NN/BRT BASED MODEL FOR EVALUATING IMPACT OF TQM ON HIGHER TECHNICAL EDUCATION

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ABSTRACT

The prime aim of this study is to propose a novel model for evaluating the impact of Total Quality Standard in the area of higher technical education system. The secondary purpose of the work is to analyze various models and then depict a new model based on neural network and bagged regression tree (NN/BTR) to analyze the data and model accomplished after training the network with extremely low computational cost. Based on theoretical considerations, a model is proposed associating the TQM parameters to the educational establishment and its performance factors. Investigative and Positive factor analyses empirically verified and validated the underlying dimensions of TQM and educational establishment for higher technical studies. The accomplished result is considered for minimized value of maximum average peak ratio (MAPR) in every iteration. The accomplished result shows better throughput and positive indication that if TQM is properly implemented with the proposed consideration, the educational establishment has better feasibility of redefining their quality for higher technical education.

Keywords: Total Quality Management, Higher Technical Education, MAPR, Neural network, Bagged Regression Tree

1. INTRODUCTION

Undoubtedly education and health sector are two prime areas necessary for a sustainable development of a rustic or a private. Education but contains a wider perspective in sense that it transfers from generation to generation. Its importance lies in that undeniable fact that every individual contributes to the economy relying upon his abilities and skills, gained from years of learning. The technical education establishments themselves are changing their approaches to the planning and delivery of education. They’re building partnerships with firms, developing regional and international consortia, or joining multi-agency partnerships to produce quality education. This research work examines the concept of quality, and therefore the standing of quality assurance system in technical education suppliers. The standard concept has been a well-liked analysis topic in production management literature where researchers have tried to spot key dimensions of total quality management (TQM) practices and performance. Researchers have...
outlined the concept of quality in numerous ways in which starting from perception of price [1] to
cconformance to needs [2], fitness to use [3] and eventually to meting customer’s expectations [4].
Whereas variety of studies have addressed the specified options of practices, facilities, staffs that
contribute to the TQM implementation and hence organizational performance, the role of TQM
practices on business performance of SMEs has received comparatively less attention. There is
seemingly to be a robust logical relationship between implementation of TQM practices and
business performance. whereas studies on TQM implementation seem to specialize in identifying
the role of TQM practices on organizational success, TQM practices are still directed from inside
the organization. [5]

There is a scarcity of empirical analysis investigating the TQM constructs and its association
with educational institutional quality performance. Despite its conceptual rigor, TQM’s role in
affecting higher level technical education’s performance (whether facilitative or contributory)
considerably at intervals the context of tiny educational needs additional analysis attention.
Though the connection between TQM implementation and educational quality level performance
has been mentioned within the previous research work there's no analysis up till now been
recorded investigating the subject from the perspective of higher technical education [6, 7, 8].
Quality planning and enhancements in any institution will require proper identification of its
customer and their needs. In education, quality will refer to excellent academic culture, results,
progressive and adaptive management.

Recently, there has been substantial interest within the development of neural networks for
solving a good variety of issues from completely different fields. Neural networks are distributed
information processing systems composed of the many easy computational components
interacting across weighted connections. Galvanized by the design of the human brain, neural
networks exhibit sure options because the ability to find out complicated patterns of knowledge
and generalize the learned information. Neural networks are merely parameterized non-linear
functions which will be fitted to information for prediction functions [9].

In section 2 we give an overview of models for quality management in education. Section 3
highlights about the models for higher technical education followed by research problem
description in Section 4. Proposed system is discussed in Section 5. Implementation and result is
discussed in Section 6 and finally section 7 makes some concluding remarks.

II. MODELS FOR QUALITY MANAGEMENT IN EDUCATION

The British Standard Institution (BSI) defines quality as “the totality of options and
characteristics of a product or service that bear on its ability to satisfy stated or implied desires
(BSI, 1991). Green and Harvey[10] identified totally different approaches to defining quality i.e.,
(a) in terms of remarkable (exceeding high standards and spending a needed standard); (b) in
terms of consistency (exhibited through “zero defects’ and “getting right the primary time”,
creating quality a culture); (c) as fitness for purpose (meaning the merchandise or service meets
the stated purpose, client specifications and satisfaction); (d) be able to give recommendation and
experience to help the event of recent quality assurance agencies; (e) Facilitate links between
accrediting bodies as they operate across national borders; (f) allow better-informed international
recognition of qualifications; (g) be able to assist within the development and use of credit
transfer schemes to reinforce the mobility of scholars between establishments each among and
across national borders; and (h) Enable members to be tuned in to dubious accrediting practices
and organizations.

Table 1: Hierarchy of Quality Management
Total Quality Management | Involves suppliers and customers, Aims for continuous improvement  
| Concerns products and Processes, Responsibility with all workers  
| Delivered through team work  

Quality Assurance | Use of statistical Process control, Emphasis on prevention  
| External Accreditation, Delegated Involvement  
| Audit of Quality Systems, Cause & effect Analysis  

Quality Control | Concerned with product testing, Responsibility with supervisors  
| Limited Quality criteria, Some self Inspection, Paper based system  

Inspection | Post production review, Reworking, Rejection, Control of Workforce  
| Limited to physical products  

Source Dale and Plunkett (1988)[11]

The Hierarchy of Quality Management is given in Table 1. Numerous stages of quality management are adopted from this hierarchy as per demand. Leading thinkers on quality are W. Edwards Deming, Joseph Juran and Phillip B Crosby. The eminent total quality management (TQM) expertise and renowned statistician Edward W. Deming stressed on prevention instead of cure because the key to quality (Deming, 1986). Deming’s theory of quality management is summarized in 14 point philosophy that has been adopted for higher technical education by Chandandeep and Sareen (2005)[12]. He introduced Deming’s cycle additionally called PDCA cycle as through four functions: PLAN, DO, CHECK and ACT.

**Joseph Juran**

Juran outlined quality as ‘fitness for purpose’, per him, a product or service will meet its specifications and however not be match for the aim. The specification is also faulty and therefore the specification ought to be what the client desires. Juran recommends 10 steps approach to quality improvement as in table three, the key being (a) Structured annual plans (b) coaching for the complete organization and (c) Quality directed leaderships.

**Table 2: Juran’s 10 Steps of Quality Improvement**

<table>
<thead>
<tr>
<th>1</th>
<th>Create of awareness of the need and opportunity for improvement</th>
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<tbody>
<tr>
<td>2</td>
<td>Set explicit goals for improvement</td>
</tr>
<tr>
<td>3</td>
<td>Create an organizational structure to drive the improvement process.</td>
</tr>
<tr>
<td>4</td>
<td>Provide appropriate training.</td>
</tr>
<tr>
<td>5</td>
<td>Adopt a project approach to problem solving</td>
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<tr>
<td>6</td>
<td>Identify and report progress.</td>
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<tr>
<td>7</td>
<td>Recognize and reinforce success.</td>
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<tr>
<td>8</td>
<td>Communicate results.</td>
</tr>
<tr>
<td>9</td>
<td>Keep records of changes.</td>
</tr>
<tr>
<td>10</td>
<td>Build an annual improvement cycle into all company processes.</td>
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</table>
Crosby focuses on the senior management and has given two widespread statements - “Quality is free” and “zero defects”. In keeping with him quality is: (a) Not goodness for luxury (b) Not intangible (c) doesn't originate within the employees and (d) originate within the quality department. Crosby is best known for his four absolutes of quality management (Crosby, 1984)[13] (a) The definition of quality is conformance to client needs (b) The system to achieve quality is prevention and not detection (c) The measurement of quality is that the worth of nonconformance. Quality concept was originally developed within the producing trade. Within the space of higher education, the adoption of quality management has been superficial and diluted by the exercise of educational freedom (Largosen, et al, 2004) any, the prevailing culture of universities is usually based mostly on individual autonomy, that is zealously guarded (Colling and Harvey, 1995)[14]. Therefore it is sometimes tough to use the options of quality to higher education considering the very fact that quality needs teamwork (Broaden and Dale). However, the standard of upper education is incredibly vital for stakeholders, notably funding agencies, students, workers and employers of graduates (Srikanthan and Darlymple, 2003)[15]. Higher technical education establishments will learn a good deal from these ideas.

III. MODELS FOR HIGHER TECHNICAL EDUCATION

Abdul Raouf (2011) mentioned two approaches to quality management in higher education i.e., one relating ISO 9000 and therefore the different approach based mostly on European Models like European Foundation for Quality Management (EFQM) and Malcolm Baldrige National Quality Award (MBNQA).

**ISO 9000:2000:** [16] International Standardization Organization (ISO) established in 1946 to develop international quality standards was originally conceived for firms within the producing business to predict the reliability of the product and quality management however later unfold to alternative sections like education. the present one is ISO 9000:2000. “ An ISO 9000 certificate for an education and coaching organization provides “assurance” that's well organized which the outcomes of programmes and courses meet the supposed goals and wishes of the users; but it doesn't essentially guarantee that the content of those courses and programmes meet explicit instructional standards.” (Van den Berghe, 1998).

**EFQM Model:** [17] It is a non-standpoint model that will be used to assess an organization’s progress towards excellence. Superior results with respect to performance, customers, individuals and society are achieved through leadership, driving policy and strategy, individuals partnerships and resources and processes. EFQM method is claimed to be rigorous where performance is judged through a sort of “peer group” assessment during which enabling factors are judged on the premise of combination of the degree of excellence of the establishments approach and therefore the degree of approach and result factors are judged on the premise of combination of the degree of excellence of results and scope of results. (Doherty, 1997).

**MBNQA:** [18] The Malcolm Bridge National Quality Awards (MBNQA) has developed decisive factor for performance excellence and its goals are (a) Delivering of ever improving values to students and alternative stakeholders (b) Contributing to enhance academic quality and (c) Improvement of overall organizational effectiveness and capabilities as organizations Since the tutorial criteria were introduced in 1999 success of the MBNQA education model for a comparative analysis has rarely been found printed. (Osso-Asare and Longbottom: 2002). ISO 9000 could be a system to assure that a corporation is functioning in step with the prescribed procedures, ways etc. EFQM could be a method based mostly model and MBNQA could be a product based approach. but method based mostly approach facilitates any enhancements within the method and merchandise. Keeping this in mind Raouf developed University Quality Model.

**Six-Sigma Methodology:** [19] Six sigma as a high quality model originated at Motorola in Eighties. Its main objectives are to scale back variation and defects, increase client satisfaction and increase profits. This model is being applied for quality assessment and improvement. It is often considered as metric, a philosophy and a technique. As a metric, six-sigma is statistical expression that denotes a population’s commonplace deviation and could be a live of variation concerning mean. As a philosophy it's involved with client focus and artistic method enhancements with a belief that there's robust correlation between level of defects, prices and client satisfaction. However Man (2002) applied the six sigma methodology to
adult learning and concluded that establishments can profit lots even by application of the concept while not the statistical portion.

**Total Quality Management:** [20] The total quality management (TQM) has surfaced as an superseding concept within the field of quality in recent years. It has a philosophy that subsumes earlier ways of assessment, quality management and quality assurance. TQM assumes that quality is what the patron of the service / product perceives. “TQM could be a people driven method. It involves changes in people’s attitudes primarily. additionally, it deals with method orientation and continuous improvement of the processes.

**ABET Model:** [21] ABET (Accreditation Board for Engineering & Technology) is recognized by CHEA, USA for accreditation of faculty and university level programs in applied sciences, computing, engineering and technology. ABET was established in 1932 as Engineer’s Council for skilled development (ECPD). Following the tradition of accreditation within the USA, the ABET model follows a voluntary participation by establishments to supply themselves to assess the standard of their programs.

**NAAC:** [22] National Assessment and Accreditation Council (NAAC) has identified seven criteria to function the idea for the assessment of upper education establishments within the country. Assessment may be a voluntary method, though some state governments have created it necessary for his or her schools. It follows a four-phase method of assessment of a unit (institution or programme/department) covering (nationally evolved criteria for assessment (b)Self study by the establishment (peer team visit (d) Final call by executive Committee of NAAC.

**NBA Model:** [23] The All India Council for Technical Education (AICTE), India constituted the national Board of Accreditation (NBA) in September 1994, below section 10 (u) of the AICTE Act 1987, “to periodically conduct analysis of technical establishments or programmes on the premise of pointers, Commission or different bodies, relating to recognition or de-recognition of the establishment or a programme” and “to develop a high quality aware System of Technical Education where excellence, relevance to plug desires and participation by all stake holders are primarily the key determinants”.

**IV. RESEARCH PROBLEM**

Traditionally Quality assurance is a vital facet in production sector. Within the era of globalization, privatization quality assurance problems also are arising at the institutional level and involve legal, technical and educational dimensions. As an example, establishments have to be compelled to establish clear conventions and memoranda of agreement between the possibly completely different parties concerned in making and delivering technical education programmes. establishments should be clear regarding who the accountable agents are for every a part of the tutorial method and the way accountability are achieved. they need to indicate how students, as shoppers of education, are protected and the way they will gain redress within the event of technical or educational issues, notably people who arise in alternative jurisdictions. Technical problems involve the inter-operability of various ICT systems likewise as levels of technical support for employees and students. Educational and academic quality problems embody the ways in which and the terms on which curricula are approved and reviewed, how student learning and progression is mapped, tracked and recorded and the way quality is measured across completely different academic cultures.

**V. PROPOSED SYSTEM**

The proposed system highlights the impact of Total Quality Management in Technical Education in Karnataka, Southern State of India. The research is focused on various issues of technical education such as, teaching learning process, curriculum design and development, quality in education, stakeholders’ participation in academic matters, methods of student evaluation and assessment, skills and knowledge required for the technical graduates, industry requirements, and customer satisfaction. A mathematical model based on neural network is designed for this purpose.
Accurate analysis of the TQM is critical for both short and long term objective in planning of effective implementation of TQM in engineering colleges. The result extracted from the model will influence different quantity of the decisions involving generators for committing for a given period and broadly influences the financial aspects of the entire engineering college. Hence the research work will introduce a mathematical model that will evaluate the impact of TQM even on the financial benefit for the engineering colleges. The quality and cost prediction algorithms will also feature prominently in reduced-form hybrid models for various factors of quality management in technical education. The proposed model is designed considering TQM factors like quality data & reporting, role of top management, resource management, training, quality policy of top management, and process management. The model is completely based on the data gathered from the desk researches from the engineering colleges in Karnataka[AR] and the model attempts to find its feasibility of success in higher technical education. The proposed models for evaluation an impact of TQM on education establishment for higher studies are as shown in following flow chart.

Flow chart 1: showing Proposed Model Schema

The main charm of neural networks is their flexibility in approximating a wide variation of practical relationships between inputs and outputs. Indeed, sufficiently complicated neural networks are able to approximate arbitrary functions arbitrarily well, one in all the foremost attention-grabbing properties of neural networks is their ability to figure and forecast even on the idea of incomplete, noisy, and fuzzy knowledge. Furthermore, they don’t need a priori hypothesis and don’t impose any practical kind between inputs and output. For this reason, neural networks are terribly helpful in those cases where data of the
practical kind relating inputs and output is lacking, or when a previous assumption concerning such a relationship ought to be avoided [24, 25]. During this study, attributable to the higher than mentioned blessings, a neural networks model has been developed to work out the foremost vital important factors of total quality management and to live the results of the important factors of total quality management on technical academic institutional performance. Although the preliminary data is gathered from Engineering college of Karnataka, but the proposed system will be based on such a set of data that can be utilized by any other institutional with minor customization.

Table 3: Exploratory Factor Analysis of TQM Implementation

<table>
<thead>
<tr>
<th>Factors &amp; Their influence</th>
<th>Impact factor</th>
</tr>
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<tbody>
<tr>
<td><strong>1. Quality Data and Reporting</strong></td>
<td></td>
</tr>
<tr>
<td>Availability of quality data in education</td>
<td>0.80</td>
</tr>
<tr>
<td>Use of data as management tools</td>
<td>0.75</td>
</tr>
<tr>
<td>Scope of the quality data</td>
<td>0.74</td>
</tr>
<tr>
<td>Evaluation of managerial performance</td>
<td>0.71</td>
</tr>
<tr>
<td><strong>2. Role of Top Management</strong></td>
<td></td>
</tr>
<tr>
<td>Acceptance of responsibility for quality</td>
<td>0.76</td>
</tr>
<tr>
<td>Supports of top management</td>
<td>0.75</td>
</tr>
<tr>
<td>Existence of objectives for quality</td>
<td>0.73</td>
</tr>
<tr>
<td><strong>3. Resource Management</strong></td>
<td></td>
</tr>
<tr>
<td>Provision of resources in the educational organization</td>
<td>0.76</td>
</tr>
<tr>
<td>Human resources in the educational organization</td>
<td>0.72</td>
</tr>
<tr>
<td>Infrastructure in the educational organization</td>
<td>0.51</td>
</tr>
<tr>
<td><strong>4. Training</strong></td>
<td></td>
</tr>
<tr>
<td>Training in advanced techniques</td>
<td>0.82</td>
</tr>
<tr>
<td>Training in statistical techniques</td>
<td>0.82</td>
</tr>
<tr>
<td>Specific work-skill training</td>
<td>0.67</td>
</tr>
<tr>
<td><strong>5. Quality Policy of Top Management</strong></td>
<td></td>
</tr>
<tr>
<td>Importance of quality in relation to cost/revenue objectives</td>
<td>0.87</td>
</tr>
<tr>
<td>Management consideration of quality improvement as a way to increase profits</td>
<td>0.75</td>
</tr>
<tr>
<td><strong>6. Process Management</strong></td>
<td></td>
</tr>
<tr>
<td>Importance of inspections and review</td>
<td>0.80</td>
</tr>
<tr>
<td>Amount of inspections and review of work</td>
<td>0.67</td>
</tr>
</tbody>
</table>

The relationship between TMQ practices and higher technical educational institutions performance is modeled using a customized neural networks. Each TQM factor (i.e. principle) is designed as a hidden layer with a tangent sigmoid transfer function. Then the manifest variables (i.e. inputs) are related to their
factors (i.e. hidden layers). Finally, all six TQM factors are linked to the output layer (i.e. performance) with a linear transfer function. In the model, TQM practices are labeled as input variables while TQM factors are hidden layers. One neuron is used in the hidden layers in order to find the importance of each TQM practice in the whole system.

VI. IMPLEMENTATION & RESULTS

The proposed work is basically carried out using Neural Network and Bagged Regression Trees [27]. The model is trained on data from 2009 to 2011 and the model accuracy on out-of-sample periods is computed with the Mean Absolute Error (MAE) and Mean Absolute Percent Error (MAPE) metrics. The backpropagation (BP) algorithm was used for training process. The BP algorithm is a gradient algorithm, which minimizes the average absolute error between the current output and the target value by modification of the network weights [26]. It carries out supervised learning of neural network weights using training data as inputs and known output minimizing the mean absolute percentage error (MAPE). Matlab 7.0 software with Neural Networks Toolbox is used to develop and train the neural networks model.

Figure 2. Raw data representation

Figure 3. Data and Model Prediction

Figure 4. Trained Network Throughput for actual data and data for proposed model
Figure 5. Estimation of MAPE in 1st iteration

Figure 6. Trained second time for comparison for actual data and data from proposed system

Figure 7. MAPE Estimation after applying Bagged Regression Tree

Figure 8. Re-training using Neural network for the residual data
Figure 9. Normalized data and model prediction for actual data and data from proposed neural network training.

Figure 2. shows the graphical representation of the raw data considering parameters of quality of top management, process management, training, resource management, quality data and reporting, and process management. The time consideration of the data is from 2009-2011. Figure 3 represents the throughput after applying neural network for analyzing the difference in actual data and proposed model. The final training output of neural network can be visualized in Figure 4. While Figure 5 highlights the initial estimation of MAPE of 2.41%. Figure 6 represent the training conducted for second cycle for the purpose of further normalization of data to be used for prediction purpose. The final MAPE value of 1.39 is received after the model is subjected to Bagged Regression Tree in Figure 7. Finally, figure 8 and 9 represents the normalization of the prediction value which is quite smoother in comparison to throughput accomplished in figure 4. This fact represents quite satisfactory result for the proposed model.

The normalized effects of the factors on the output (impact of TQM on higher technical education) and the effects of inputs on their related factors are given in Table 2 and Table 3 respectively.

Table 4: Normalized effects of TQM factors on business performance

<table>
<thead>
<tr>
<th>TQM Factors</th>
<th>Normalized weight</th>
</tr>
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<tbody>
<tr>
<td>Quality policy of top management</td>
<td>0.40</td>
</tr>
<tr>
<td>Process management</td>
<td>0.22</td>
</tr>
<tr>
<td>Training</td>
<td>0.19</td>
</tr>
<tr>
<td>Resource Management</td>
<td>0.12</td>
</tr>
<tr>
<td>Role of top management</td>
<td>0.05</td>
</tr>
<tr>
<td>Quality data and reporting</td>
<td>0.03</td>
</tr>
</tbody>
</table>

A desk research is conducted for this purpose. The data set was divided into two groups: 100 samples for training and 40 for testing. Customized neural networks were trained using the training data set. Then the testing data were asked to the trained neural networks in order to evaluate its estimation performance. The mean absolute percentage error was used as performance evaluation criteria. After 400 epochs the minimum MAPE value is reached.

From Table 4, the study can be able to summarize that quality policy of high management has the foremost important impact (0.40) on institutional performance. It is followed by process management (0.22), training (0.19), resource management (0.12). Other factors have significantly less impact on quality performance. In higher level technical education, successes of TQM applications rely on a robust leadership that has to be initiated by the highest management. Quality improvement plans proposed by many expertise emphasize primarily the commitment of high management. high management of the technical instructional establishment determines an acceptable organization culture, vision, and quality policy. Managers of technical education establishment ought to confirm objectives, and set specific
measurable goals to satisfy client expectations and improve their institution’s performance. On the opposite hand, the highest managements should give adequate resources to the implementation of quality efforts in education system. This model implies that the managers’ role incorporates a direct impact on the performance of the establishment. So as to extend cumulative profit and revenue, and to scale back value of quality, technical education institution’s managers should convey their priorities and expectations to their workers. The second necessary issue, process management, which has such sub-factors as importance of inspections, review or checking of employee’s performance and quantity of inspections had sufficiently sturdy influence on TQM during this model. A potential reason for this may well be the potential low personnel compliance to the implicit and express norms and rules of the workplace. In such a case the marginal contribution to total quality of the inputs used for method management (inspection, supervision etc.) functions would be expected to be high. This might explain the high worth of the process management coefficient within the model.

Training is considered as the third highest influence on technical educational institution’s performance. During this model, training process will include advanced quality techniques like a) training on specialized tools (simulators/emulator) b) training on research and development which almost every engineering colleges lacks due to resource constraint among others, statistical techniques and specific work talent coaching. These conventional and advanced tools are terribly helpful in monitoring and measuring progress and performance. Information analysis and interpretation can also facilitate technical educational institution to develop a learning atmosphere, which can enhance innovation and an improved educational culture.

Resource management plays a very significant role in furnishing quality and valuable resources to students. In today’s highly competitive and interrelated instructional atmosphere, study materials represent a considerable a part of the worth of merchandise. In view of the high share of the reading materials value in total value, the key objective of the buying department have to be compelled to be buying the correct quality of a product within the right amount from the correct supply at the correct time. the correct supply will offer the correct quality of fabric on time at an affordable value. provider choice and analysis are important to the success of a producing firm. this is often as a result of the price and quality of products and services sold are directly associated with the price and quality of products and services purchased. Therefore, buying and provider choice have a vital role within the offer chain method and institutional performance[28].

After determining vital advanced and connected single criteria one has to develop an improvement conceive to increase total quality management performance and consequently improve the institutional performance of the higher technical education. If the performance of the above mentioned single criteria is enhanced, the institutional performances of the upper technical education are improved. The present total quality management implementation of the upper technical education in Karnataka was analyzed using the neural network model. Relevant improvement and redesign recommendations were generated. The analysis of current TQM implementation was distributed within the 2 stages. At the primary stage advanced criteria was evaluated and ranked from most significant to lower given in Table a pair of

VII. CONCLUSION

An approach for Total Quality Management analysis of educational establishments in higher technical studies is proposed. It is based mostly on a checklist tool employed in neural networks-based analysis model. This phenomenon exhibits higher computation power, on the one hand, and therefore the decreases in computational cost, on the opposite hand have stimulated the analysis on Neural Network. Recently several NN models are applied in quality management studies. Several NN applications in quality management studies use NN models as an alternate to multivariate statistical strategies like logistic regression analysis that NN models have higher predictive power than multivariate statistical strategies. In analyzing the whole quality management implementation for generating redesign recommendations we have a tendency to use neural networks. Neural networks development doesn't need information of the underlying relationships between input and output variables (both linear and non-linear), since the network “learns” hidden relationships within the information. These complicated relationships are discovered and
automatically assimilated into weights contain the “learned information” from the network coaching part and are analogous to regression coefficients. The model then attempts to train the neural network weights bottom-up. Then the model can be attempted to use top-down analysis for locating the foremost vital checklist things that improvement might most important increase the whole quality and organizational performance. Only by looking the worst values one cannot find easy the most important items. The most advantage of this methodology is to travel a step additional than easy modeling, i.e. based mostly on the analysis results generate relevant improvement recommendations.

Based on the neural network approach, the most important TQM criteria that affect performance of the educational establishment in Karnataka were determined. While most engineering colleges do not have an established quality department, many of them have invested substantial resources in adapting and implementing TQM programs to improve their performance. It is generally accepted that several higher technical educational colleges did not achieve any improvement and some only a little. Specifically, due to the presence of a multitude of barriers, many colleges utilize only a partial implementation of TQM, and hence are unable to achieve continuous and systematic improvement.

In these studies, two main offenders were identified. The primary was the unsure definition of TQM. The second was the inappropriate implementation of TQM within the educational institution for higher technical studies. Despite this lack of success, several establishments realized that TQM may be a important supply for improving the academic performance of their establishments. If TQM set up is implemented properly, it produces a spread of advantages like understanding customers’ desires, improved client satisfaction, improved internal communication, higher downside solving and fewer errors. The success of a TQM program will increase when its implementation is extended to the complete educational institutions. this permits the reformation of academic culture and therefore the permeation of the new educational philosophy into each aspect of establishments. The philosophy of doing things right should be implemented with enthusiasm and commitment throughout the organization -from high to bottom and therefore the very little progress the so-called “Kaizen” by the Japanese- should be viewed as “a race while not a finish”. Consequently, effective implementation of TQM may be a valuable asset in an exceedingly company’s resource portfolio, one that may turn out vital competitive capabilities and be a supply of competitive advantage [29].

It should be acknowledged that the study is subject to some methodological constraints. First, it is highly recommended that the scale and nature of the sample should be enhanced to confirm variability and management for attainable extraneous variation. Whereas the sample is restricted to solely one region, it’d be strongly counseled that information ought to be gathered from numerous location of India as well as each numerous other domains like management and medical studies too. Since the information during this study is a result of desk research in order to check the efficiency of the created model, objective performance indicators should be utilized within the analysis. Finally, further constructs may well be utilized within the future studies to realize further insights in exploring the connection between TQM and educational institution for technical studies performance.

REFERENCES


Smith, K.A. In: Smith K. (Ed.) Neural Networks in Business: Techniques and Applications, Hershey, PA, USA, 2002, pp 1-25,


Clifton D. Sutton, Classification and Regression Trees, Bagging, and Boosting, Handbook of Statistics, Vol. 24 ISSN: 0169-7161, Elsevier, 2005


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