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PARETO OPTIMIZATION USING LEAN MANUFACTURING SYSTEM IN TECHNICAL INSTITUTE

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Abstract: Pareto Optimization in an integrated management approach aims to continuously improve the performance of student's expectations in technical institute & in turn institutes gain in reputation & quality education is the main emphasis of this paper. To accomplish this objective, some of the key factors that contribute to the success of technical institutes efforts are identified. These key factors are here termed as critical success factors (CSFs). The purpose of the present study is to identify and propose a list of "vital few" by using lean technology tool of Kaizen for the benefit of technical institute practitioners. A quality tool "Pareto analysis optimization" is used to sort and arrange the CSFs according to the order of criticality. A few vital CSFs are identified and reported. The results of this study will help in successful implementation of TQM program in technical institute where continuous drop in attendance of students are being reported & each work are presented in the end of the paper

Keywords : Pareto Optimization; critical success factors (CSFs); top-management commitment; Pareto analysis; technical institute.

I. INTRODUCTION

Engineering institutions in current scenario in India accounts for appx.intake of more than 5, 00,000 students in Bachelor's program, around 30,000 in Master's program and less than 1000 in PhD program. The number of institutions has been drastically growing in an order of expanse in the last two decades, mostly in the private sector. This rapid expansion has raised stern concerns about the quality of engineering education in these institutions. Over the next decade, India will have two significant opportunities in the form of manufacturing and engineering services outsourcing in addition to growing opportunities in business process outsourcing and information technology outsourcing. In order to encounter the growing demand, the capacity of engineering education especially in under-graduate (UG) programmes and at Diploma level needs to be tripled while simultaneously enhancing quality. Currently, most graduates do not possess the skills needed to compete in the global economy, and industries have been facing a consistent skills deficit. The challenge for universities is to work out a vigorous balance between totality of knowledge and specialization that gratifies to current technological demand. Institutions of higher learning usually been financed by government are slow in responding to changes in the environment. The challenge is to create organizations, private or in the public private partnership (PPP) mode with well enunciated vision and goals which can respond evocatively to such challenges. Research in universities is sub-critical for number of reasons that have to be addressed. The most serious challenge is the dearth of well-qualified faculty and issue of attracting and retaining students.The paper tries to incorporate lean technology in an education institute to address issues.

The word Kaizen means:
KAI: CHANGE & ZEN :GOOD

In the current era of globalization, Technical institutes are adopting new tools and techniques to produce result oriented course selection & methodology to compete and survive in the educational market. The most daunting issue faced by institutes today is how to attract maximum number of students in their institute and to achieve maximum placement & emoluments. One promising method for addressing this issue is the application of lean management principles and techniques of Kaizen & its Pareto Optimization. Lean management is simply less known tool in Indian market practice especially in an educational institute. Regardlesss the use of resources for any work other than the creation of value, thus a target for elimination, Lean Manufacturing principles, needs to compete with efficiency and quickly respond to user needs and niches. There is no doubt that the technical institutes are confronted with challenges and looking to implement improvements in their key activities or processes to cope with the fluctuations and increasing results. Applying lean management philosophy is one of the most important concepts that may help institutes to revive their methodology. In this paper, the literature survey findings such as existing level of lean practices, types of lean tools employed, and perceived level of different encountered by the various industries are discussed.et al., 2008). Voluminous work has

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been done and still been undertaken on TQM practices and performance. Many empirical studies have reported strong and positive results on the link between **Pareto optimization** practices and quality performance (Lakhal et al, 2006; Prajogo and Sohal, 2003; Fryer et al., 2007; Samat et al., 2006; Wali et al., 2003; Kaynak, 2003; Powell, 1995; Hafeez et al., 2006; Mellahi and Eyuboglu, 2001) while some other studies also suggested a positive link between TQM practices and organizational performance (Anderson et al., 1995; Flynn et al., 1995; Choi and Ebock, 1998; 156 F. Talib , Z. Rahman, M.N. Qureshi Cua et al., 2001; Kaynak, 2003; Wali et al., 2003). The work by Jablonski (1991) and Hasan and Kerr (2003) on the relevance and impact of TQM, asserted that those implementing TQM will realize increased productivity, increased satisfaction, reduced costs, enchanted quality of work, and increased competitive advantage. Empirical studies interested in identifying CSFs using cluster methodology.Cluster analysis organizes data into groups based on similarities between data points.Sometimes data contains natural divisions that indicate appropriate number of cluster to determine optimal number of clusters to group data.

Kaizen Methodology

Review of the literature suggested that there are numerous CSFs that can be identified as being crucial to Successful implementation of Kaizen. However, Pareto optimization using Kaizen can be categorized into two types.

- One at a time strategy
- Simultaneous

In the former method, a multi objective optimizer is Applied one at a time with the goal of finding one single optimal solution. Multi objectivity methodology uses iter ative scalarization of standard procedure. The main criti cism of most of these approaches are results for conver gence & change using these solutions to maintain its effective ness multi objective optimization methods use such an iterative scalarization scheme of standard procedures. However, applicability of single objective optimization procedure does not give efficient result compared to other. Morse in 1980 detailed one of the first applications of cluster analysis to a non- dominated set. Pareto optimization when conducted in Engineering education imparting at Degree & diploma level had sudden drop in attendance due to several rea sons despite of 75% attendance being mandatory so various approaches were analyzed which is depicted by chart shows subtle improvement in attendance after exercising Simultaneous strategy is being adopted for this procedure for calculating .CSFs

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II. EXPERIMENTAL DESIGN

Experimenting with new pedagogy and sustaining a willingness to do so are therefore important characteristics of a university**.** A strong competitive pressure has forced education sector adopt QM tools and techniques to offer higher quality education and services as a way to upgrade and keep their students intake increased & performance in order to improve their position in the global market also CSFs as "the essential things that must be achieved by the company or which areas will produce the greatest competitive leverage".

They emphasize that CSFs are not objectives, but are the actions and processes that can be controlled by management

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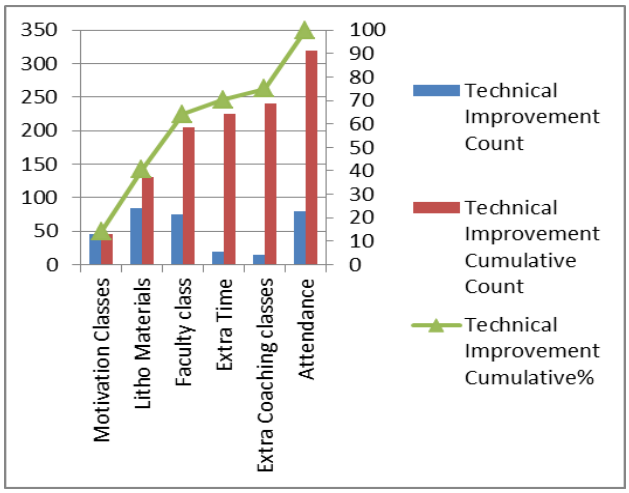
to achieve the organizations goals. The definition given by Boynton and Zmud is is more universal which is equally applicable to all sectors. The importance of defining the CSFs of TQM for implementation is to increase the success rate, reduce costs, and prevent disillusionment with continuous improvement programs (Fryer et al., 2007). Alternatively, it can be said that the CSFs are those vital few requirements that must be present in an organization.

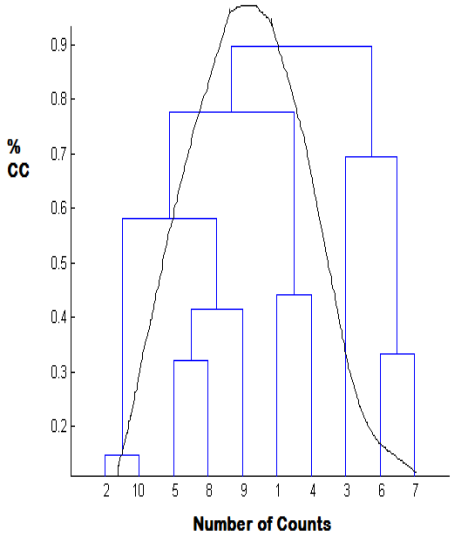
Technical Improvement

Reason	Count	Cumulative Count	Cumulative%
Motivation Classes	45	45	14.0625
Litho Materials	85	130	40.625
Faculty class	75	205	64.0625
Extra Time	20	225	70.3125
Extra Coaching classes	15	240	75
Attendance	80	320	100



2.2. **Critical success factors**

The extent review of the literature suggested that there are numerous CSFs (also referred as constructs or TQM practices in the literature) that can be identified as being crucial to the successful implementation of TQM. CSFs as reported in the TQM literature have been investigated extensively by Saraph et al., 1989; Brah et Behra and Gundersen, 2001; Sila and Ebrahimpour, 2002; Samat et al., 2006; Antony et al., 2002; Sureshchandar et al., 2002; Talib and Rahman, 2010b; In this case of technical institute the critical success fac tor emerges out to be faculty approach in class along with infrastructure facilities as one can view from Pareto optimization graph.



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III. LITERATURE REVIEW

A strong competitive pressure has forced education sector to adopt QM tools and techniques to offer higher quality education and services as a way to delight and keep their students intake increased & performance in order to improve their position in the global market also What are critical success factors? A literature review shows that previous empirical studies on TQM shows that researchers and academia have defined TQM CSFs in different ways although they are augmenting to each other (Prajogo and Sohal, 2003; Terziovski and Samson, 1999). Generally speaking, the CSFs can be defined as "the critical areas which must be accomplished to achieve its goal by critical examination (Oakland, 1995). According to Boynton & Zmud sures success Vol.4, No. 2, 2010 157 continual attentions to bring about increased performance. Brotherton and Shaw (1996) defined CSFs as "the essential things that must be achieved by the-company or which areas will produce the greatest competitive leverage". They emphasize that CSFs are not objectives, but are the actions and processes that can be controlled by management to achieve the organizations goals. Te definition given by Boynton and Zmud is more universal which is equally applicable to all sectors.

The importance of defining the CSFs of TQM for implementation is to increase the success rate, reduce costs, and prevent disillusionment with continuous improvement programs (Fryer et al., 2007). Alternatively, it can be said that the CSFs are those vital few requirements that must be present in an organization to be able to attain its vision, and to be guided towards its vision (Wali et al., 2003). Hence, better management of such CSFs will result in improved quality and increased financial performance for the organization.

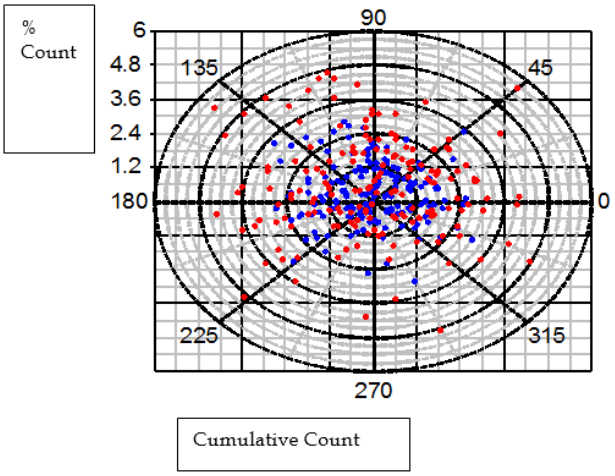
2.2 Critical success factors of TQM in service industries The extent review of the literature suggested that there are numerous CSFs (also referred as constructs or TQM practices in the literature) that can be identified as being crucial to the successful implementation of TQM. CSFs as reported in the TQM literature have been investigated extensively by Saraph et al., 1989; Brah et al., 2000; Agus, 2004; Behra and Gundersen, 2001; Sila and Ebrahimpour, 2002; Samat et al., 2006; Antony et al., 2002; Sureshchandar et al., 2002; Talib and Rahman, 2010b;

IV. ACKNOWLEDGEMENT

The feature of this paper is to understand the technique which is essential for an organization to enhance the strength. The author is gratefully acknowledging the insightful figures received from the educa tional institute -chief, the associate faculty members, referees, which have considerably helped in materializing the paper.

V. CONCLUSIONS

Technical Institutes efforts are to find a new way to reduce abseentism in classes & make teaching pedagogy more intense, elimination of weak causes, enhance high quality of education, increase the productivity, and better student satisfaction. These parameters are usually achieved through the implementation of lean management practices in their institutes This paper presented an important impending into the status of lean manufacturing implementation in institutes. The progress in lean implementation is snail-paced and needs to be augmented. It has a further scope to develop focused lean concepts, which could be implemented for the low level of lean management were anxiety in changing the attitude of students, lack of awareness, and training about the lean management concepts, cost and time involved in lean implementation. Therefore, it can be concluded that the institutes need to give more attention to implement lean management in all the key areas. Hence, appropriate lean education, training, and research setup in association with lean consultants stimulate the lean awareness and technological development in all type of institutes, to opt suitable lean practices for implementation, continuous development and for sustaining leanness in the competitive environment of current scenarios.



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The blue mark shows increased presence of students due to lean practices introduced & red marks shows the elimination of cause. One of the major area apart from all these practices one needs to address is the way institutes are dominated to frame the reules as they are affiliated & approved by AICTE, principle autonomous, which has been politically influenced in practice leading to considerable loss of credibility. There is a need to establish an apex independent regulatory authority that can achieve the objectives of regulation without political interference. All institutions must be mandated to obtain a certificate of audit annually which can be called 'Competence Educationist Certificate'. to perform the role of auditing. In order to ensure success in regulatory processes, multiple independent agencies should be established. At the same time, it must be made mandatory for all institutions to disclose on their website all the information necessary for students, parents and stakeholders. & develop software which can access the functionality of student's progress from time to time.

VI. REFERENCES & RESOURCES

Gemba Academy, YouTube video "Learn what the true meaning of Kaizen is" (iv)Liker Jeffrey K, Hoseus Michael, Toyota Culture, The Heart and Soul of the Toyota Way (ii, vii) Maurer Robert Ph.D, One Small Step Can Change Your Life - The Kaizen Way, (iii, v)Womack James P., Jones Daniel T, Lean Thinking: Image courtesy docs. oracle & other website., excerpts from working group on Engg education 2008

Main Feature	Pvt	Pvt,Aided with University	University/Govt
Internet & Infrastructure	Depends	OK	Good
Student Performance Indicators	Exams		
Industry Interaction	Good	Good	Better
System Inertia	less	better	Ok
Faculty Resource	Market Driven ,Hire &Fire	Same as pvt	Good
Vision	Partial	Partial	OK
Research	Poor	Good	Better
Student Admissions	State Level Admission Test + Management Quota		
Finance	Struggle,depends upon strength of intake	Adequate	Adequate

	Count	Cumulative Count	Cumulative%
Main feature	Pvt	Pvt,Aided with University	University/Govt
Vision	5	3	3
Finance	4	6	8
System Inertia	5	2	2
Faculty Resource	6	8	5
Industry Interaction	5	7	8
Internet & Infrastructure	4	6	8
Student Admissions	9		
Student Performance Indicators	8		
Research	4	5	9