Management in education institutions Aspinwall (1997) concludes that "there appears to be no apparent reason for rejecting the

applicability of TQM as a general philosophy". This management practice should be implemented in higher education sector in order to get positive results and to reap its benefits.

Motwani and Kumar (1997) in a study in the United States of America noted that TQM has been adapted by many educational institutions and this adaptation has resulted in success stories about "improved communication, higher employee morale, increased productivity, improved process efficiency, and reduction in defects and costs".

In a similar study about top business schools in Pakistan (Public and Private combined), Ahmed and Ali (2012) through exploratory factor analysis found that this concept is still new in Pakistan's business schools and areas where some attention is required include training of employees (Human Resource Development), alignment of vision with academic processes and establishment of linkage between industry and curriculum.

Asif et.al (2013) during a research to identify critical success factors of TQM in Pakistani Higher Education Institutes also concluded that "leadership, vision, measurement and analysis, process control and evaluation, program design and resource allocation and stakeholder's focus" are the most important and they emerge as critical success factors of TQM in higher education.

Based on the literature review, researchers conclude that few recent studies have used a modified form of an instrument developed by Turkish scholars for similar studies. This study instead of modifying the instrument, adopts the instrument as a whole in order to explore whether the results differ or not.

3. Methodology

3.1 Research Strategy

A quantitative approach has been adopted for this research. The reason

for using this approach is to identify elements of Total Quality Management that are being practiced in public sector higher education institutions.

3.2 Sample

A sample of five universities was selected on the basis of commonality i.e. all institutions were from the public sector and chartered by the same Provincial Government. Similar environment, dependency on same superior ministry, locality and nature (i.e. all are not specific education based) further justifies selection of this sample.

A total of 220 questionnaires were sent (44 each) to the selected five universities in the sample.

3.2 Research Instrument

While attempting to develop a tool for data collection, researchers came across an instrument previously designed by Bayraktar, Tatoglu and Zaim (2008) while conducting a similar study in Turkish Higher Education Institutions.[1] Therefore researchers adopted the questionnaire with slight modifications as far as the terminology is concerned.

3.3 Elements of TQM used in this Study

Table 3 below gives a summary of the number of items used to measure each construct of Total Quality Management in universities included in the sample. Coding and description of what items have been used under each construct in this study is attached in the Appendix section of this paper.

[1] The original instrument was tested for reliability using "perceptual data collected from a sample of 144 academics from 22 HEIs in Istanbul, Turkey".

Permission for using this instrument was taken from honorable Ekrem Tatoglu via E.mail correspondence.

Table 3
No. of Items Under Each Construct

Constructs	No. of Items
Leadership(L)	9
Vision (V)	6
Measurement and Evaluation (M)	7
Process Control and Improvement (PI)	6
Program Design (PD)	5
Quality System Improvement (QI)	3
Employee Involvement(E)	6
Recognition and Reward (R)	4
Education and Training (ET)	5
Student Focus (S)	4
Other Stakeholders' Focus (OS)	6

4. Data Analysis & Results

The following section of this paper analyzes the data collected. Firstly, sample characteristics are discussed using descriptive statistics; secondly, sample adequacy is checked; thirdly, as mentioned earlier reliability of the instrument is tested using Cronbach's alpha and lastly after fulfilling these statistical requirements, Exploratory Factor Analysis is conducted to address the purpose of this study.

Out of the 220 questionnaires sent, 128 were returned by the respondents. Out of these 128, 7 were incorrectly filled or were left incomplete, therefore the actual sample size for this study was 121 i.e. the response rate was approximately 55 percent.

4.1 Reliability

Prior to conducting the main analysis; reliability of the instrument was tested. Although, the instrument was originally used in a study in Turkey and it was statistically reliable (Alpha was over 0.80 for all constructs), still it is important to retest the reliability in Pakistan's context in order to ensure reliable analysis. Table 4 below gives the results of reliability check for each construct using Cronbach's Alpha:

Table 4
Cronbach's Alpha for all constructs:

Constructs	No. of Items	Cronbach's Alpha
Leadership(L)	9	0.883
Vision (V)	6	0.855
Measurement and Evaluation (M)	7	0.885
Process Control and Improvement (PI)	6	0.810
Program Design (PD)	5	0.846
Quality System Improvement (QI)	3	0.811
Employee Involvement(E)	6	0.855
Recognition and Reward (R)	4	0.834
Education and Training (ET)	5	0.853
Student Focus (S)	4	0.804
Other Stakeholders' Focus (OS)	6	0.649

From the table above, it can be concluded that the instrument used is statistically reliable in Pakistan's context as well and the Cronbach's Alpha for all the items was at least over 0.80, except for the 11th construct i.e. Other Stakeholders focus, if one item is dropped from this construct then the value of Cronbach's Alpha for this construct goes to 0.860, but this item is theoretically important in a way that the purpose of higher education reforms globally was to bridge the HEI and industry gap and strive for a knowledge based economy, therefore in researcher's opinion this item should not be dropped.

Since, the main objective of this study is to identify to what extent TQM in being practiced in public sector education institutions and also to explore the factors that failed to converge or need to improve. Therefore, exploratory factor analysis was conducted using SPSS.

4.2 Measures of Sample Adequacy

In order to meet the statistical requirements of running Factor Analysis, two tests were conducted to measure sample adequacy. These tests are Kaiser-Meyer-Olkin (KMO) and Bartlett's test of Sphericity. The Kaiser-Meyer-Olkin (KMO) Sampling Adequacy value of 0.832 is considered to be appropriate (Meritorious) for Factor Analysis. According to the webpage

"Measures of Appropriateness of Factor Analysis" of University of Texas-At Austin following table suggests the appropriateness of KMO:

Table 5
KMO Sample Adequacy Values for Reference

KMO Values(in)	Comment
0.90's	Marvelous
0.80's	Meritorious
0.70's	Middling
0.60's	Mediocre
0.50's	Miserable
<0.50's	Unacceptable

Source: Web page "Measures of Appropriateness of Factor Analysis of University of Texas-At Austin"

Following KMO, Bartlett's test of Sphericity was conducted to check whether the correlation matrix is an identity matrix or not. As the significance value for this test is less than alpha level i.e. 0.000<0.05 (as shown in Table No.6), null hypothesis that "the population matrix is an identity matrix is rejected".

Table No.6
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.832
Bartlett's Test of Sphericity	Approx. Chi-Square	4707.891
	Df	1830
	Sig.	0.000

4.3 Exploratory Factor Analysis

Since all the statistical pre-requisites of conducting a factor analysis have been met, the researcher can proceed with the exploratory factor analysis in order to determine the extent of implementation of Total Quality Management in public sector higher education institutions in Pakistan.

Factor analysis is a multivariate statistical approach used in education as well as other professions related studies and is often used in analyzing "self-reported questionnaires" (Williams et al.2010). Two types of factor analysis

are used, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), this study uses the former. According to Newsom (2005): *"With EFA, researchers usually decide on the number of factors by examining output from a Principal Components Analysis (PCA i.e., eigenvalues are used). With CFA, the researchers must specify the number of factors a priori".*

Whereas objective of an EFA is to explore factor structure of a measure and is often used when a study does not involve any hypothesis regarding the factor structure (Newsom, 2005). Following part of this sub-section of Data Analysis discusses the key objective of this study and its findings:

4.3.1 Scree Plot

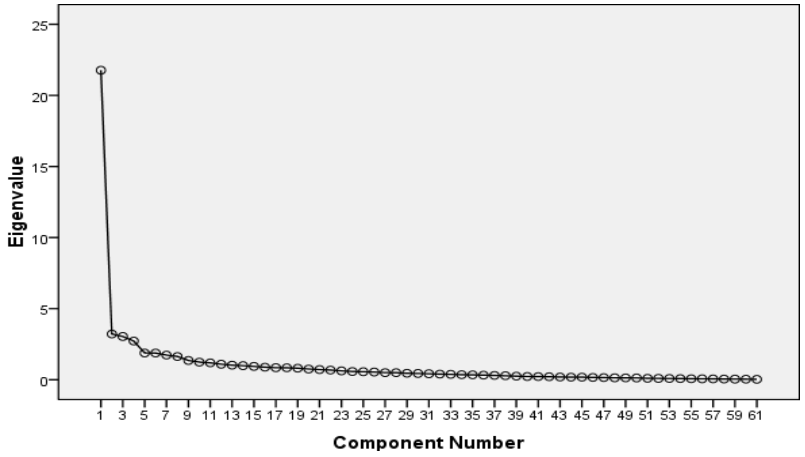

Fig. 1 Scree Plot

From the Scree Plot given in Figure 1, it can be interpreted that the almost flattening line and Eigenvalue falling below 1 (one) suggest that the items included in this study converge into 13 (thirteen) factors. Once the number of factors are identified; using Factor Loading and Eigenvalues from Principal Component Analysis, explores which of the items have converged in to these 13 factors and which have failed i.e. which areas of TQM require attention from administrators.

4.3.2 Principal Component Analysis

Using Principal Component Analysis (Cumulative Percentage of Variance and Eigenvalue > 1 Rule) it can also be seen that 13 factors/components are extracted that provides approximately 71 percent of the total variance. Table No. 7 below enlists the factors and total cumulative variance explained by each of the thirteen factors:

Table No. 7
Total and Cumulative Variance due to extracted factors

Factor	Extraction Sums of Squared Loadings	
	% of Variance	Cumulative %
1	35.685	35.685
2	5.269	40.953
3	4.983	45.936
4	4.460	50.397
5	3.081	53.478
6	3.073	56.551
7	2.837	59.388
8	2.680	62.068
9	2.217	64.285
10	2.031	66.317
11	1.939	68.256
12	1.785	70.040
13	1.679	71.719

After identification of the number of factors; using the Rotated Component Matrix that came as a result of Factor Analysis, items that converged and did not converge were identified in order to satisfy the main objective of this study (see Table No.9 attached as Annexure-B), according to Black et.al, (2006) items with factor loadings of "0.50 or greater" are taken to be significant; therefore, for final analysis loadings with value less than of 0.50 were ignored. Keeping these things and rules of thumb in view, 46 out of 61 items converged.

4.3.3 Non-Converging Items (Areas for Improvement)

One basic purpose of this study was to identify areas of improvement as

far as implementation of Total Quality Management is concerned in public sector higher education institutions is concerned. Out of 61 items included in this study, 15 items did not converge into any of the 13 factors. Table 8 enlists the 13 converging factors.

Table No.8
Non-Converging Items (TQM Areas that require attention)

Label/Abbreviation	Explanation
L9	University/Institute follows long-term steady performance in place of short-term provisional solutions.
V2	University Vision is widely known and shared by our staff.
V3	University Vision effectively inspires our workforce to improve performance of our students and institution.
V6	Employees from different levels are involved in developing policies and plans.
M2	Institute compares academic and administrative processes with other institutions.
M5	Institute uses standard performance measures to evaluate performance of academic units.
M6	Institute uses standard performance measures to evaluate performance of staff.
PI5	University has processes that are designed to be 'fool proof" aiming to minimize errors.
QI1	University advocates TQM improvement on continuous basis.
E5	Employees give suggestions and these suggestions are cautiously evaluated and implemented if accepted.
R1	Reward System in our institute is such that it is able to identify employee efforts and their participation.
ET1	Education and Training activities of our employees for academic excellence are encouraged.
ET3	Trainings on TQM are conducted where employees are encouraged to participate.
ET5	Employees, are treated as the organization's most valuable and long-term resources, that are worthy of receiving necessary education and training in order to achieve the university's vision.
S3	Co-curricular activities and student clubs are supported.

5. Conclusion

Like the New Public Management, Total Quality Management is a

complete "Management Approach or Strategy". It is a practice that originated keeping in view needs of the corporate or business sector but soon like many other values of private sector, this practice also started knocking the door of public sector and ultimately the public education sector with an aim of improving governance through efficiency and hence improving the quality of education.

The concept of TQM arrived more than a decade ago, but similar to any other idea, this exercise came a bit late and is disseminating slowly in Pakistan. The concern for quality in education has certainly increased all over the globe and Pakistan as well and therefore Quality Enhancement Cells have been established by HEC-Pakistan in several Universities. TQM in this sector is not just about having a quality or standardized curriculum, but it also deals with governance patterns, patterns of policy making through employee involvement, it requires decision makers to continuously improve processes, keep up with the pace of the changing environment (bridging the Industry-University gap), rewarding everyone adequately, investing in human resource (employees and students) and infrastructure and much more.

Though 74 percent(46 out of 61) of the items included in this study converged into different factors; but observing the mean and standard deviation values (for each item), one can conclude that even the converging factors do not have high implementation values.

On the basis of this quantitative study, following are some of the key recommendations regarding areas of TQM that require more attention:

- Other than addressing day to day activities and issues, long-term policies and strategies should be formulated in order to achieve sustainability and foresee future.

- Since HEC has made mandatory that every higher education institution must have an explicitly written "Vision", many universities have developed one, but it has not been shared by its workforce. Therefore

employees may be taken onboard while developing the vision and objectives so that they own it and are inspired by it.

- Competition though might sound alien to public sector in general but is really important in today's world, therefore institutions need to compare academic and administrative processes with other institutions and improve them in order to get more resources from different bodies.

- Fair Performance Measures should be developed and importantly implemented to evaluate performance of academic units and employees. Institutions use standard performance measures to evaluate performance of academic units. Following performance measures, a fair reward and recognition mechanism should exist in order to keep employees motivated and encouraged.

- Employees should be treated as the organization's most valuable and long-term resources, that are worthy of receiving necessary education and training in order to achieve the university's vision. Adequate resources must be allocated for training of both teaching and non-teaching faculty in order to improve the quality of education and in order to improve administrative processes.

- It is also recommended that co-curricular activities and student clubs should be supported by public sector institutions to develop its students as a package.

- Lastly, continuous improvement and monitoring may be built-in into all policies and procedures instead of just one time attention so that issues are addressed and errors are minimized.

Addressing these areas and building on current TQM good practices, public sector higher education institutions can compete with private sector institutions in terms of quality education, resource allocation and governance efficiency. The aforementioned areas need to be addressed by the decision

makers, and relatively more resources (financial, time or administrative) should be diverted to these areas until they come at par with other dimensions of Total Quality Management; but care should be taken that when diverting some of the resources areas that are currently performing well are not negatively affected in the long run.

5. Research Implications

This research provides an overview of the public sector higher education institutions. A similar study can be conducted on private sector Higher Education Institutions and a comparison can be done on how much difference exists in term of the implementation of TQM. Findings of such a research will also show that the private sector is really quick in adaptability of new management ideas than the Public Sector? Following a study on comparing these two sectors, researchers can then try to explore reasons for these difference keeping in view particular dimensions.

Lastly, conducting a research again using this instrument on a similar sample and then performing confirmatory factor analysis (CFA) can help in reassurance of Total Quality Management's implementation by limiting the study to 13 factors.

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Annexure-A

Below is the coding and description of items that have been used in this study under each of the 11 constructs:

Leadership (L) (University Top Management):

- L1 knows about TQM and its implementation.
- L2 actively participates and supports TQM practice and process improvement.
- L3 aware of the quality related new concepts and implementation.
- L4 strongly encourages employee involvement in TQM.
- L5 empowers workforce to resolve quality issues.
- L6 allocates adequate resources for administrative and non-administrative staff's education and training.
- L7 discusses quality-related issues on TQM in their management meetings.
- L8 focuses on how to improve the performance of students and employees apart from relying on financial criteria.

- L9 follows long-term steady performance in place of short-term provisional solutions.

Vision (V) (of our University):

- V1 is explicitly written.
- V2 is widely known and shared by our staff.
- V3 effectively inspires our workforce to improve performance of our students and institution.
- V4 and Academic and administrative processes are well aligned.
- V5 University has well defined academic and administrative processes and performance measures as well as policies.
- V6 Employees from different levels are involved in developing our policies and plans.

Measurement and Evaluation (M) (Our University)

- M1 on a regular basis audits practices according to policies and strategies.
- M2 compares academic and administrative processes with other institutions.
- M3 has standard performance measures (e.g. number of publications, course evaluations) to evaluate performance of the institution and TQM implementation.
- M4 uses Standard performance measures to evaluate performance of

university's top management.

- M5 uses Standard performance measures to evaluate performance of academic units.
- M6 uses Standard performance measures to evaluate performance of staff.
- M7 The aim of evaluation is improvement not criticism.

Process Control and Improvement (PI) (Our University)

- PI1 is kept neat and clean at all times.
- PI2 meets expectations of its students and workforce.
- PI3 is equipped with modern facilities (e.g. laboratories, internet) to boost the effectiveness of education.
- PI4 maintains facilities (e.g. classrooms, laboratories, and computers) in a good condition.
- PI5 processes are designed to be 'fool proof" aiming to minimize errors.
- PI6 collects statistical data (e.g. error rates on student records, course attendances) and evaluates them to control and improve processes.

Program Design (PD) (Curriculum)

- PD1 considers Students' requirements when being designed.
- PD2 considers suggestions of area experts when being designed.
- PD3 addresses needs and suggestions from the business world and

incorporates them.

- PD4 and academic programs are evaluated and updated every year.
- PD5 and University facilities (e.g. laboratories, finance, human resources) are considered in the development and improvement of the programs.

Quality System Improvement (QI) (Our University)

- QI1 advocates TQM improvement on continuous basis.
- QI2 is committed to TQM to establish our quality system in a level to be certified by ISO 9000.
- QI3 has a quality manual, quality system documents and working instructions.

Employee Involvement (E) (Employees in Our University)

- E1 work in cross-functional teams.
- E2 now have enhanced coordination and collaboration due to quality efforts.
- E3 are actively involved in TQM-related activities.
- E4 have suggestion system to improve the processes.
- E5 give suggestions and these suggestions are cautiously evaluated and implemented if accepted.
- E6 are very committed to the success of our university and its quality.

Recognition and Reward (R) (Our University)

- R1 has a reward program to identify employee TQM efforts and their participation.
- R2 has clear procedures for employees' rewards and penalties, and applies them transparently.
- R3 has Recognition and reward activities that effectively stimulate employee commitment to TQM efforts.
- R4 appoints administrative and academic staff that possesses skills required for a specific position.

Education and Training (ET) (Our University)

- ET1 encourages education and training activities of our employees for academic excellence.
- ET2 provides special training for work-related skills to all employees.
- ET3 organizes training on TQM for employees and encourages employees to participate.
- ET4 has financial resources for employee education and training.
- ET5 Our University believes that Employees, as the organization's most valuable and long-term resources, are worthy of receiving the necessary education and training in order to achieve the university's vision.

Student Focus (S) (Our University):

- S1 gathers student complaints and evaluates them.

- S2 conducts a course-evaluation survey for every course taught in each semester.

- S3 supports co-curricular activities and student clubs.

- S4 has some organized efforts on continuous education of our students for their business-life and personal development after graduation.

Other Stakeholders' Focus (OS) (Our University)

- OS1 gathers workforce complaints and evaluates them.

- OS2 considers the changing needs of the business world.

- OS3 regularly conducts surveys on job satisfaction.

- OS4 has mechanism to understand the expectation of industry regarding its graduates.

- OS5 follows up the career path of its graduates.

- OS6 has some mechanism to identify the academic and administrative needs of its workforce.

Annexure-B

Table 9
Extraction Method: Principal Component Analysis

Rotated Component Matrix[a]													
	Factor/Component												
	1	2	3	4	5	6	7	8	9	10	11	12	13
L1			.615										
L2			.748										
L3			.792										
L4			.786										
L5			.603										
L6								.597					
L7			.646										
L8					.615								
L9													
V1				.507	.503								
V2													
V3													
V4		700											
V5		638											
V6													
M1		517									.501		
M2													
M3		709											
M4		697											
M5													
M6													
M7					.503								
PI1					.657								
PI2					.553								
PI3							.611						
PI4							.797						
PI5													
PI6									.589				
PD1						.717							
PD2						.716							
PD3						.707							
PD4						.706							
PD5								.537					
QI1													
QI2	.527									.543			
QI3										.655			
E1										.714			
E2				.604									
E3							.623						
E4				.518									

E5													
E6				.558									
R1													
R2				.526									
R3				.638									
R4											.613		
ET1													
ET2												.695	
ET3													
ET4								.601					
ET5													
S1									.670				
S2									.627				
S3													
S4	.552												
OS1	.674												
OS2													.682
OS3	.651												
OS4	.656												
OS5	.707												
OS6	.767												

(Values less than 0.50 were suppressed to make analysis easier).

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 24 iterations.