

Effectiveness of TQM Philosophy at Operational Level for Quality Product in Pakistan: Empirical Study of Textile Dyeing Industry

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Abstract: Total Quality Management (TQM) is comprehensive philosophy started in 1980s and implemented effectively around the world. Since industries of underdevelopment countries like Pakistan are motivated to understand and implement this doctrine to survive in global competitive environment either by adopting international standards or developing their national quality management frame work i.e Prime Minister Quality Award. This research project descriptively analyzed level of effectiveness i.e. positive or negative consequences of TQM theoretical perspective on textile dyeing operational levels in Pakistan. Internet based questionnaire was designed in online 'Google form application software' and distributed to textile companies through email addresses found on All Pakistan Textile Mills Association (APTMA) and All Pakistan Processing Mills Association (APPMA). Systematically, response results collected on Google drive sheets and descriptive analysis shows theoretical concepts are not clear among peoples for example dyed fabric intended to satisfy customer requirements but this study shows most of people not aware about Kano model though, international trade in terms of standardization alternatively promote quality culture and implementation of TQM increases at slow speed in textile dyeing industry. Quality control tools, cost reduction approach linked with waste management and other technical and managerial aspects can be effectively improved with TQM Training programs. For continual improvement situational leadership, proactive plans, management commitment, establishing quality control departments, using problem solving tools and give importance to customer feedback are practically implemented.

Key Words: Descriptive analysis, Textile Dyeing, TQM Philosophy, TQM, Quality, Customer

I. Introduction

Philosophical evolution of Total Quality Management (TQM) has significant impact on human development and technical production processes, with key benefit of customer satisfaction and resultantly improving the organizational performance. It involves the appropriate synchronization of operational procedures allow customized development in all production floors, specifically intend to conform requirements or exceeding customer's expectations. TQM emphasizes waste reduction approach to enhance quality among the total features of an organization and to minimize rework cost with effectiveness in processes for efficient productivity. Any organization irrespective of size and motives profit or nonprofit organization can adopt the ideology of TQM significantly, to meet their business objective successfully. Failure of this dogma arises by various production may cause of their non-compliance practices with the standardize principles and procedures of TQM philosophy. However, some production units adopt and execute entire anticipated tasks of TQM philosophy with self-motivation, while some organizations have lackadaisical approach, ordinary by implementing some segment and section of the principles. This approach may leads to the failure of most production units in meeting up to their anticipated goals from appropriate implementation of this philosophy.

Total Quality Management (TQM) has been indicated as a novel approach of managing organizations covers utmost all operational management theories. In tiresome dyeing house endeavors to gain competitive advantage and to surpass their competitors by providing aesthetically conspicuous quality products that meets or exceeds the anticipation of customers. Thus, in the textile industry TQM reveals as continuous process to meet customer demands and face frequent technical issues on regular competition. In this context dyeing managers intentions increase towards product customization with continuous improvement. It is essential step to ensure quality of product in textile dyeing for increasing market share and increases revenue and decreases variability. Process management develop overall product excellence to achieve better customer perception, reliability, durability, aesthetic and additional functional use with more accurate and precisely in terms of technical improvement.

Total quality management composed of paradigms each has comprehensive philosophical foundation for achievement of quality excellence in different operational level. Purpose of this study is to investigate the effectiveness of TQM philosophy adopted in textile dyeing sector of Pakistan and to identify problems with the implementation of TQM. None of the preceding scholarly researches imitate the effectiveness of TQM

philosophy in explicitly Pakistan textile dyeing sector. This is the reason why this project was undertaken and it forms the foundation of uniqueness. This research will estimate and quantify management perceptions about TQM framework in respect of efficient manufacturing structure, contribution towards revenue growth, TQM training programs, Political, Economic, Social and Technological (PEST) analysis for establishing TQM philosophy and identify most frequently TQM methods applied in textile dyeing sector. This research will estimate not only dyeing house management behaviors responsible for most executive operations to modify and engineered textile dyeing yield, conforms to current and future customer requisite orders and also determined functional managers understanding towards TQM. Instead of emphasizing entire practice as an issue of importance, most textile dyeing units focus their excellence actions on particular phenomena, in order to price reduction or just meet requirements of international standards. Development and perception of new management theories and concepts within the marketplace lead to cultural change in the textile industry purely basis on total quality management tools and techniques support these concepts. Resultantly, textile dyeing units adopting TQM tools and techniques can be more effectively withstand against political, social economic and technological global challenges. Now TQM implementation required proper intentions for retention of existing customers with better services and product features may involve extra processing, finishing's and printing facilities in terms of vertical integrated approach. Thus to yield an optimal product norms of textile dyeing units required to advance TQM methodologies like six sigma, kaizen etc.

II. Literature Review

Quality is idealistic invented word introduced by Roman philosopher Cicero (Wenk, Fernandez, & Dupuis, 2000). Moreover, etymologically the word quality goes back to the Latin word *qualitas* intending character, nature, essential which is derived from the Latin word *quails* entails what kind, sort, condition (Louis & van Velzen, 2012). Quality is measure by parameters defined according to specific categorical attributes possessed by a thing (Hoyle, 2009). In 1987, ISO 8402 definite superiority as the whole features and this demarcation was superseded by the definition in ISO 9000:2005 "The degree to which a set of inherent characteristics fulfills requirements" (Hoyle, 2009). Quality management is broad important concept dealt with process and procedures and system accomplishments essentially needed in quality planning and adequacy of quality goals. Specifically, quality management comprises the following four elements quality planning, quality control, quality assurance and quality improvement. Total quality management (TQM) in particular can be defined as managing the whole (total) to attain an excellence (quality) product or service (H & Dale H. Besterfield, 2011). TQM framework or models instigate with the existing information publicized by quality experts to enhance ethical values and implementation approaches. The various models are available for implementation process and their effectiveness can be integrated with geographic, demographic situation during selection therefore very remarkable to look at important TQM models from an integration point of view. Traditionally Oakland (1989) formalized the first model of quality. Dr. Noriaki Kano in 1984 has developed his two dimensional customer satisfaction model demonstrate proper attention towards customer behaviors associated with quality of products and services in terms of stated, unstated, expected and exciting needs. European Foundation for Quality Management (EFQM) has designed EFQM Framework or Value Model. This model has nine principle criteria and further categorized two classes called enabler and results, where leadership, people, policy and strategy, partnership & services and process are classified as enabler for quality innovative and learning activities and other class of results consist of people, customer, society and key. To manage productivity conforms to standards and proper utilization of resources NPO was initiated Prime Minister Quality Award (PMQA) on the basis of Malcolm Baldrige National Quality Award (MBNQA). The basic aim of this initiation was to promote excellence and award those distinguish, performing quality practices at national level and giving prime importance to quality. (Shafiq, 2012) quoted Lemak, Mero and Reed that Effectiveness of TQM philosophy may be integrated with implementation and required to execute as a system. He also added although different models and framework as PDCA/PDSA cycle, Oakland, EFQM, MBNQA and PMQA discussed above for TQM effectiveness are available considered as general implementation approaches but there is no specific stages of implementation.

2.1. Eight (08) Basic Principle Elements of TQM

Above definitions and frame work interpretations give an idea of basic principles encompasses all desired elements for perfect and effective management system.

- i. **Customer-focused.** Eventually the customers decide the level of quality. An organizational effort to encourage quality improvement does not matter unless customer defines its actual. In the perspective of quality management, a customer can be distinct as the recipient of one's product, service or information
- ii. **Total employee involvement.** Outcomes of different studies shows positive integration between production yield and employee's contribution extended to revenue of good economical values. Employees participation has virtuous importance to attain overall organizational objectives and performance goals. (Fai Pun,

- 2002). Fearless employees with good environment observed more committed and after necessary training and motivation, their working interests increased to achieve organization goals (ASQ, 2014).
- iii. **Process-centered.** Process approach is fundamental part of any management system. Every process involves some inputs associated to man, machine, method, material and after process converted into output product. In textile industry natural and manmade fibers used as material and different machines process them into subsequently different product like sliver, roving, yarn, woven cloth. Thus during manufacturing process concept for internal customer satisfaction developed. Furthermore, various management and statistical tools used to detect and control variations for achievement of defect free product known as outcomes (ASQ, 2014).
 - iv. **Integrated system.** Total quality management methods effectively bridging vertically integrated companies functional areas; therefore, formulation of strategic planning and decision making process becomes easier. In all perspective, inputs, process and output organized as particular unique business entity where specific vision statement demonstrates future revelation associated to its mission and objectives. Quality policies, critical procedures and regulatory codes must be understood by all members of organization. For effectiveness of overall system activities, it is required to be install progress monitoring devices and ensure operational communication between departments on continuous basis. Prime Minister Quality Award in Pakistan and other additional international standards like ISO 9000 quality management system exhibited comprehensive guidelines for interested organizations to achieve excellence in their environment.
 - v. **Strategic and systematic approach.** Allocation of resources within time and budget constraints to achieve selected targets without compromising on quality of product or service according to required logical approach and to sustain pre-established vision.
 - vi. **Continual improvement.** Organizations interested to sustain in competitive environment required continuous determinations to maintain their quality of product or service. For this purpose plan, do, check and act approach is often practice. This approach validate process through monitoring and online or offline controls methodology with effective communication
 - vii. **Fact-based decision making.** Performance evaluation is cognitive task linked with numerical values often called key performance index. TQM philosophy allows to collection and interpretation of data to encourage factual based decision making. After analyzing particular data either by descriptive techniques like histograms, pareto charts, control charts or inferential methods like analysis of variance and design of experiment etc. process inputs and output results can be optimized in terms of repeatability and reproducibility.
 - viii. **Communications.** Communication generally refers to process between sender and receiver comprises of speaking, listening, reading and writing. In any TQM organization exchange of right information at right time and constantly every time will increase ultimate success. With effective communication functional performances of employees considerably amplified (ASQ, 2014).

2.2. Quality Management Tools and Techniques

Cumulatively over hundreds of quality management tools and techniques developed as described in book 'quality tool box by (Tague, 2005) and '100 methods for TQM' by (Kanji & Asher, 1996). In ASQ alphabetically provided necessary tools/techniques description available for quality management concerned. Moreover, in all quality related books essential tools for quality management always been discussed in details. Furthermore, it has been observed that tools and techniques categorized into statistical and managerial perspective for effective and smooth intuition in organizational execution.

2.3 Cost of Quality and Financial targets

Measurement of total quality management system costs linked with organization financial targets in terms of revenue growth, American Society for Quality Control has distinct four types of cost of quality i.e prevention costs, appraisal costs, internal failure costs and external failure costs. Total productivity of an organization realized after determining the magnitude of cost incurred. (Mitra, 2012). Different types of wastes are increasing cost of final product hence, TQM was seen as a waste removing method by managing the whole in improving the way things are done. TQM approach helps to improve business operating procedures by incorporating quality management system so that prevention methodology is follow rather than detection through developing quality attitudes and skills.

2.4 Overview of Pakistan Textile dyeing Industry in trade perspective

Textile Processing Sector established in 1947 is practically working since its incredible foundation. Approximately 700 textile processing units are supporting the national and international level requirements resultantly providing leverage to economy. Now recently textile industry investment increase over \$ 8.5 billion in restructuring and higher value addition. Consequently in 2012 to 2013, amount \$ 387 million had spent

on import of textile machinery, Rs 13.9 billion utilized for the import of 36850 ton industrial dyes and pigments. The cloth production is 1,030 million square meters in 2012-13. out of total cloth production, grey cloth is 56% , subsequently 30% subjected to dyeing and printing process and 14% blended and bleached. It has been observed that out of total export, 20% fabric associated to dyeing production, and dyeing managers continuously endeavoring to minimize misconception about Pakistan's textile dyeing industry being a low quality provider in the global market. However, Pakistan has earned revenue from its textile exports about \$13.06 billion during 2012-13 (Dr. Noor Ahmed Memon, 2013).

2.5 Operations in Textile Dyeing Industry

consequently manufacturing of textiles mainly consist of spinning, weaving, processing and garment development with different methodologies and unique output for various applications, for example textile spinning have diverse mechanism as technologies available for yarn manufacturing i.e ring spinning, rotor spinning, friction spinning etc. Similarly weaving process can be done with water jet loom, air jet loom, rapier looms, dobby, jacquard etc. Dyeing is a process of imparting various colors in fiber, yarn and fabric. Quality of dyeing is integrated with fiber characteristics, fabric weave, chemical composition of dyes and auxiliaries, physical interaction of light, color fastness to light, crocking and washing. However, quality of dyeing process is associated with quality of fiber, spun yarn and woven fabric, because these materials are input for dyeing process. Therefore better input will minimize wastage of time, money and workmanship. Quality of dyed fabric required proper handling of mechanical devices along with controlled chemical reactions because both have crucial importance in order to achieve defect free dyeing products. In practice, synthetic dyes are consumed in production at higher proportion due to superior fixation, low price, better fastness properties and longtime durability than natural dyes required more precautionary procedures, high prices, and poorer fixation rate. Textile dyeing process is not simple as it is associated to fiber characteristics, properties of water, pretreatments, mercerization, productivity /maintenance of machines, chemical auxiliaries, accuracy of testing lab reports and nature of dyes. Moreover, some basic processes also define quality of final dyed product.

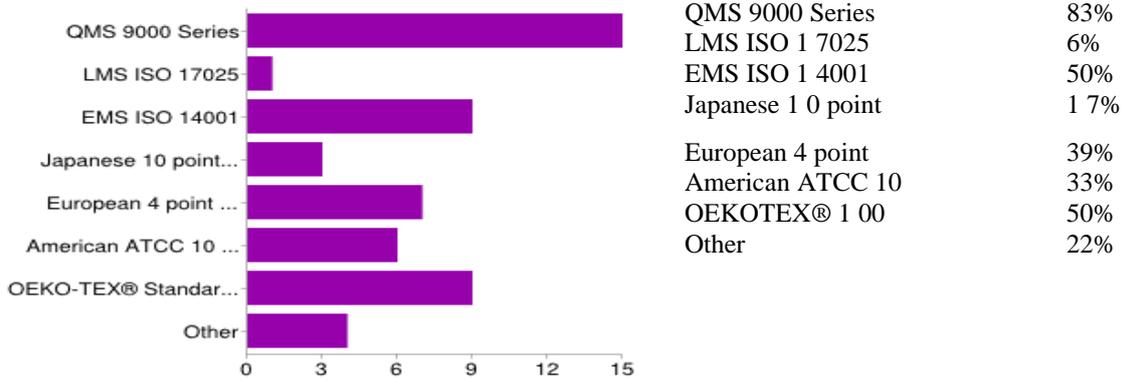
III. Research Methodology

In social sciences different research methodologies are practiced to conduct research i.e. surveys, experiments and the analysis of pre-published information. In this project deductive approach is followed ontological and epistemological positions. Various research questions are designed according to theory depicted in literature review for significant conclusion about effectiveness of total quality management philosophy at operation level specific to textile dyeing sector. For this purpose primary data was collected from concerned quality managers/operators of textile companies in Pakistan. This research project is based on research questionnaire survey asked in the study linked with consequent research goals/objectives, research methodologies of literature review. In this research project perspective, questionnaire is used as a data collecting instrument. Questionnaire consists of multiple queries asked from respondents of selected sample to acquire reliable responses. Questionnaire is tool most frequently used to collect information through survey. Obviously computer programs are contributing in various disciplines with analytical techniques, especially cloud technology helps to store important data and provide access at any place. Connection to this project secondary data was accessed through internet, research instrument development on internet and other applications like Microsoft office used for finalization of this project. For qualitative data analysis software allows the analyst to systematically organize and index qualitative data, and then to retrieve that collected data with flexibility in different ways. Therefore, within constraints like time limitations, low budget and large textile geographical area where companies are operating was difficult to reach, thus develop an electronic mail web based survey questionnaire to collect the data from the sample textile dyeing mills in Pakistan. This research project questionnaire was designed and published on Google drive application tool known as 'forms' to facilitate respondents can easily respond also saving cost and time.

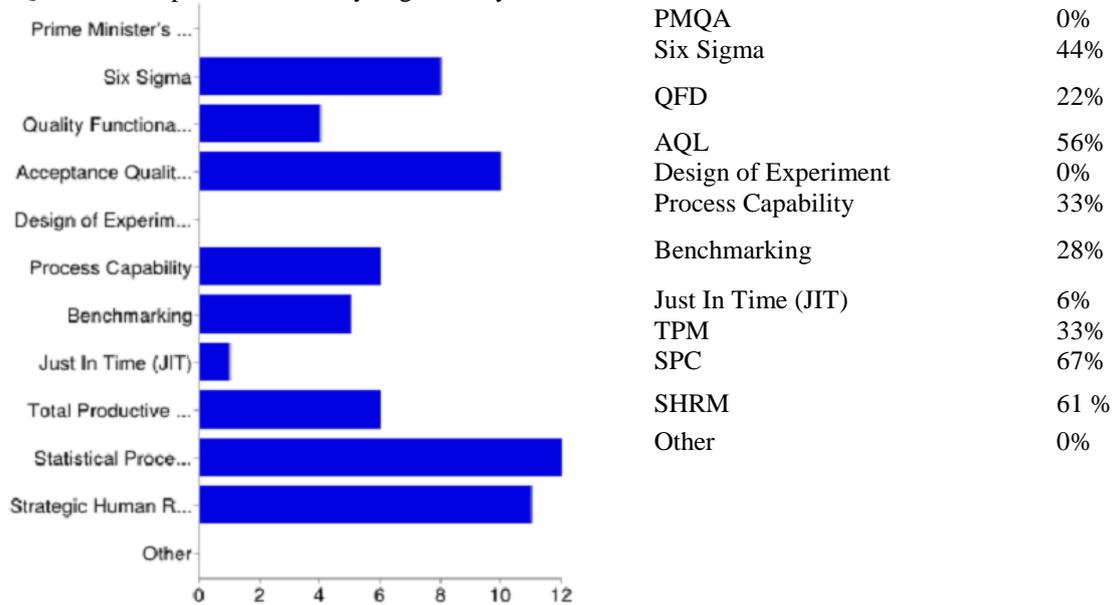
Nexus above suggestions of researchers, questions were designed and framed with necessary instructions for completing the questionnaire. In this research project some questions were open ended and overall questions designed on five-point Likert scale and respondents were asked to place himself on the continuum from

'Strongly Disagree = 1', 'Disagree = 2', 'Neutral = 3', 'Agree = 4' and 'Strongly Agree = 5'.

3.1.Descriptive Result in Response to Questionnaire
Standards Adopted in Textile Dyeing industry

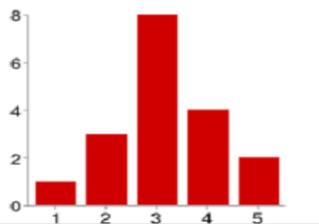
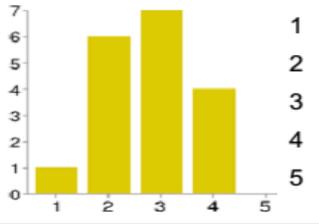
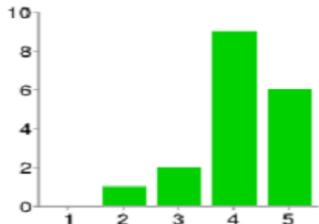
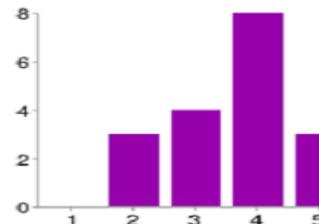
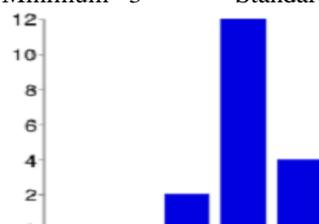
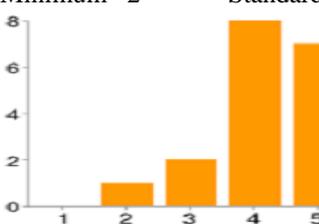
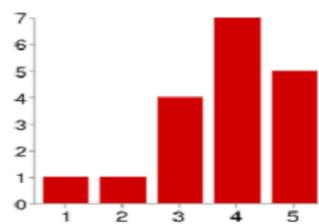
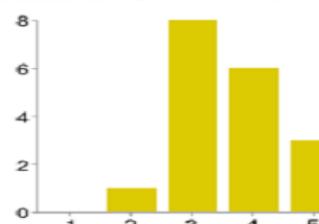
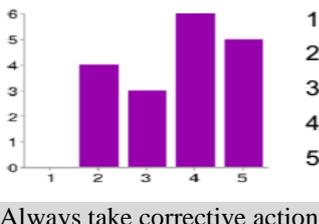


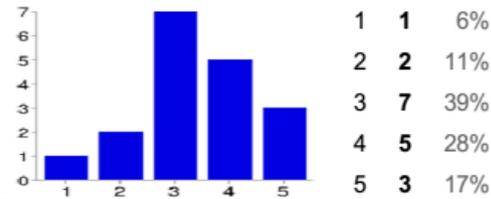
TQM tools Adopted in Textile Dyeing Industry



Applied quality management principles in dyeing house management

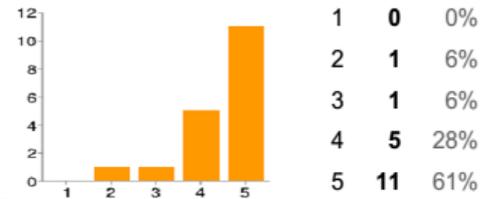


Satisfactory Concept of TQM theories and models		Small q vs Big Q approach.	
Maximum 5	Average 3.17	Maximum 4	Average 2.8
Minimum 1	Standard Deviation 1.04	Minimum 1	Standard Deviation 0.8
	1 1 6%		1 1 6%
	2 3 17%		2 6 33%
	3 8 44%		3 7 39%
	4 4 22%		4 4 22%
	5 2 11%		5 0 0%
Situational Leadership Style		Management have proactive plans	
Maximum 5	Average 4.1	Maximum 5	Average 3.6
Minimum 2	Standard Deviation 0.8	Minimum 2	Standard Deviation 0.98
	1 0 0%		1 0 0%
	2 1 6%		2 3 17%
	3 2 11%		3 4 22%
	4 9 50%		4 8 44%
	5 6 33%		5 3 17%
Top management commitment		Management conflicts resolution	
Maximum 5	Average 4.1	Maximum 5	Average 4.1
Minimum 3	Standard Deviation 0.6	Minimum 2	Standard Deviation 0.85
	1 0 0%		1 0 0%
	2 0 0%		2 1 6%
	3 2 11%		3 2 11%
	4 12 67%		4 8 44%
	5 4 22%		5 7 39%
Management always motivated and encourage employees for participating towards common goals		Management can effectively reduce cost of quality	
Maximum 5	Average 3.8	Maximum 5	Average 3.6
Minimum 1	Standard Deviation 1.1	Minimum 2	Standard Deviation 0.85
	1 1 6%		1 0 0%
	2 1 6%		2 1 6%
	3 4 22%		3 8 44%
	4 7 39%		4 6 33%
	5 5 28%		5 3 17%
organization products /services are customer driven		Always collect customer feedback	
Maximum 5	Average 4.2	Maximum 5	Average 3.7
Minimum 3	Standard Deviation 0.81	Minimum 2	Standard Deviation 1.2
	1 0 0%		1 0 0%
	2 0 0%		2 4 22%
	3 4 22%		3 3 17%
	4 6 33%		4 6 33%
	5 8 44%		5 5 28%
Product delivered to customer always on time		Always take corrective actions for customer complaint if any	
Maximum 5	Average 3.4	Maximum 5	Average 4.4
Minimum 1	Standard Deviation 1.1	Minimum 2	Standard Deviation 0.9



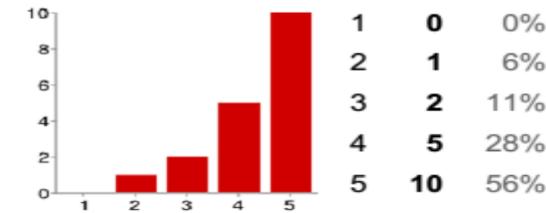
customer satisfaction increased in terms of productivity and revenue

Maximum 5 Average 4.3
Minimum 2 Standard Deviation 0.91



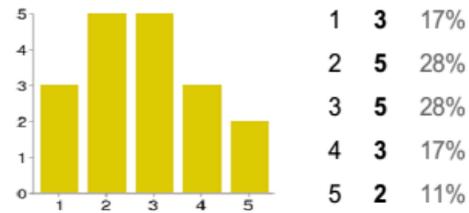
Kano model used for understanding customer satisfaction

Maximum 5 Average 2.8
Minimum 1 Standard Deviation 1.3



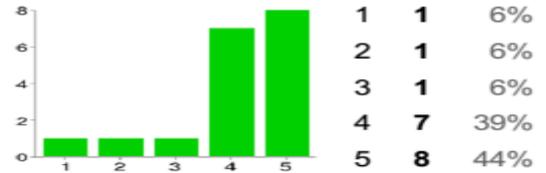
organization communication system with internal customer(s) is highly effective

Maximum 5 Average 4.1
Minimum 1 Standard Deviation 1.2



organization communication system with external customer(s) is highly effective

Maximum 5 Average 3.6
Minimum 1 Standard Deviation 1.2



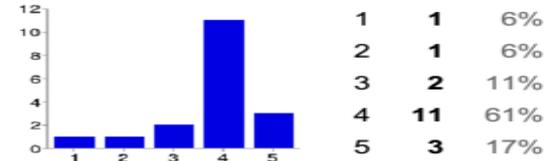
Procedures for communication are implemented positively

Maximum 5 Average 3.8
Minimum 1 Standard Deviation 1.0



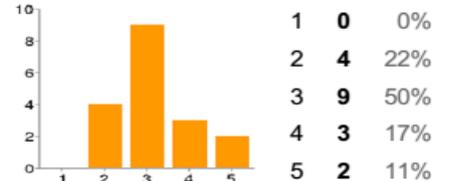
customer complaint on Performance of dyed product quality

Maximum 5 Average 3.2
Minimum 2 Standard Deviation 0.9



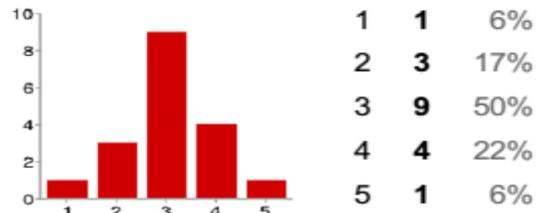
customer complaint about Conformance (According to Std) of dyed product quality

Maximum 5 Average 3.05
Minimum 1 Standard Deviation 0.94



customer complaint for Reliability (Consistency of Performance over Time) of dyed product quality

Maximum 5 Average 2.94
Minimum 1 Standard Deviation 1.2



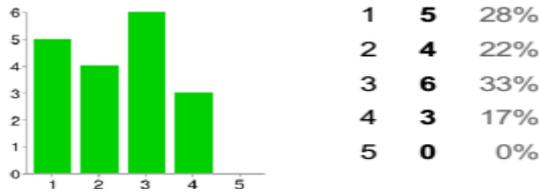
customer complaint about Durability (Use full life) of dyed product quality

Maximum 4 Average 2.4
Minimum 1 Standard Deviation 1.1



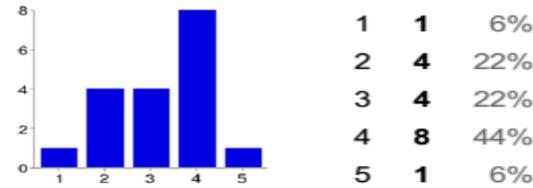
customer complaint on Serviceability (Ease of repair) for dyed product quality

Maximum 4 Average 2.2
Minimum 1 Standard Deviation 1.2



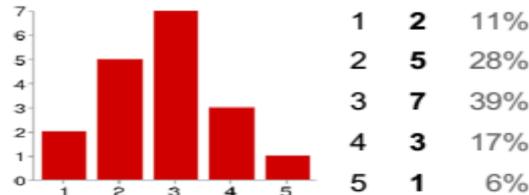
customer complaint about Aesthetic (Sense, Feel, Look etc) of dyed product quality

Maximum 5 Average 3.2
Minimum 1 Standard Deviation 1.1



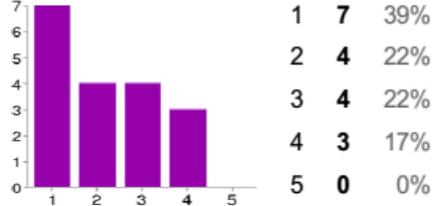
problem or loss due to Perceived Quality (past performance) about your dyed product quality

Maximum 5 Average 2.8
Minimum 1 Standard Deviation 1.06



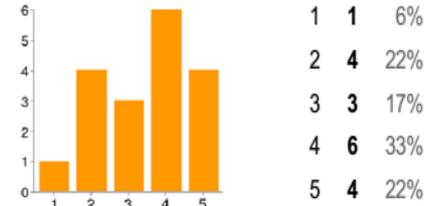
Human Resources are an asset

Maximum 5 Average 4.3
Minimum 2 Standard Deviation 0.9



customer demand for Features (Additional Finishing etc) in dyed product

Maximum 5 Average 3.4
Minimum 1 Standard Deviation 1.2



All employees properly trained for their operational duties

Maximum 5 Average 3.6
Minimum 3 Standard Deviation 0.6



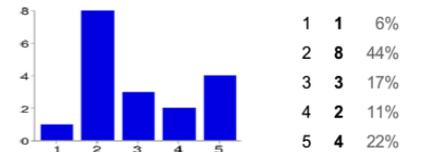
Employees concepts about TQM theories and models

Maximum 5 Average 3.1
Minimum 2 Standard Deviation 1.1



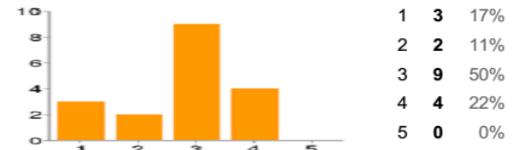
Trainings are properly scheduled

Maximum 5 Average 3.0
Minimum 1 Standard Deviation 1.3



Employees have less interest in quality objectives

Maximum 4 Average 2.8
Minimum 1 Standard Deviation 1.0



Employees suggestions are appreciated by organization

Maximum 5 Average 3.8
Minimum 2 Standard Deviation 0.8

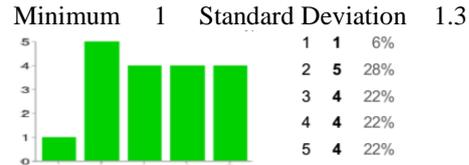
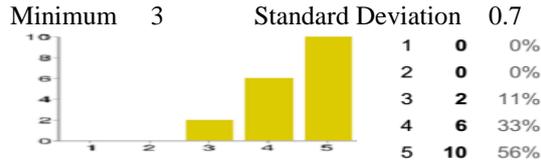


Organization believed on team work for better results

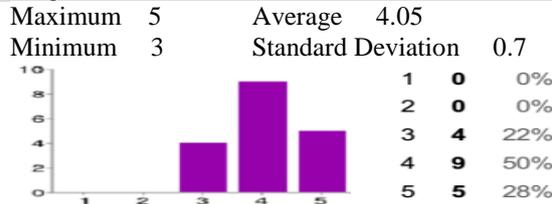
Maximum 5 Average 4.4

Organization facilitates basic human need

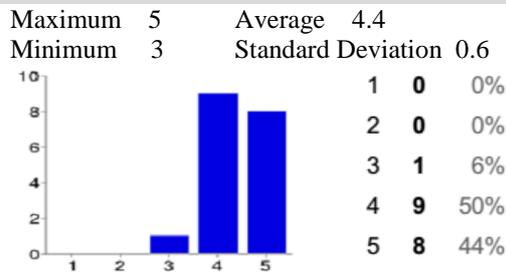
Maximum 5 Average 3.3



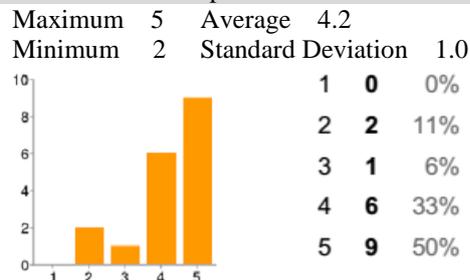
Organization view point about TQM Training Programs effectiveness



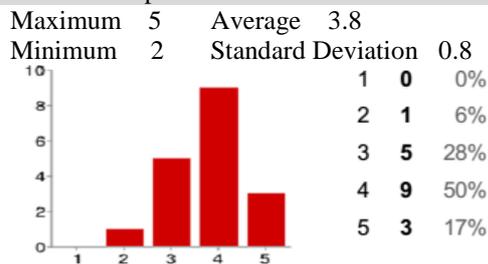
Organization has continual improvement plan with vision, mission and objective



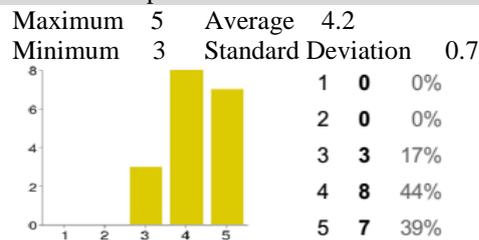
Organization has established quality control departments for continual improvement to become more competitive



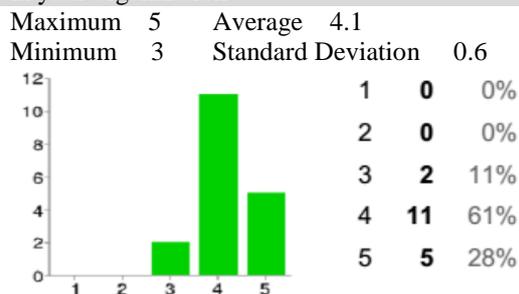
Organization used problem solving tools for continual improvement



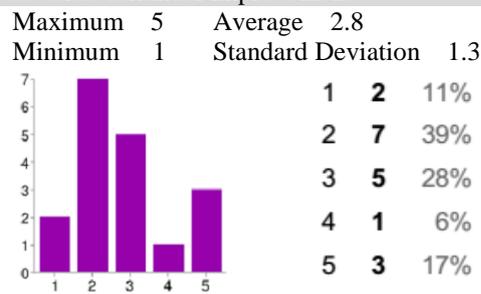
Customer suggestions / feedback used for continual improvement



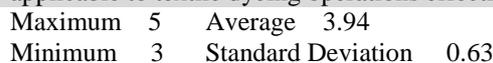
Previous quality results are continually improved in your organization



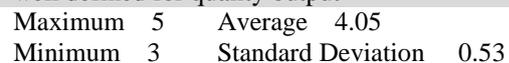
Organizational hierarchy create hindrance towards continual improvement

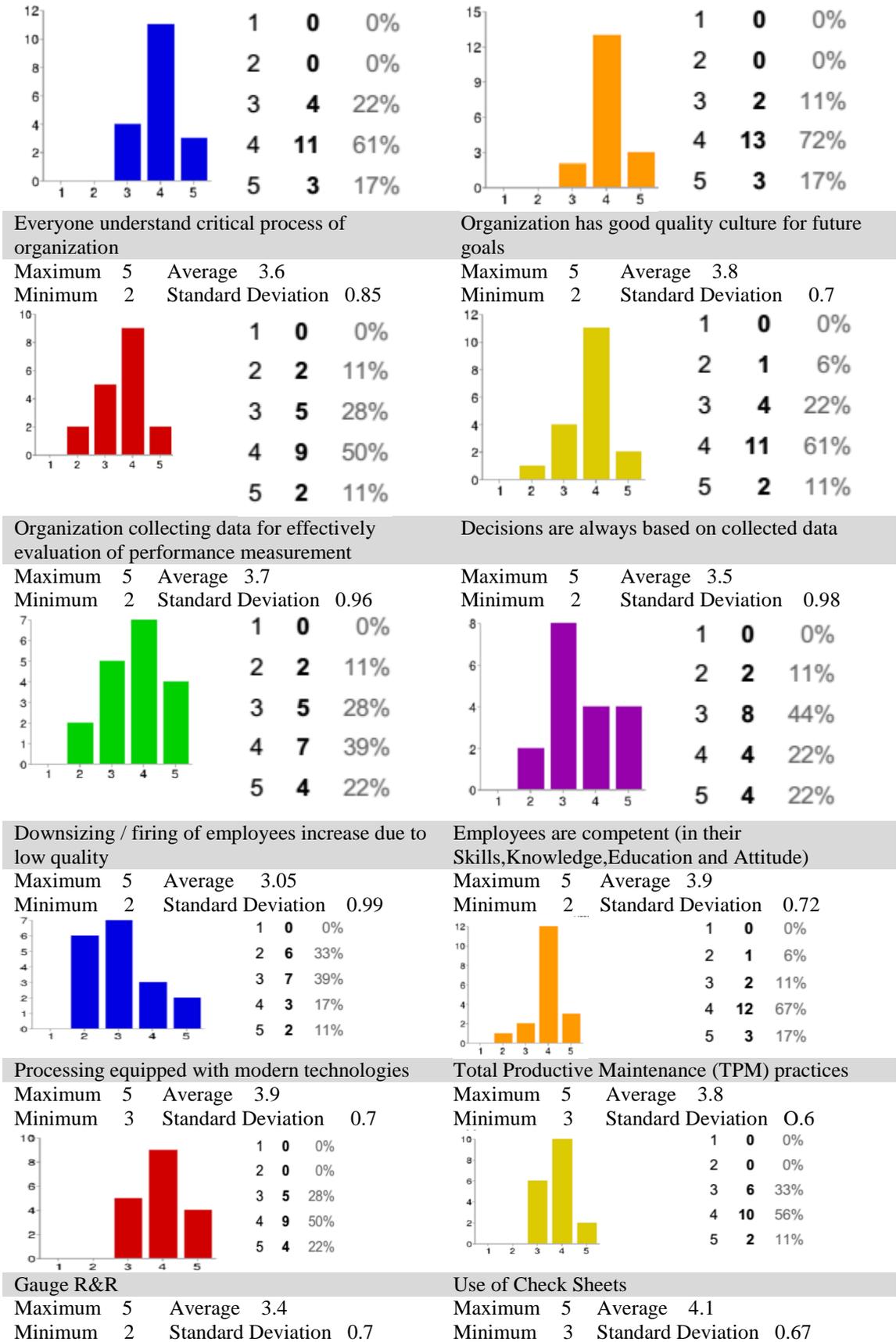


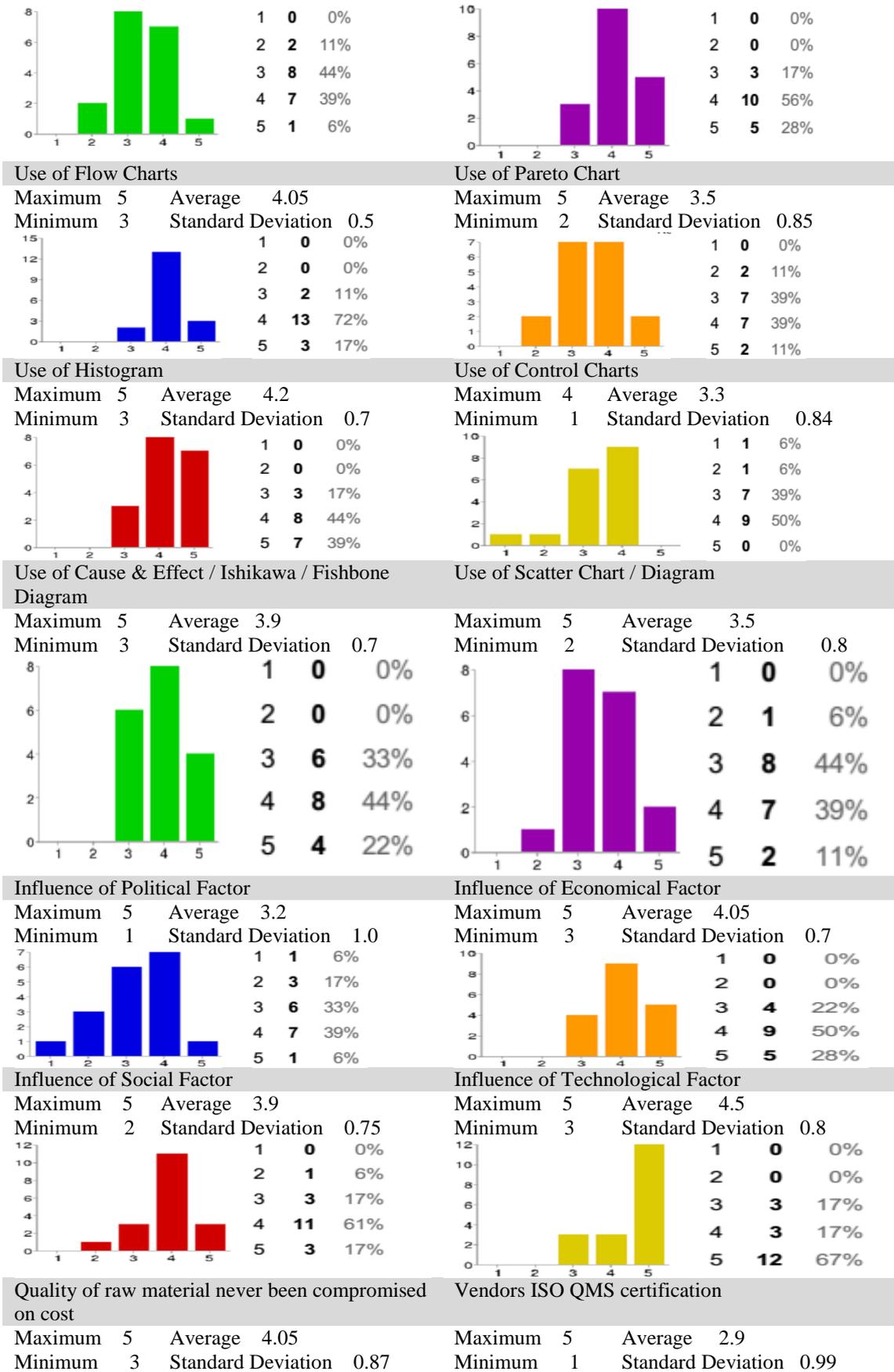
Total quality management (TQM) philosophy is applicable to textile dyeing operations effectively

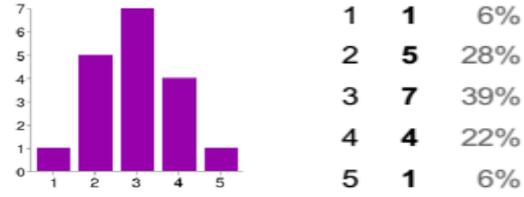


All process are associated to main process are well defined for quality output



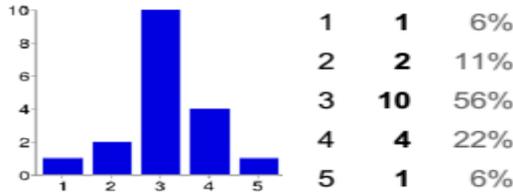






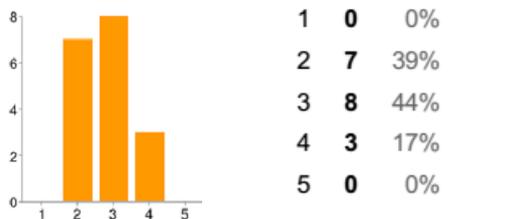
Vendors ISO EMS certification

Maximum 5 Average 3.1
Minimum 1 Standard Deviation 0.9



High Cost of internal failure (within process/org)

Maximum 4 Average 2.8
Minimum 2 Standard Deviation 0.7



High Cost of external failure

Maximum 5 Average 2.5
Minimum 1 Standard Deviation 0.92



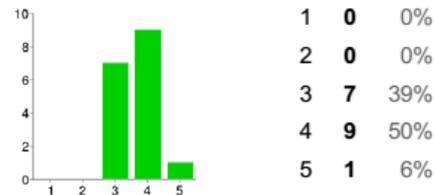
High Cost of Prevention

Maximum 5 Average 3.7
Minimum 3 Standard Deviation 0.6



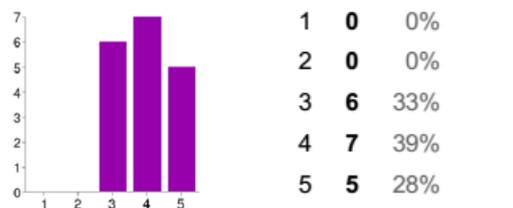
High Cost of Appraisal

Maximum 5 Average 3.6
Minimum 3 Standard Deviation 0.6



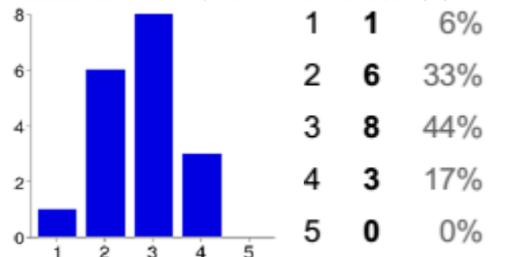
Have your organization effectively managing costs of quality

Maximum 5 Average 3.9
Minimum 3 Standard Deviation 0.84



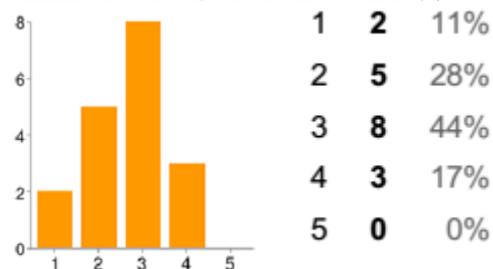
Transportation waste within process

Maximum 4 Average 2.7
Minimum 1 Standard Deviation 0.8



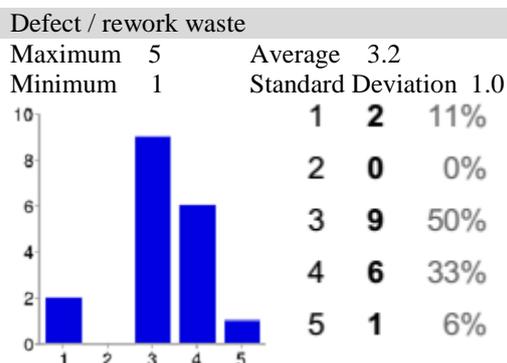
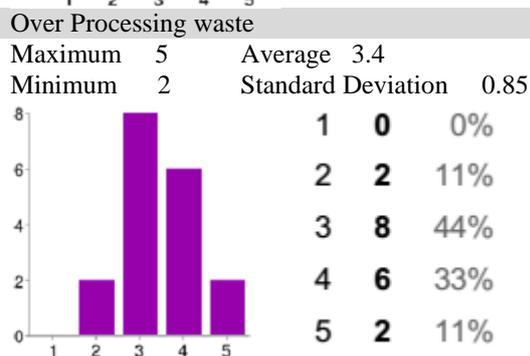
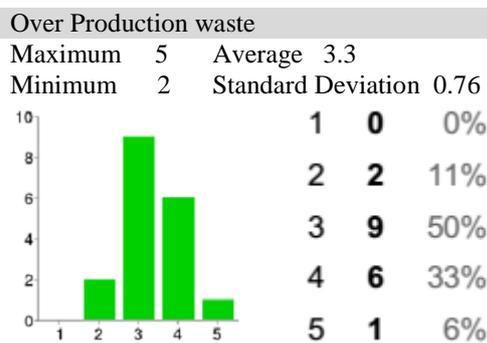
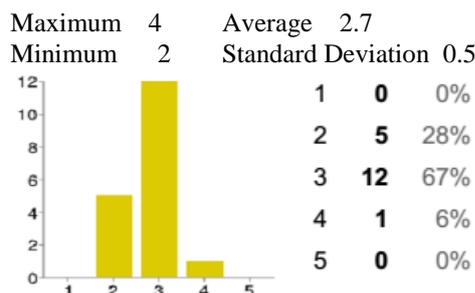
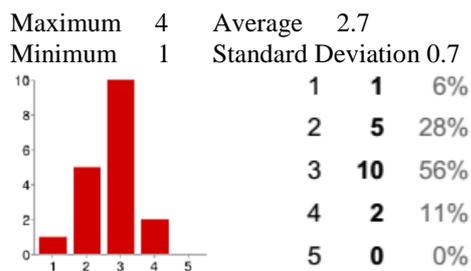
Inventory waste

Maximum 4 Average 2.6
Minimum 1 Standard Deviation 0.9



Unnecessary Motion Waste

Waiting time between process



IV. Summary, Findings, Conclusion And Recommendations

4.1. Summary

The main objective of this research project was to descriptively analyze effectiveness of TQM philosophy estimated with different dimensions. Core principle aspects of TQM implementation give idea about TQM effectiveness. When we look overall behaviors of respondents about TQM Philosophical acceptance in textile operations obtain average of all responses cumulatively even not mature in ideology of TQM but near to agree its implementation in their organization. On the basis of TQM management principles; research objectives was develop to ascertain basic concepts of TQM framework, theories and models implementation and to identify TQM contribution in cost reduction. Moreover, implementation challenges facing by industry and industrial views about TQM training effectiveness are part of research objectives. In this connection a comprehensive research study was piloted and for this purpose an electronic mail survey designed and distributed to industry on their email addresses. Summary of average of average response shows in Table- 4.1.

Ser	Management Principles	Average of Average responses
	Leadership	3.6
	Customer Satisfaction	3.3
	People Involvement	3.6
	Continual Improvement	3.9
	Integrated System	3.8
	Factual Approach to Decision making	3.6
	Process Variable	3.7
	Cost of quality	3.3
	7 types of wastes	2.9

4.2. Findings of the Study

This section consists of findings from literature review, descriptive analysis of the empirical data collected through electronic questionnaire survey.

4.2.1. Finding from Literature Review

Subsequent findings from particular literature review on TQM philosophy aligned with research project objectives “*effectiveness of TQM philosophy at operational level for quality product in Pakistan: empirical study of textile dyeing industry*”. The TQM philosophy is wide knowledge of terms and tools specific to management principles endorse quality improvement. However there is inconsistency in the use of terms in textile dyeing industry for this management approach due to varied definitions in both literature and practice. Hence, the different theoretical parameters of TQM explored in appropriate way for better understanding of pedagogical concepts logically fit for research purpose. As discussed in literature review; TQM is comprehensive paradigm of quality management pertains to tools & techniques, theories, models and adequate framework ensuring do right first time, every time.

- a. Quality is difficult to define and is an elusive concept
- b. TQM is implemented at textile industry is part of excellence journey
- c. Management theories and concepts are practiced but TQM concepts are still not understood at expert level
- d. TQM philosophy practices worldwide successfully
- e. TQM is based on elements like leadership, total customer satisfaction, continuous improvement, people involvement, training and education, effective communication, reward and recognition, proactive approach and teamwork etc.
- f. Cost of quality (COQ) managed effectively in TQM organizations
- g. ISO 9001 has been successfully implemented in textile industry

4.2.2. Finding from Descriptive Analysis

Effectiveness of TQM philosophy can be assessed through implementation of TQM soft and hard tools & methods. Following outcomes concluded after descriptive analysis:

- a. Large number of organizations is ISO 9000(about 83%) quality management system certified as well as environmental management system certifications & OEKOTEX 100 standards are dominantly adopted in dyeing industry.
- b. Statistical process control and strategic human resource management is more in practice.
- c. In response to quality management principles customer focus, process approach and continual improvement with people involvement are observed highly emphasized, however other principles are also practiced according to organizational structure and priorities.
- d. Lack of concepts about TQM theories and models and there is lack of practice in TQM core value like small q vs big Q approach
- e. General management like situational leadership, proactive plans, management commitment, conflict resolution employee’s motivation and cost reduction approach is fully practiced in textile dyeing industry.
- f. Most of the organizations products/services are customer driven and collect customer feedback with corrective action approach towards any complaint. It has been observed organizations generally practiced excellent customer management and have not any specific complaint about quality but Kano model is not used or may not understood by various organizations.
- g. Maximum organizations believe that human resources are asset and provided necessary trainings despite training schedule are not fixed. It has been observed from response results that employees are equally interested in quality objectives and their suggestions for improvements appreciated if feasible. Organizations are also believed on team work effectiveness of TQM trainings. However, basic human needs are considerably not met.
- h. Organizations have continual improvement plans for this purpose establishing quality control departments, using problem solving tools and give importance to customer feedback . As a result previous quality results are improving and hierarchy of dyeing organizations supports continual improvement.
- i. Total quality management philosophy is applicable to textile dyeing operations effectively and all dyeing process are associated to main process or vertical integrated with quality culture setup is practiced where everyone understand critical process.
- j. Large number of organizations collecting data specifically output of test results for their decisions. However, some organizations accept variability and referred to further quality grading as superior & inferior.
- k. It has been observed that mostly organizations employees are competent and organizations does not compromises on quality. Possible modern technologies are adopted. Seven quality tools and TPM are practiced within quality control departments of dyeing industry. Despite political, economic, social and

technological factors influencing on continuous growth, Pakistan dyeing industry process are managed with possible efforts towards quality culture and quality products.

- l. Collected response results are clearly depicted that internal external failure of costs pertaining to textile dyeing industry is low and cost of prevention and appraisal incurred high. These results shows organizations specifically focus on minimization of cost and successfully managing cost of quality.
- m. Over processing, over production and rework wastes are more than transportation, inventory, unnecessary motion and waiting time wastes. However, most of the organizations in textile dyeing industry still thinking overproduction is an achievement.

4.3. Conclusions

Cumulative average results shows effectiveness of TQM philosophy is increases with its implementation. However there is absence of any specific effectiveness measuring method. Textile dyeing organizations are striving for success in international trade and for this particular challenge textile industry managing its quality standards up to mark. In context of TQM Philosophy effectiveness, results obtained for given TQM parameters are indicating that culture of dyeing industry is reshaping into quality culture. Although political, economic, social and technological challenges are influences rapid growth whereas, industry has ongoing good practices of TQM at slow speed. Summary of responses shows TQM elements are focused for development of quality products in textile dyeing environment depicting average numerical descriptive results above in table-5.1. Costs of quality are managed appropriately with minimum waste generation approach. It has been observed that there is less knowledge of TQM concepts, theories and advance models despite TQM training programs helpful to enhance its effectiveness in textile dyeing industry. Furthermore, some inherent technical problems also induces dyeing defects due to impure water, Total Dissolve Solvents (TDS), poor treatment and other associated back process faults.

4.4 Recommendations

Aforementioned study results showed that persuasive Total Quality Management (TQM) concepts are grooming slowly with continuous improvement approach. Effectiveness of Total quality management will be more efficient by providing necessary short modules training to employees and employers of textile dyeing industry. For example certified quality professional and certified quality inspector trainings are available in Pakistan. To reach expected effective dissemination of total quality management ideology in textile dyeing industry, Industrialist participation and vigorous collaboration with researchers should be developed on priority. Textile dyeing mills are suggested to participate in prime minister quality award (PMQA) as it is total quality management framework based on European Foundation for Quality Management (EFQM) excellence model. PMQA achievements are more helpful for demonstration of TQM philosophy effectiveness at operational levels in every industry.

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