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Pioneers of TQM: Their Journey and Philosophies

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Abstract

Customer's outlook has always contributed an organization to juggle around enhanced quality and is a decade old observation which even facilitated Japanese to eradicate their inferior quality products after Second World War to enhance quality of their industrial products in comparison to United States of America and European world. This scenario of quality augmentation forced business houses to switch to Total Quality in late 1960's at all levels which was fastened earlier just to product quality. With the amplified demand of superior quality products across the world, it became mandatory for global enterprises to develop such a culture of continuous quality improvement which was well advised and established by some pioneers of this field namely: Deming, Juran, Feiganbaum, Ishikawa and Crosby etc. Nevertheless, a management philosophy named Total Quality Management (TQM) glorified this concept and took a center stage in the 1980's. TQM allows every individual within an organization to indulge, to contribute and to build up wisdom of continuous improvement in them. One must see TQM as a culture, not as a program because if once it is established through all the corners of an organization, then glorification of business will become its permanent feature.

Keywords: *TQM, Philosophies, Quality Planning.*

Introduction

Total Quality Management (TQM) emphasized on ever-increasing customer gratification although reducing the costs as well where it maintains all system approach which indulges all processes, departments in an organization, all employees (top leadership to an operator) at each level as an integral part to ensure success in the manufacturing of products or delivery of services (Reed et al. 2000). Kanji (1990) believed that TQM has been the key to second industrial revolution for existence of the fittest. Author stated that there has been misinterpretation about the concept of quality not only in US but also in Britain, where some organizations felt it not necessary to invest in quality beyond a certain limit as it will no more be a profitable task. Another misinterpretation considering quality is that it is only concerned with objects. Overcoming these difficulties will require a proper structure (Kanji 1996) and TQM can certainly be the key for growth and survival of organizations (Warwood and Roberts 2004).. Shattered by war, Japanese were facing industrial crisis so taken their knowledge hand to hand and finally, they were in a state after two decades that the western world recognizes them (Tsutsui 1996). The Japanese products entering in US and Europe were having far better quality than them (Hayes 1981) which happens primarily after adopting the rules lay down by Deming and Juran.

Quality has different definitions otherwise there is no universally acceptable/demanding definition of quality and it is also evident from the definitions of these notables. As Crosby's definition is singular in nature, wheather Deming asserted on comprehensive definition of quality. Deming and Feigenbaum's definition carries two levels (Nwabueze 2001), where quality is multidimensional and customers have changing needs and expectations over time. Feigenbaum asserted that the quality estimation is in the territory of customer only whereas organizations must be close enough to customers to gauge their gratification and must have the capability to convert the customer's needs into product features (Hoyer and Hoyer 2001). It clearly indicates the role of marketing and production in drawing these evaluations to product. Ishikawa states that quality should not be up to just product, but beside this it includes the quality people, process, and all other component of the business. He also argues that merely saying product is of high quality doesn't

guarantee customer satisfaction. Hence, quality carries an ever changing definition within it. The Juran's definition "fitness for use" also carries customer needs and conformance (Dale 2003).

Pioneers of TQM

William Edwards Deming

A brief meeting with Walter A. Shewhart in 1939 seems to be motivational for Deming. Same year, Deming edited a book written by Shewhart which prolonged their coordination. Then the year 1949 brought the moment which made Deming an unmatchable feat in quality revolution when he proposed the PDSA (Plan- Do- Study- Act) cycle. Originally known as The Shewhart Cycle, it got popularized as Deming Cycle because Deming was the prime face for popularizing it. The PDSA cycle can be used as a system to check the feasibility of a new idea. On a broad pathway, the cycle provided an insight to relate customer requirements with processing and production of the product. He first visited Japan in 1947, where he delivered some seminar about quality improvement. After an invitation from Japanese Union of Scientists and Engineers (JUSE) in 1950, he delivered lectures and seminars to thousands of Japanese engineers and managers. It helped JUSE to recognize the honest and true nature of Deming, his knowledge and capabilities in the field of QM. The same year JUSE honored him by introducing the "Deming Prize". He frequently visited Japan from 1951-1956 to aid JUSE's efforts. He endow with an inclusive theory for management organizations and institutions. He suggested that a system must have a mission and vision, and it must be clear to everyone in an organization.

The year 1980 turned out to be worthy for Deming, in June, when the NBC (national broadcasting company) documentary mentioned him in the "If Japan can, why can't we?" A video illustrated the recovery of Japanese industrial sector after Second World War and judged it against US industry. The video apparently showed the problems in US industry and the problems which were needed to be corrected. Leaving others behind who were present there, Deming came out with encouraging way outs to improve these problems. At that moment it turned out to be apparent to the spectators that why the Japanese gave credit to Deming for sustainment and resurgence of Japanese industry after Second World War. He brought out the weaknesses of US executives in terms of lack of appropriate edification, relevant theory and knowledge. He mentioned that due to more experimental beliefs the US came across with a dawdling improvement. His first assignment with a bonafied US company came in 1981 when he joined Ford Motor Co. Traditionally; workers were blamed for poor quality of product. He specifically pointed out that 85% of quality problems are due to process and system itself as well as by poor management. Only 15% problems are due to worker's error. He emphasized that the managers should persuade employees to fear out quality problems. Apparently most of the articles considering TQM even today itself have included Deming's philosophy. Deming's philosophy is significant for implementing quality and productivity up gradation Montgomery et al. (2011). The hulking Deming is often known for his 14 points of management and seven deadly diseases of quality management. He considered that each of these diseases is fencing the efficient execution of his philosophy.

Joseph Moses Juran

The impressive fellow Juran described a diagnostic philosophy for managing the quality. In contrast to his counterparts he presented guidance more actively about planning, control and improvement of quality. He frequently proposed suggestions about managing practices to persuade and cultivate enhancement in product and service. He actively worked as an industrial engineer in Western Electrics for years and on various designations for federal government. During Second World War he developed his knowledge in research and publishing about quality management.

Just like Deming, Juran was also an admirable person for Japanese. After his visit to Japan in 1954, his knowledge and intelligence about quality was taken granted and in 1956 JUSE published his book "Planning and Practices in Quality Control". Year 1966 has some special memories about Juran, where he was the first person who introduced the western world about quality circles in a presentation to the European organization for quality control's annual conference. In his book "A History of Managing for Quality", he described origin and definition of TQM whereby simultaneously focused on trends along with

future requirements of managing quality. His major contribution to the quality management is the "Juran's Quality Trilogy" which explains the interrelationship of three processes outlined below:

(i) Quality Planning: Juran suggested that organizations must have to recognize customer first and simultaneously their needs thereafter. The product development must respond the customers' aspects into it and it should be in such a way that these product features can be produced alongside relocating the resulting plans to the maneuvering forces.

(ii) Quality Control: Juran proposed that organizations must evaluate their actual operating performance capacity and match this with the target capacity. If some difference lays then act upon in such a way that performance should not hinder.

(iii) Quality Improvement: Juran recommended that organizations must reduce wastage. They must focus on improvement and planning of deficient processes.

Kaoru Ishikawa

Influenced from the work of Deming, Juran and Feigenaum the Japanese pioneer Ishikawa widely recognized as a proponent or prime mover of quality and quality circles in Japan. Like his contemporaries he always accolades the worth of education whereby affirming that quality commences and concludes with it. He has been widely recognized for his exceptional involvement in development of quality control theory, principles and techniques across the globe. His greatest triumph was in development of "Quality Control" and "Ishikawa Diagram or Fishbone Diagram". Fishbone diagram was embodied with a graphical representation of relationship involving both the problem and its potential causes. He argued that quality management is not only about the product and encompassing after sales service; it should extend up to or include the quality of management, entity and the firm. He always believed that a firm should treat quality improvement as a never ending progression keeping in view the long term sustainability. Ishikawa got recognition for suggesting the four aspects of TQM namely: quality circles, continuous training, Ishikawa diagram (a quality tool) and quality chain. In his words, the core of successful implementation of TQM lies within the employee participation and quality circles, he believed in, are an imperative means to achieve this.
In Ishikawa's words "Achieving TQM is merely not limited to the quality department, definitely it must involve every departments of a business organization. It must be lead by top management and they have to set an example to others within an organization that they are serious about quality". In collaboration with the JUSE in early 1950's, he organized training programs for shop floor supervisors. These programs were initially named as "workshop QC study groups". It was renamed to "QC circle" in 1962. This concept of involving all employees in the company's problem solving course of action creates a momentous ground for Japan's business refinement and success. Furthermore, "Ishikawa diagram" is a quality tool which facilitates to resolve quality problems in an organized approach. His concept which is popular even today has proposed quality through leadership. His concept of TQM which has six principles redefined the Japanese manufacturing. His two foremost publications were decoded and translated into English.
Ishikawa remarked that the Japanese quality control created an uprising in management which characterizes a different and distinctive approach of belief about management. He always maintained that there should always be organization wide quality control. For attainment of better quality control, everybody in organization must participate including the top management and all employees. He argued that the core of TQM lies within education i.e. "begins with education and ends with education". Another eminent display by him in the grassland of quality was identification of the concept of "internal customer" and "seven basic tools of quality". He stated that his past experience extended his belief that as much as 95% of all problems within an organization could be resolved by employing of these tools.

Armand Vallin Feigenbaum

The history of quality engineering in 20th century will always be half empty without the enduring contribution and breakthrough ideas suggested by the majestic management guru "Feigenbaum". He has been a pioneer of managerial innovation and its implementation. Throughout his career he was not only an academician but he trained different business leaders in a coherent system. His definitions,

philosophies and principles of TQM earned him a unique place in the history of engineering. He provided a different approach about how to speak the language of management. His redefined business theories over the years reveal the financially viable relationships where quality spearheads commercial performance. Even, the U.S. Air force also recognized his abilities in a young age (23 years), when they facilitated his knowledge and work in the engine design of P-38 and P-47 fighters and naval aircrafts during Second World War.

Feigenbaum was the first individual who used the terms "Quality Costs" in 1943. He categorized quality costs into three sub categories namely: appraisal costs, prevention costs and failure costs. All would combine to form "Total quality cost". His holistic perspective about TQC suggests that quality must encompass through all the phases i.e. it should include design, manufacturing, quality control, sales and after-sales services keeping in view the customer satisfaction. His modern quality control idea endowed high significance to management. His suggestions are as follows:

1. Quality training to operators for enhancing their efficiency

2. Entire organizations must aim to increase quality awareness

3. Every quality initiative must include entire organization

Feigenbaum in his first textbook, "Quality Control (1951)", developed his approach to TQM and later used this term in 1961. In his second text book "Total Quality Control (1983)", he explained the success story of flourishing implementation of quality control programs in some organizations and failure in others. He maintained that firms must take quality as a doorway to success. Over the itinerary of 45 years of publication of this profound work on TQC, its 10 attributes are still decisive for management of quality in organizations, worldwide, today.

Philip Bayard Crosby

Best known for proposing the notorious phrase "Do it right the first time" and the concept of "Zero defects" at Martin-Marietta, defending that any count, whatsoever, of defects should not be acceptable and consider it to be lone standard of performance. As Feigenbaum is well recognized for cost of quality and creating total quality control while Crosby is widely cited as a prominent figure in TQM movement and his work as quality manager or consultant at Martin-Marietta (now Lockheed-Martin), ITT Corporation and Philip Crosby Associates (PCA). He carried a hulking years experience as a quality management proficient and business executive. His business background and commanding communication skills as an entrepreneur always facilitated him to achieve a prime stature in TQM movement through the decades. He maintained that every single defect is preventable (Mohanty and Lakhe 2000). He supported the role of management and organizational methods over statistical techniques for shifting ethnicity and attitude (Evans and Dean 2000).

Crosby's TQM idea is encircled in 4 absolutes as follows:

1. **DIRFT- Do it right the first time-** Crosby suggested that for attainment of DIRFT some vital requirements should have been defined noticeably, simultaneously both customers and suppliers must have understanding of them. Afterward, it is the priority of the management to convey these requirements to the mighty workers along with pursuance and support them to meet those.

2. **The system of quality is prevention-** Crosby forced that the system of quality should be prevention rather than post-production inspection, for avoiding high appraisal costs. He argued that attainment of quality with high appraisal is not viable but simultaneously it is an expensive way. What actually matters is preclusion of defects.

3. **The performance standard is zero defects-** Crosby interpreted that in an organization thousands of miniature actions take place alongside. Every action should be possessed full proof before performance, to accomplish the whole thing correct and defect free. Each employee should portrait in their mind to recognize the importance of all these actions. Zero defects should be the performance standard of an organization.

4. **The measurement of quality is the price of non-conformance -** Crosby segregated the quality costs

into two components: the price of conformance and the price of nonconformance. The price of conformance is stated to be the sum which is required to pay out in order to craft things correctly. Prevention effort cost, statistical tool cost and quality training cost comes under it. The price of non-conformance comprises all expenses incurred in doing things wrong.

To go through the concept of TQM, we must pay attention towards the journey and philosophies of Pioneers. It is evident from the theories of TQM pioneers that quality culture is the need of hour. Finally, Table 1 is portraying the journey of these quality pioneers.

Table 1: Journey of Quality Pioneers

Pioneers → **Area of concern ↓**	**Deming (1900-1993)**	**Juran (1904- 2008)**	**Ishikawa (1915-1989)**	**Feigenbaum (1922-2014)**	**Crosby (1926-2001)**
Biography	Born in USA BS from University of Wyoming MS from University of Colorado Ph.D. from Yale University	Born in Romania later immigrated to USA BS from University of Minnesota Law graduate from Loyola University Chicago School of Law	Born in Japan Ph.D. from University of Tokyo	Born in USA BA from Union College MA from MIT Sloan School of Management Ph.D. from Massachusetts Institute of Technology (MIT)	Born in USA Undergraduate from the Ohio College of Podiatric Medicine

Contribution as an Academician	1924- 25 Assistant professor of physics in University of Colorado 1927- 39 Mathematical physicist in the department of agriculture 1930- 44 Lecturer in National Bureau of Standards	1945- 1951 Adjunct professor of industrial engineering in New York University	1947 Associate professor in University of Tokyo 1960 Full time professor in University of Tokyo		
Contribution as an Engineer or Management Consultant	1940- 1950 Consultant to secretary of war and defense	1924 Worked in inspection department of Western Electric's	1939- 1941 Naval technical officer 1941- 1947	1945 Worked for US air force in engine design of P-38 and P-47 fighters and naval aircrafts	During World War II and again during the Korean war he served in the navy

	1942- 1953 Advisor for sampling, bureau of the budget 1993 Founded W. Edwards Deming institute in Washington, DC	1925 Served as second lieutenant in US army signal corps reserve, signal intelligence division. Later promoted to captain 1926 Worked in specially created "inspection statistical department" of Bell Telephone Laboratories 1942 Appointed as an assistant administrator in-charge of the reports and records division of lend-lease	Worked at Nissan liquid fuel company 1949 Joined JUSE 1952- 1978 Chief editor of Hinshitsu Kanri (Statistical Quality Control), which was a monthly magazine published by JUSE 1971 Director of JUSE 1971- 1974 Vice chairman of Japanese Society for	1958- 1968 Became the world-wide director of manufacturing operations at the General Electric company. Later appointed as president and CEO of General Systems company 1961-1963 President of the American Society for Quality (ASQ) 1988 Appointed to the first board of overseers of the "Malcolm Baldrige National Quality Award" program by the secretary of commerce in Washington, D.C.	1957 Joined the Martin company in Florida as a senior quality engineer 1965 Received an invitation from the ITT corporation to become its quality director 1979 Established Philip Crosby Associates (PCA), a quality management consulting firm

		1949- 1979 Started personal freelance consultancy with about 40 clients namely: International Latex Co., Bausch, Lomb Optical Co., General Foods Corporation 1979 Founded the Juran institute	Quality Control (JSQC) 1974-1975 Elected as president of JSQC 1980 Appointed as the Chairman of MITI's nuclear power plant quality assurance review committee		1991 Founded Career IV 1997 Founded Philip Crosby Associates-II (PCA II)
Key Principle or Theory or Findings	1949 Introduced PDCA cycle Best known for • his 14 key principles to	1941 Began to apply the Pareto principle Best known for • Management Theory- extensively	1962 Introduced the concept of "Quality circle" in cooperation with JUSE 1982	1943 Used the term "Quality costs" 1951 Introduced "Total quality control" concept	1961 Created the "Zero defects" concept Coined the phrase "Quality is free"

	managers for transforming business effectiveness (Published in Out of the Crisis) • his system of thought which he called the "System of profound knowledge" • "Seven deadly diseases"	credited for adding the human dimension to quality management • Juran Trilogy	Introduce "Cause and effect diagram or fishbone diagram" Put the concept of "Internal customer"	1961 Used the term "Total quality management"	
Awards and Achievements	1955 Received the "Shewhart Medal" from the American Society for Quality Control	1981 Awarded with the "Second Order Medal of the Sacred Treasure" by the Emperor of Japan. This is the highest award Japan can present to a	1952 Awarded with "Deming Prize" for individuals by the Deming Prize Committee in Japan	First recipient of ASQ's "Lancaster Award" 1965 Awarded with ASQ's "Edwards Medal"	1964 Received the "Civilian Service Medal" for creating the zero defects concept

	(ASQC) 1987 Then President of USA Ronald Reagan awarded him with "National Medal of Technology and Innovation"	foreigner	1972 Awarded with ASQ's "Eugene L. Grant Award" 1977 Japanese government presented "Blue Ribbon Medal" 1982 Awarded with "Walter A. Shewhart" 1988 Awarded with "Order of the Sacred Treasures", second class by the Japanese government	1988 Awarded with "Medaille G. Borel" by France, the first American to be honored so 1996 Asia-Pacific quality organization awarded him with "Ishikawa/Harrington Medal". He was the first recipient of this award. 2008 Then President of USA George W. Bush presented him with the "National Medal of Technology and Innovation".	1981 Awarded with ASQ's "Edwards Medal" 1985 Awarded with "Central Florida Marketer of the Year" 1986 "Outstanding Philanthropist of the Year" award by Society of Fundraising Executives 2000 YMCA

					International Management Council awarded him with "W.M. McFeely Award"
Major Books	1939 Deming edited a book written by Shewhart titled as "Statistical method from the viewpoint of quality control" 1943 Published "Statistical adjustment of data" 1982	1951 Published the "Quality control handbook" 1964 Published "Managerial breakthrough" 1970 Published "Quality planning and analysis" 1988 Published "Juran on planning for quality"	1980 Originally titled "QC circle koryo" in Japanese later published in English titled as "General principles of the QC circle" 1985 Published in english "What is total quality control? The Japanese way" which was originally published in Japanese	1951 Published " Quality control" 1961 Published "Total quality control"	1979 Published "Quality is free" 1984 Published "Quality without tears" 1999 "Quality and me: lessons from an evolving life"

	Published "Quality, productivity and competitive position" 1986 Published his classic work "Out of the crisis" 1993 Published "The new economics for industry, government, education"		in 1981 titled as "TQC towa Nanika-Nipponteki Hinshitsu Kanri"		
International Recognition	1947 Involved in early planning for the 1951 Japanese	1954 Got invitation from Japan to deliver a series of lectures	1993 For recognizing him, ASQ named a national medal	1997 "Feigenbaum Medal" was established by Quebec Society for Quality	1995 "The Crosby Medal for Competitiveness

	census 1950 After an invitation from JUSE, Deming presented his courses to 230 engineers in Tokyo 1950 JUSE established "Deming Prize" behind his name 1987 USA established "Malcolm Baldrige National	1956 JUSE published a book "Planning and practices in quality control" from collection of Juran's 1954 lectures 2004 An honorary doctorate degree was awarded to him by "Lulea University of Technology" in Sweden	portraying him as "Distinguished pioneer in the achievement of respect for humanity in the quality disciplines"	1998 ASQ established the "Feigenbaum Medal" to be granted annually for excellence in performance 2005 "Feigenbaum Leadership Excellence Award" was established in Dubai 2011 "Armand V. Feigenbaum Lifetime Achievement Medal" was established by the Asia Pacific Quality Organization (APQO) and the Walter L. Hurd Foundation	through Quality" named in his honor by the American Society for Competitiveness

	Quality Award" which was equivalent to the "Deming Prize" of Japan				
Memberships	1947- 1952 Member of United Nations sub commission on statistical sampling 1986 Elected to the "National Academy of Engineering" and to the "Science and Technology Hall of Fame" in Dayton	1946 Member of ASQC and also appointed as member of editorial board of industrial quality control 1981 Named honorary member of ASQC 1988- 91 Served as member of the "Malcolm Baldrige National Quality Award" board of overseers	1971 Member of the preparatory committee for the founding of the JSQC 1976 Member of the board of directors for JUSE Press, Ltd. 1982 Named as an honorary member of the JSQC	Member of the Advisory Group of the U.S. Army Life member of the Institute of Electrical and Electronics Engineers Life member of the American Society of Mechanical Engineers Life member of Plymouth Society of Marine Biology	2001 Named as an honorary member of the ASQ

	1991 Inducted into the Automotive Hall of Fame.				
Leading Feature	Control of Variables	Fitness for Purpose	Companywide Quality Control	Total Quality Control	Zero Defects

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