

# INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT & MANAGEMENT

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## COMPREHENDING AND IMPLEMENTING BEST PRACTICES OF QUALITY MANAGEMENT ACROSS INDUSTRIES

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### ABSTRACT

The paper aims to comprehend the quality co-creators and documents how quality philosophies applicable to automotive manufacturing are definitely distinct from quality implementations in the healthcare services industry and how the study may extend to research in other sectors. This study does a review available on the differences associated with quality implementations, challenges and differentiating quality in the manufacturing and healthcare services industry. There are successes and challenges of comprehending and implementing quality in the manufacturing and health care services sector. There are valuable discussions on developing paradigms and quality concepts for both these sectors and how the customer becomes the value co-creator for innovation in products and services. The manufacturing and the healthcare services industry provide perfect instances of quality in their processes. The Japanese manufacturing provides a learning opportunity in customizing for health care services in making quality profitable and quality implementation effective and the healthcare industry, an example on delivering care processes and methodology for improving businesses by eliminating waste, reducing expenses and enhancing satisfaction. The research is limited to literature that is available and future studies require further research on how quality standards gets developed for different sectors. Future studies may explore on customer as a quality co-creator for innovation of products and services. Integrating customers in the social innovations development for quality improvements in the innovation of products and services may require study. This study explores the differences between quality implementations in two sectors and provides valuable discussions on extending the studies to other industries.

### KEYWORDS

Juran, six sigma, Deming, total quality management

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### INTRODUCTION

Management gurus such as Deming, Juran and Crosby focused on quality by studying them and defined the different quality measures that establishments needed to implement making processes and products better suited to customer satisfaction. Quality defined by management gurus differ. Deming emphasized on process improvements and use of statistical process control charts. Crosby discussed on zero defect specifications and do it right the first time. Juran's focus on quality popularly called Juran's philosophy has the three significant quality parameters of *quality planning*, *quality control* and *quality implementation*. These individuals were three important contributors to *total quality management* that firms learnt from if they had to zero in on defects and produce the best possible products and services. The resounding success of firms especially those of Japanese firms mainly attributes to excellent practices in quality management. First, this study discusses Kawasaki, a Japanese automotive company that successfully implemented quality management. Why were companies like Kawasaki able to provide greater quality products at affordable prices? Did Kawasaki make any tradeoffs with performance attributes and cost to deliver greater quality products? A perfect example of quality management, Kawasaki, brought in notable effectiveness in quality at the same time being cost effective. The resounding success of Japanese manufacturing units and service units were a perfect cause for other companies to think about implementing quality in their processes and practices. Quality is one of the most important reasons why Japanese firms were able to establish in markets of America. They were able to secure a market share in America due to deficiencies in the quality and performance of products created by companies there. The Japanese were able to define and incorporate perceived quality into manufacturing of automobiles that appealed to the customer during decision making in the vehicle purchases. In literature, this perceived quality is one of the five core elements of a firm's brand equity (Cole and Flynn 2009) along with other factors such as loyalty towards brands, brand awareness; brand associates and defined proprietary traits of quality such as patents, trademarks and associates. This in turn adds value to firms selling automobiles by profiting from pricing; building the brand portfolio; automobile differentiation and customer willingness to purchase the vehicle. For the healthcare industry, value systems are necessary to healthcare quality (Azam et al. 2011). Quality is the best performance measures across all industries. The product sector improves by quality implementation for remaining competitive.

Continuous improvement in quality has also led to defining new measures of quality such as vehicle safety (Cole and Flynn 2009). Two very different industrial sectors are leading the way in quality implementation due to their adherence to total quality management in all their procedures, processes and techniques. In the automotive sector, Kawasaki motors has adhered to *six sigma* quality measures in implementing almost zero defect products and in the health care service industry, The Red Cross Hospital (Netherlands) services has adhered to quality in service performance. The health care services industry is an example of quality implementation on how they comprehend quality management concepts of quality gurus such as Deming, Juran and Crosby and have applied them to the services sector where the customer needs are both tangible and intangible. Other quality implementation scenarios are discussed from these two industry sectors. Both these industry sectors have incorporated either Juran or Deming's philosophy to quality. The two industries apply quality management from different perspectives and are able to implement the quality objectives by customizing and evaluating required quality parameters. Studies on literature in healthcare emphasize on developing integrated healthcare models.

These take into consideration customization of the use of SERVQUAL, a tool used in measuring:

- Customer expectations and service perceptions
- Facility management
- Quality management
- Internal quality and service capabilities
- Evidence based management from leadership and governance for continuous improvement in service quality
- Requirement for team quality in hospitals

g) Re-evaluation and Total Quality Management (TQM) implementation (Azam et al. 2011; Mosadeghrad 2014; Esain et al. 2011; Rubenstein et al. 2013; Abdallah 2013)

Quality function deployment (QFD) requires customizing and integrating care procedures for patients during continuous quality improvement programs. The QFD customization along with the Pareto analysis in an integrated service delivery system has facilitated the necessary performance measures identification useful for effective quality assurance in healthcare (Vanteddu and McAllister 2014; Thor et al. 2008). In firms such as Medtronic Inc. in the USA that manufactures devices that improve cardiovascular and neurological health of patients worldwide, the quality improvement in manufacturing is associated with excellence in manufacturing, timely production and a *quality improvement* process (Atherton and Kleiner 1998). It has deployed a quality concepts training program and 40 quality improvement teams for its customer-focused quality (CFQ).

#### APPLICATIONS OF QUALITY IN MANUFACTURING: KAWASAKI MOTORS

Quality concept of Deming in the manufacturing industry was the greatest contributor to present day management thought processes. He laid the foundation for many manufacturing industries to bring in their best product and service. Most Japanese manufacturing units owe their tremendous success to Deming's teachings. The basic premise of quality management is that it is possible to provide good quality products and services to customers at a much lower price and firms will become profitable in the end if they incorporate quality. Crosby also spells this on how establishments can profit from comprehending the costs of quality (Ghobadian and Speller, 1994). His philosophy was that only firms that were doing well knew this and others were ignorant of this. Deming's concept to quality was a four-rule process called the plan, do, check and act popularly called the PDCA, also called the Shewart cycle (Rienzo 1993). Customizing the PDCA cycle needs to coordinate with the QFD for ensuring customer comfort with healthcare services (Vanteddu and McAllister 2014). A manufacturing unit that manufactures motor bikes will have to adhere to the PDCA if they have to bring in quality to their product. Established firms that are into manufacturing will benefit if they adhere to Deming's proposal. In manufacturing units inspecting a lot of defects in the manufacturing process, these defects need to be set right before the final output is ready. Hence, Deming's proposal about the 14-point strategy for quality concentrates on the knowledge that employees ascertain about the management, the establishment and the deployment of work flow processes (Rienzo 1993; Ghobadian and Speller 1994). Any manufacturing unit needs to optimize its total systems knowledge at work. No individual sub system in manufacturing can work independently of another. For example, in the manufacture of motorbikes, the engine division cannot work independently of the other division. They adopted profound knowledge systems with the theory of optimization (Rienzo 1993). For a manufacturing firm to incorporate quality, the total system should focus towards the firm's long-term objective of creating a winning situation for all its customers, employees, suppliers, the community and the environment. Kawasaki won the global race for Caterpillar bronze award in 2009 after it became the first in the hydraulic business to receive a bronze award across all its manufacturing sites. The firm was delighted to achieve the Supplier Quality Excellence Process Bronze status from Caterpillar. The strong values and ethical principles in conducting business and the commitment to collaborate with the objective to implement a culture for "zero-defects" across the supply base was the reason for this excellence. *Quality processes* at every production stage is significant. As quoted by Kawasaki Precision Machinery's (KPM) General Manager Steve Cardew: "This is a fantastic result as for 15 years our success is the result of a determination to produce the greatest quality products in the world. Now we are proud to be recognized for that quality, as well as delivery and performance, and the next step is to achieve silver." This manufacturing unit made several improvements in its specific areas of operation especially in safety and lean manufacturing. The supply base optimization at Caterpillar and Kawasaki required years of consistent greater quality deliverables. The materials purchased by KAWASAKI for its motor bike parts is of the greatest quality regardless of the cost of manufacture as it would have resulted in manufacturing defects at the cost of the system. Inferior material may lead to adjustment and repair during manufacture and assembly and it may come to such a stage that the product gets withdrawn. Kawasaki's design of production parts has not seen many variations in recent times due to the improving performance quality though there were variations before. Variation control was due to product improvements and meeting changing engine designs that were part of the quality improvement process. Kawasaki's adherence to Statistical Process Control and *control charts* to demonstrate variation in processes and its keen knowledge of how to determine if a process is in statistical control has led to greater quality performance in all systems and sub systems. It is generally felt that if the whole system is optimized and standardized, there will not be any variation. However, even with the same inputs, production results can differ due to human and machine errors. These are statistically controlled. This system is very much in vogue in Kawasaki where the source and range of variation can be easily identified using statistical control tools. Whereas in the healthcare industry, literature have discussed the necessity for a Human Resources Management (HRM) evaluation of measures and criteria specified by the Deming Prize, Malcolm Baldrige National Quality Award, European Quality Award, and George M Low Quality Award (Azam et al. 2011; Abdallah 2013).

In another perspective regarding awards and recognition within healthcare services industry, Baxter Healthcare Corporation in the USA that manufactures products that treat kidney, heart disease, blood disorders and perform blood processing, award programs recognizing employee's ideas for improvement in service quality and cost optimization systems saved Baxter millions of dollars every year. This became motivational factors for its employees (Atherton and Kleiner 1998). Medtronic Inc. in the USA, a company that manufactures products in cardiovascular and neurological healthcare has created an awards program that recognizes employee for their participation in product and service quality improvement. The pharmaceutical industry has demonstrated innovation and management successfully using quality implementations and quality improvement programs by knowledge development, medical innovations and creating revenue (Kim et al. 2016). The focus is on healthcare technologies development; process and knowledge creation and conceptualization; healthcare value systems, supply and logistics; and healthcare systems, quality and social technologies.

The other most important tool that Kawasaki used for quality was a working Research and Development wing establishment manned by experts in dynamics and motorbike production techniques. The R and D division at Kawasaki was like a school because it learnt that knowledge does not grow out of experience alone. There should be theoretical experience conceptualization and the results of the experience charted. The cause and effect associates establish validated results. Standardizing is possible only if there is a theoretical base.

In the case of healthcare provided by a Swedish hospital, concurrent implementation of quality improvement programs added to the coordination efforts at the establishment (Nyström et al. 2013). This has resulted in the hospital establishing a learning initiative in quality for continuous improvement. The hospital now focuses on leadership for holistically managing dynamism and transitions to facilitate coordination; network management for innovation and knowledge sharing in the area of specialization through learning seminars and improving hygienic conditions in hospitals to prevent contracting diseases. At Baxter Healthcare Corporation in the USA, the Quality Leadership Program (QLP) for services focuses on continuous improvement; total employee participation; prevention, defect-free work; and accomplishing customer requirements (Atherton and Kleiner 1998). In terms of quality implementation in manufacturing, the company's intention of becoming an organization of excellence has facilitated quality in *Computer Integrated Manufacturing* (CIM); statistical process control; standardization and simultaneous engineering. Another Swedish hospital was able to apply quality improvement in improving program effectiveness over five-years of time and standardize it (Thor et al. 2008). Similar studies have demonstrated quality improvements in learning by applying the PDCA (Esain et al. 2011). Some studies in healthcare services have identified that continuous quality improvement in certain contexts may not be associated with the PDCA concept and cannot be standardized (Rubenstein et al. 2013).

In the automotive industry, Kawasaki makes use of Deming's rules to quality in its truest. Every process, be it manufacturing or supply chain adheres strictly to the rules given by Deming.

Kawasaki is Deming's baby because Kawasaki has absorbed Deming's principle of quality and implemented these objectives:

1. Kawasaki's objective of purposeful improvement towards its product is to remain competitive and to provide employment.
2. Kawasaki has ushered in the new philosophy by comprehending the economies of scale through the incorporation of new management techniques and consideration of new leadership challenges.
3. Kawasaki has built quality control systems before setting up manufacturing. So it is always quality first and then process.
4. They have brought in the cost revolution by optimizing and identifying with one supplier to usher in loyalty and trust.
5. Constant improvement in production systems to improve productivity through processes has led to decrease of expenses for Kawasaki.
6. Kawasaki's training institutes for in house employees brings excellence to the automobile industry.

7. Leadership of Kawasaki has turned and brought in a revolution and supervision is of the greatest order and target.
8. People working at Kawasaki have no fear so they work with happiness and contentment. There are no barriers of communication in any department and between departments. The entire unit works as one.
9. Kawasaki has never emphasized or exhorted and solicited targets for zero defects and new levels of productivity. Though quality is a chief parameter it is subtly introduced.
10. The factory floor has no work quotas, there are no management by objective, instead it is management by substitution.
11. Kawasaki has instituted workmanship pride by giving away awards for excellence in workmanship. It has changed the responsibility of supervisors from numbers to quality control.
12. The opportunity given to workers for advanced education and research is the best technique for instituting loyalty and self-improvement.
13. Kawasaki says, "Everyone is a part of transformation. So let us work towards it".
14. Kawasaki allows changes to happen from within and welcomes participative suggestions (Rienzo 1993).

**USE OF PERFORMANCE MANAGEMENT AT KAWASAKI MOTORS**

Kawasaki’s quality processes are significantly simple in nature. The quality process applied by Kawasaki is simple design and institution of training its work force. Every employee has to undergo training workshops at least once in 6 months. No one is exempt from training. Training allows employees to comprehend production techniques and institutionalize changes. Deming recommended that incorporating statistical thinking through training is necessary so workers can appreciate variation (Rienzo 1993). So does Ishikawa, another revered quality guru on the need for training employees in manufacturing and services for customers by learning process flow charting; audits, statistics, pareto analysis; schemas for quality control and control charts (Ghobadian and Speller 1994). Kawasaki has formalized its performance management systems and processes. "Formalizing the process would remove some of the perceived ambiguity and arbitrariness that employees feel and increase the manager consistency and supervisors who manage subordinate performance," said Donell Rubidoux, who took responsibility for leading the way for the establishment to increase the employee productivity by deploying performance management. This aims at imparting quality techniques to employees that Kawasaki conducts regularly. In fact, it is said jocularly that employees at Kawasaki attend more school hours than work hours. This has led to superior performance and great leadership. Being able to translate company goals and vision into action for subordinates is important for the leadership as they institute improvement methodologies. Training and excessive stress on self-development has brought about the world’s best turn around leadership that has made Kawasaki the number one player in the industry. This has spurred quality concept implementation to work force transformation and driven out fear and has created trust and brought in lot of innovation. Deming encouraged that people perform better in establishments when they feel secure and eliminate fear. This works in the favor of leadership within their establishment when optimizing system performance for delivering product and service quality (Rienzo 1993). Workers are no longer bothered about numerical quotas. Instead, they have worked towards institutionalizing methods for improvement. Deming insisted that quality and productivity in manufacturing and services improve from replacing quotas with taking initiatives that encourages workmanship and stabilizing the system performance with teamwork (Rienzo 1993; Ghobadian and Speller 1994). The leadership at Kawasaki is very inspirational as it has prodded on great levels of output and a technically very strong team of robust well knowledgeable engineers pride themselves in working at Kawasaki. The implementation of quality is so simple that everyone in Kawasaki needs no introduction to it. It is also very important to understand that almost 90% of the work forces at Kawasaki are permanent employees and promotions happen from within. Hence, performance management is the target. This performance management is one of the total quality management attributes. The work ethos at Kawasaki has broken down barriers between areas; fostered mutual trust, respect and admiration for everyone’s work. A notable contribution in quality processes is the nonexistence of internal and external barriers that break the information flow. Hence everyone within and outside the establishment are able to perceive the internal and external barriers that impede the information flow, and prevent entities from perceiving establishment agendas, and foster the quality management pursuit between cross functional teams and change in customer attitudes and associated parties by a better way of comprehending attitude and work culture. Similarly, another company named Windsor Export Supply, a division of Ford Motor Company faced problems with Freight auditing and was able to apply Deming’s philosophy to correct discrepancies in the information flow for reducing the time to process an invoice receipt and issuing checks for payments (Rienzo 1993). US companies in the auto sector faced similar problems in not being able to perceive the market needs and getting comfortable with their secure market niches and ways of functioning (Cole and Flynn 2009). It can be said that Kawasaki has become a leader only with a carefully chalked out management process that has aimed at quality and customer satisfaction with impeccable standards of customer and employee facilitation to bring in excellence in purpose, deliverables and workmanship.

Innovation and sustainability can happen only if there are continuous quality implementation programs. It is justified by Kawasaki that their dedication to implementing the industry best practices has made them the leaders of the market. Notwithstanding challenges, they have been able to incorporate quality in all their processes.

**FIGURE 1: APPROACHES TO QUALITY IN A SERVICE INDUSTRY: JOSEPH M JURAN’S TRILOGY AS APPLIED TO HEALTH CARE SERVICES**

**THREE UNIVERSAL PROCESSES OF THE JURAN TRILOGY®**



(Source: Business 901 - Building Funnels of Opportunity, 2011)

Joseph M Juran’s application to quality management is similar to Deming’s 14-points on quality implementations. Juran focuses on his trilogy of quality planning, quality control and quality improvement. According to Juran, firms face quality problems because of the constraints imposed by the top management rather than at the operational level (Kolesar 2008). Taguchi has insisted that the inadequacies in product and service design quality add expenses to society (Ghobadian and

Speller 1994). The losses for the establishment in manufacturing require optimizing costs. Juran defines quality as “fitness for use”. Some literature phrase product or service quality as “fitness for purpose” (Ghobadian and Speller 1994). According to Juran, any establishment that is quality defined needs to have constant activity spirals like market research; product development and design; instructions for production process control and testing with appraisals from customers. Interdependent departments in an establishment need establishment wide quality management. The top management must define quality management according to Juran. To bring in superior quality processes any establishment has to invest in planning infrastructure. Juran organizes his quality program into three facets. The planning that includes the process of preparing to meet quality needs, the process of meeting quality needs during deployment and the process of reaching unprecedented performance. Juran’s application to quality bases its concept that quality once instituted needs continuous upgrades so that quality systems are still in place. Quality dynamics require support at all management levels. No establishment is complete without some quality update happening regularly. Quality needs to be underway across the entire establishment (Ghobadian and Speller 1994). Health care services cannot be defined on a basis quantitatively as they are intangible, inseparable to performance parameters, variable from time to time and are generally perishable in nature in the sense that service definitions keep changing from time to time depending upon people’s way of living prevalent at that time. These peculiar health care service characteristics pose a great challenge to firms’ providing these services. The attributes that are closely associated to health care services need identification with some sort of quality definition and the necessity of quality incorporation in the service provision. Not only was this service intangible, it became very difficult to measure quality service. This led to arguments about improving service quality and implementing quality across all deliveries. Juran’s trilogy of quality management unified the quality management concepts and brought them together as a system (Bisgaard 2007) known as the Juran’s Trilogy. Juran’s excellent definition defined quality as ‘fitness for use’ of a product or service, a definition based on meeting customer needs. This adherence is also rephrased as “fitness for purpose” (Ghobadian and Speller 1994). The design of a technique, product, or service applies to features, while freedom from deficiencies applies to the delivery (Juran and Godfrey 2005). For example, any health care program would require the program beneficiaries to undergo a basic pathological set of tests for assessment before entering the program. If the test is not identifiable or defined, then the purpose of a quality health care program will be lost. Juran’s trilogy of *quality planning*, *quality improvement* and *quality control* intend impeccable standards of health care services to the customers. Any health care service needs to discover and correct its problems and defects through a documentation system. Parkview Episcopal Medical Center was able to incorporate Deming’s philosophy of quality improvement and reduce delays and that too from forty eight percent occurring in delayed surgeries due to late arrival of doctors and increased setup time of the operation room in the mornings to an improvement in punctuality to about eight percent (Rienzo 1993).

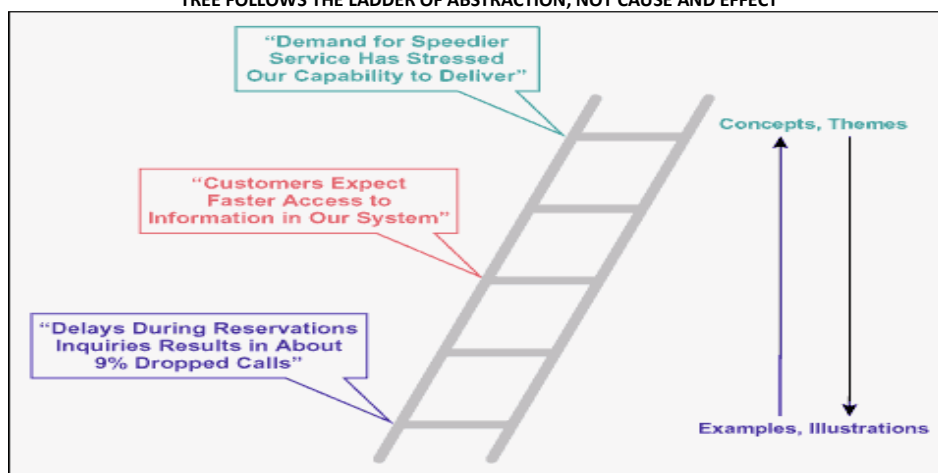
A health care service’s implementation of quality is by establishing the agenda that the quality program would result in, identifying customer sectors with health care services and determining the imminent customer needs. It would also require designing of features to meeting customers’ needs, develop processes to meet the quality plans and thereafter transition the quality process to deployment. Juran’s second focus is on quality improvement as health care services can never rest on complacency and require timely recharges on quality deliverables. Improvement in quality health care services can happen only by identification of infrastructure needs for improvement, training for teams, resources and remedies to manage control of the profitability resulting out of quality implementation. A health care service should be consistently improving its quality of deliverables. Quality control in health care services should be able to evaluate performances that are currently running, compare the outcomes with those that are in practice and act prudently on the difference.

**USE OF SIX SIGMA TOOLS TO BRING IN QUALITY IN HEALTH CARE SERVICES**

Health care services have extensively used quality to bring in top rated professional healthcare. A hospital in Northampton, Massachusetts used Six Sigma Quality Planning (QP) to create an employee vaccination process that continues to save money and offer a better quality and a more comprehensive service (Kaplan et al. 2009). The Red Cross Hospital (Netherlands) implemented Six Sigma (QI) into the ISO 9001:2000 system saving 1.2 million Euros annually, significantly improving quality (Heuvel et al. 2005). Other studies have demonstrated similar savings of €1.2 million with the successful implementation of *six sigma* in 22 hospitals out of 44 hospitals considered for a study on *six sigma* implementation (Abdallah 2013). The application of quality in health care requires continual need for a good and affordable healthcare program that respond to the needs of various customers including the practitioners of healthcare and government agencies that facilitate health care programs. The use of *six sigma*, a superior measure in quality planning requires systems to analyze and define the quality program in health care services with community participation for responsibly creating and bringing a healthy lot of citizens leading to standardization, best practices and assessment and addressing to the health care needs in communities that depends on public policy. This would also lead to participation of people in health care programs defined by income levels. Deficiencies in quality can be measured by *six sigma* measures that tabulate the planned and the expected from delivering quality health care. The health care system similar to the one illustrated in *Figure 1* in the previous page should be able to take care of the human error of sampling and communication in testing the data and fitting it into a quality measure that makes way for consistent improvement. Development, validation and implementation improve quality of services and *six sigma* implementations. *Six Sigma* implementations need to consider adhering to healthcare service needs by ensuring better information flow and timely facilitation of services. This illustrated in *Figure 2* where the quality of the healthcare service demonstrates a ladder of abstraction and not a cause and effect way of functioning. Health care services may also use the SERVQUAL model to measure the service quality by assessing customer expectation with service quality. Though health care services concept changes from sector to sector, the health care practices delivery meter down to just another ordinary *six sigma* quantitative measure. Service sectors have used the SERVQUAL measure to quantify service and on the contrary, health care services commonly use simple quality techniques that do not go in for any strict adherence to qualified quality procedures. Health care quality initiative sustainability discussed widely and researched suggests that Juran’s trilogy for quality will be most suited.

The justification of using the *six sigma* concept to quality implementation in health care industry is to zero out the defective practices that may result in poor quality health care to people and community. Since it is a service attribute, expectations are that defects lean out to almost nil.

**FIGURE 2: SIX SIGMA IN HEALTHCARE INDUSTRY  
TREE FOLLOWS THE LADDER OF ABSTRACTION, NOT CAUSE AND EFFECT**



(Source: isixsigma.com - 'Tree Diagrams for Six Sigma: Plain and Simple?')

**CONCLUSION**

The QS 9000 suitable for the supplier parts industry is a noteworthy quality system standard as best practices for implementing quality developed by integrating the quality systems at Chrysler, General Motors and Ford (Brown 1997). It incorporates the basic standard requirements of the ISO 9000. The manuals focus on advanced quality planning and control, failure mode and effects analysis, measurement systems, statistical process control and production parts approvals. The implementation takes into consideration an implementation team, management supervision, project management, documentation, audits, information systems registrations and maintenance. Other industries may benefit from developing similar industry standards in developing products and services of a greater quality. Quality implementations may greatly benefit from customer participation in the development of products and services of a greater quality for innovativeness. Businesses and services are now integrating customers into learning systems while developing products and services of a greater quality. Statistics has demonstrated that customer participation in *value co-creation* in learning systems is significant taking into consideration *people usage of information and communication technologies (ICT); people usage of new services and products; values added from ICT to new businesses; values added access to basic services; government investment in telecommunications; secondary education gross enrolment rate (percentage); energy and utilities and affordability*. Industries may now focus on customer as the value co-creator in improving quality deployment and implementations.

It is imperative to track the process life cycle attributes in manufacturing and services for achieving greater performance without deviating from instructions and what requires implementation. Mathematical and statistical measures effectively measure quality. The *six sigma* and lean techniques are the most common of all quality measurement and the industry and health care services are striving for quality certifications to prove their sophistication to unstinted quality in their products and services. Customers' satisfaction is possible only if firms are able to stick to greatest quality performance and deliverables and this in turn would comprehend to a firm's commitment to quality leading to better performance. It is also significant to comprehend that whatever be the nature of the industry, the shop floor attributes to 100 percent quantitative quality and customers needing 100 percent qualitative quantity. A good quality management system should be able to make a manager comprehend attributes that are quantifiable, qualified and delivered to a customer and go along with a method of translating themselves into unambiguous quantifiable design parameters and manufacturing. The challenge of quality lies in converting this as a critical success factor. In addition, an integrated quality model is useful in healthcare that examines the patient-medical scientist – hospital interactive associative model that qualify as manufacturer-seller-product-customer and after-sales service or service industry mode (Azam et al. 2011; Rubenstein et al. 2013). The discussion in this article goes to show that the extent of participation between the customer and the firm necessitates the need for facilitating the customer as the co-creator of value (Mosadeghrad 2011). An example is how companies such as Medtronic Inc. of the USA have established Customer-Focused Quality (CFQ) programs that enable its global leadership strategy of providing quality products, services and comfort in conveniences for its customers (Atherton and Kleiner 1998).

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