The Ministry of Education of Azerbaijan Republic

Quality Improvement Of Manufacturing Industry By Using Approach And Implementation Of Six Sigma

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Initially, I would like to thank to my scientific supervisor, Xalid Javadov for his advice, encouragement and patientguidance. I am extremely lucky to have a supervisor who cared so much about my work and responded my questions so promptly.

Contents

Introduction

Rapid changes and development bring new insights into quality in industry and the concept of quality goes from a stable form to a dynamic form.Generally, the quality that occurs during production is based on the organization and management of a finished product. A complex and effective approach to the production process is an important element of quality assurance and upgrading.Developing and innovative production systems also contribute to the increased competition in the industry and the rapid development of quality.

There is a need for a new management approach in the industry sector in Azerbaijan, which has identified the development of non-oil industry and increased competitiveness of industrial products as one of the key economic targets. The study of new systems and the identification of their application will play an important role in increasing quality and productivity in industrial production in the future. 6 squeezing concept, which has been actively and widely used in the quality, management, and promotion of advanced industrialized countries and the world's leading industrial corporations for the last 20 years, is one of the most important of them.

Continuous improvement of quality in industrial production and its governance are essential not only for the production process but also for all industry trends. 6 The self-management itself is not a separate process from the presenter, it is a support system that completes it in a more efficient and more efficient way.

In our opinion, continuous research and application of six sigma and other quality improvement systems as part of and continuing of the industry reforms and programs will enable the Azerbaijani economy to achieve local products, food security, reduce import dependence, access to more competitive products with the international market and most importantly, the formation of a more qualitative and more reliable production system will result in an overall economic growth.

CHAPTER I. Six Sigma and quality's concepts and theoretical-methodological issues in the industry.

1.1 The concept of quality in industry and theoretical basis of the quality.

Quality is a complex and multi-dimensional concept. It is the satisfaction of the consumer by economically fulfilling the functions of a product that is essentially expected. Quality is now more important than it was 20 years ago. Twenty years ago, this concept has been taking place in every aspect of our lives, while only being mentioned for the product.

The description of quality depends on the role of the people defining it. Majority of consumers have a hard time defining quality, however, those people know it when they see it. Meaning of quality has changed during the period. Nowadays, quality does not have a single universal definition. Several people observe quality as “performance to standards.” Other people observe it as "satisfying the customer" or "meeting the customer’s needs" Also, there are many general definitions about quality. They are following the definitions of quality.

❖ The Concise Oxford dictionary – quality is ‘’A degree of excellence’’

❖ (2010) Defoe and Juran – quality is “Fitness for purpose’’

❖ British standards institutions 1991 – “the totality of specifications and characteristics that bear on the ability of a product or service to satisfy a given need”

❖ Peter Drucker “Quality in a product or service is not what the supplier puts in. It is what the customer gets out and is willing to pay for. Customers pay only for what is of use to them and give them value. Nothing else constitutes quality.”

❖ Robert M. Pirsig “Quality is a characteristic of thought and statement that is recognized by a non-thinking process. Because definitions are a product of rigid, formal thinking, quality can not be defined. But even though quality cannot be defined, you know what quality is!”

❖ (2010) Goetsch and Davis - quality is “dynamic state associated with processes, products, environments, people, and services which meet or exceed expectations and help produce the superior value” (p10. Quality management by Graeme Knowles)

The idea of value began in Japan when the nation started to modify after World War II. In the midst of the bomb rubble, Japan grasped the thoughts of W. Edwards Deming (1900– 1993), an American whose techniques and speculations are credited for Japan's after war recuperation. Amusingly enough, Deming's thoughts were at first laughed at in the U.S. Subsequently, TQM flourished in Japan 30 years sooner than in the United States. American organizations appreciated Deming's thoughts just when they started experiencing difficulty contending with the Japanese in the 1980s. Deming's administration framework was philosophical, in light of consistent change toward the ideal perfect. He trusted that a promise to quality requires changing the whole association. His theory depends on a framework known as the Fourteen Points. These focuses express the moves an association must make keeping in mind the end goal to accomplish TQM.

Quality is misconstrued by numerous who consider it just as it identifies with the last deliverable, yet a quality item is itself accomplished just through quality procedures concentrated on effectiveness, development, and persistent change, and these require a quality administration culture in our activities as well as inside our associations. In part two of his 1986 book, Out of the Crisis, Edward Deming exhibited 14 rules that he accepted could make the business more aggressive by expanding quality.

Authoritative upgrades can start with anybody. While it's valid that our expert space as venture directors is limited by the task life cycle, our impact is frequently substantially more noteworthy than that, and quality administration is one of those regions where gifted undertaking supervisors are most appropriate to be instrumental change operators - first in the way of life of their activities, and second, in the way of life of their areas of expertise and associations. As venture supervisors, on the off chance that we take after Deming's standards, we can make extend situations where

quality flourishes, profiting our clients and tasks as well as maybe filling in as a tipping point for affecting a quality administration change inside our associations.

Joseph Moses Juran (December twenty-four, 1904 – Gregorian calendar month twenty-eight, 2008) was a Romanian-born yank engineer and advisor. Juran, like Deming, was invited to Japan in 1954 by the Union of Japanese Scientists and Engineers (JUSE). His lectures introduced the management dimensions of coming up with, organizing, and dominant and centered on the responsibility of management to attain quality and therefore the would like for setting goals. Juran defines quality as fitness to be used in terms of style, agreement, convenience, safety, and field use. Thus, his construct additional closely incorporates the perspective of the client. he's ready to live everything and depends on systems and problem-solving techniques. in contrast to Deming, he focuses on top-down management and technical ways instead of employee pride and satisfaction. Juran was one in all the primary to put in writing regarding the value of poor quality.This was illustrated by his "Juran triplet," associate degree approach to cross-functional management, that consists of 3 social control processes: quality coming up with, internal control, and quality improvement. while not amendment, there'll be a continuing waste; throughout the amendment, there'll be exaggerated prices, however, once the advance, margins are higher and therefore the exaggerated prices area unit recouped.

Philip Crosby (June 18, 1926 – August 18, 2001) was business-man and author who contributed to management theory and quality management practices. He is another major contributor to the quality movement. In 1979, he left ITT (International Telephone and Telegraph) and wrote his book, Quality is Free, in which he argues that dollars spent on quality and the attention paid to it always return greater benefits than the costs expended on them. Crosby's response to the quality crisis was the principle of "doing it right the first time" (DIRFT). He also included four major principles. (The Five Pillars of TQM: How to Make Total Quality Management Work for You by by Creech, Bill, p 478)

1. The definition of quality is conformance to requirements (requirements meaning both the product and the customer's requirements)
2. The system of quality is prevention
3. The performance standard is zero defects (relative to requirements)
4. The measurement of quality is the price of nonconformance

Whereas Deming and Juran emphasized the sacrifice required for a quality commitment, Crosby takes a less philosophical and more practical approach, asserting instead that high quality is relatively easy and inexpensive in the long run. According to CROSBY, the main problems related to the orientation and determination of the deficiencies in production arise from the management the quality improvement program,, causing the lack of motivation created by these short-sighted managers and negatively affecting quality improvement. (Quality Without Tears The Art Of HassleFree Management ; Crosby Phihp)

Crosby mentions practically quality improvement methods in his work and emphasized that the areas of problem detection, trend, quality awareness, system approach, performance standard, measurement and application in business can be used to improve quality. He has been focusing on the steps that qualifications will take to become part of a job.

Armand Vallin Feigenbaum (April half-dozen, 1922 – Nov thirteen, 2014) was AN yank internal control professional and bourgeois. He devised the construct of Total internal control that impressed Total Quality Management (TQM). Argued that quality ought to be company-wide, not confined to the standard management departments. His contributions to the standard body of information include: "Total internal control is a good system for integrating the standard development, quality maintenance, and quality improvement endeavor of the varied teams in a company therefore on alter production and repair at the foremost economical levels which permit full client satisfaction."

Genichi Taguchi (1924 -2012) was an engineer and statistician. From the 1950s onwards, Taguchi developed a methodology for applying statistics to improve

the quality of manufactured goods. Taguchi has made a very influential contribution to industrial statistics. Key elements of his quality philosophy include the following:

- Taguchi loss function, used to measure financial loss to society resulting from poor quality;
- The philosophy of off-line quality control, designing products and processes so that they are insensitive ("robust") to parameters outside the design engineer's control.

Innovations in the statistical design of experiments, notably the use of an outer array for factors that are uncontrollable in real life, but are systematically varied in the experiment.(Genichi Taguchi; Subir Chowdhury; Yuin Wu (2005). Taguchi's Quality Engineering Handbook. John Wiley)

David Alan Garvin (1952 -2017) Ph.D professor of Business Administration Harvard Business School wrote an interesting article about "What does product quality really mean?" where:

He identified 5 major approaches of defining quality arising from scholars in 4 disciplines: philosophy, economics, marketing, and operations management. He built an 8-dimensional framework to elaborate on those definitions. Using that framework, he addresses the empirical relationships between quality and some important variables. (Garvin, David A. Managing Quality: The Strategic and Competitive Edge, Free Press, 1988)

There are five approaches to shaping quality that cowl the that means of quality to managers, operators, and customers: transcendent, product-based, user-based, manufacturing-based, and price based mostly approach. Also, there are eight crucial dimensions of quality that may function a framework for strategic analysis: performance, features, dependableness, agreement, durability, usableness, aesthetics, and perceived quality.

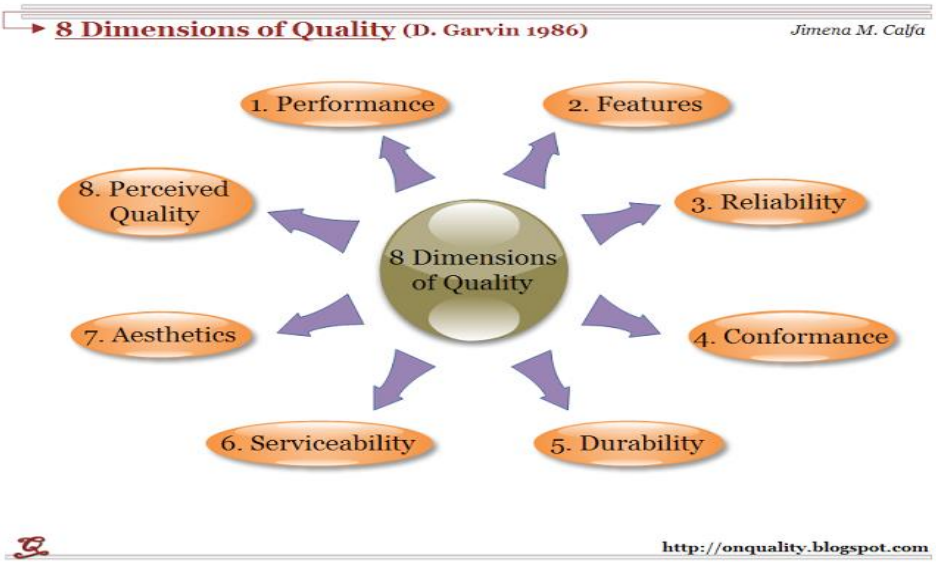


Table 1: Theoretical views and models about quality

Authors	Theories and models
W. Edwards Deming	**14 Points for Management**
Joseph Moses Juran	The Juran trilogy, Pareto principle
Philip Crosby	"doing it right the first time" (DIRFT), Defects (or ZD), Cutting the cost of quality
Armand Vallin Feigenl	Concept of quality costs
Genichi Taguchi	Taguchi method
Dr. David A Garvin	8 dimensions of quality

1.1.1 Quality in manufacturing

Manufacturing quality is different from the general quality concept. it well has to described with regard to attributes which are associated and required by a manufacturing process to control impeccably. Moreover, quality definitions in manufacturing generally focus on concrete product specifications. The most common quality definition in manufacturing is the degree to which product characteristics meet predetermined standards. it is generally reported that quality is a requirement and a characteristic of the industrial appliance. Thus,quality control is the tool used to

produce and control quality in manufacturing. There may be several formats which such manufacturing quality may be indicated. İt includes to them.

- According to agreed on standards of manufacture, the tendency to maintain the manufacturing process in control.
- The manufacturing's tendency process to produce goods or products impeccably.
- The tendency to maintain (or reduce) the variability of the production process, id est, to limit the process imbalances by holding the process repeatedly.

Thus, standardized, error-free production and repetition and diversity control have been used to describe the manufactured quality. (The Management of Quality and its Control by Charles s. Tapiero p 6,7,8)

1.2 Hıstorıcal Development And Concept Of Sıx Sıgma

The set of principles that comprise Six Sigma has its origins in the quest for quality in mass production, beginning in the late 18th century, though the field of statistics itself –upon which many of Sigma's tools are based- has been around for much longer. The fundamental establishments of Six Sigma as an estimation standard can be taken after back to Carl Friedrich Gauss (1777-1855) who displayed the possibility of the customary curve. Six Sigma as an estimation standard in item variety can be followed back to the 1920's when Walter Shewhart demonstrated that three sigma from the mean is where a procedure requires remedy. Numerous estimation gauges later went ahead of the scene, however, credit for authoring the expression "Six Sigma" goes to

a Motorola build named Bill Smith. (By chance, "Six Sigma" is a governmentally enlisted trademark of Motorola)

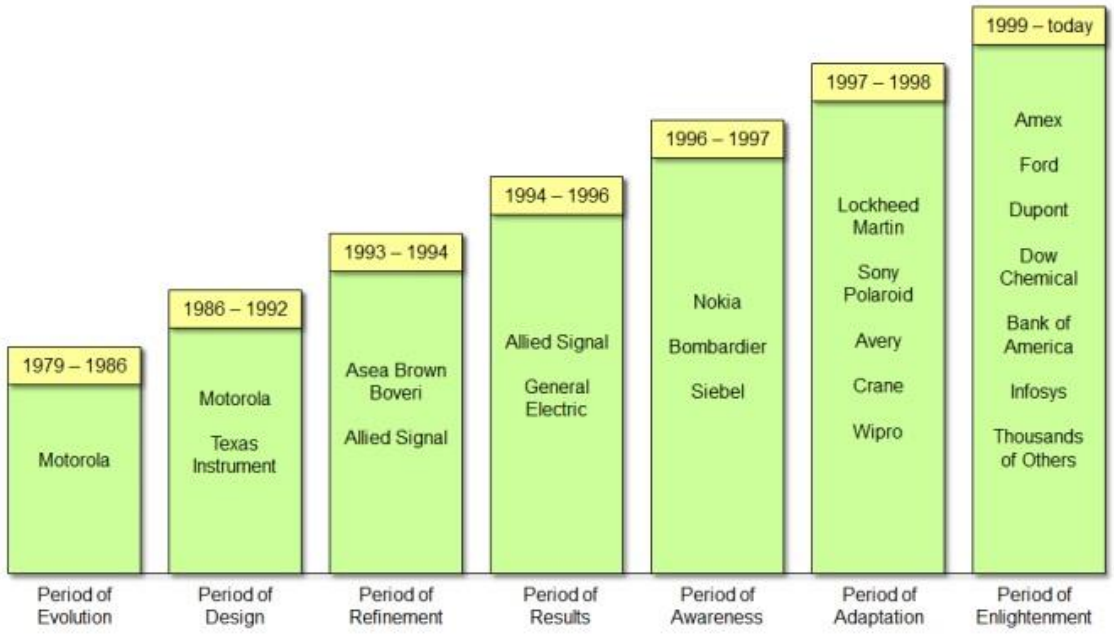
The progress of quality technology and understanding has been achieved by the development of sampling statistics at the end of the control method used in military materials during the Second World Warin America. This is followed by quality cost studies, statistical quality control studies, Total Quality Management and zero error concepts. In recent years, improvements have been made with Six Sigma studies covering all of them.

The Six Sigma approach emerged at the beginning of the 1980s when Motorola set up this approach in its organization. Thanks to this approach, Motorola has made it clear that most firms will raise costs in a period when they are adopting the philosophy of "creating high quality, high costs." GE (General Electric) and Motorola companies are organizations that use Six Sigma most impressively to improve efficiency and effectiveness (Eckes, 2005). The Motorola management that enforces the see efforts, a lot of time for achievement.

After realizing that it was of decent quality, starting to do similar work in the 1980s and working on Motorola' send favor to decrease inefficiencies in the processes. (Eckes G., 1954 Six Sigma For Everyone, John Wiley &Sons, Inc., Hoboken s.7) Six Sigma, which Motorola and GE companies put in to practice as a company strategy in the 1980s, is making huge gains in many companies today in the world.

In the 1980s and early 1990s, Motorola, like many American and European companies, lost its market share to Japanese competitors. Motorola's top executives acknowledged that their product qualities were not good. Like many companies, in that case, Company of Motorola was running more than one "quality" program, not just one. Just two years after starting to implement Six Sigma, Malcolm Baldrige was awarded the National Quality Award. Motorola Six Sigma is beyond being a set of tools; It is based on communication, education, leadership, teamwork, measurement, and customer focus. It applies business as a new way of inserting.

AlliedSignalbeganimplementingitsownqualityimprovementactivitiesintheearly 1990s. When it reached 1990, it achieved savings of more than $600 million per year thanks to extensive staff training on Six Sigma and the implementation of Six Sigma policies, achieving a 6% efficiency increase in 1998 and a profit margin of 13%. Starting with the Six Sigma implementation 1990, the company has been able to increase its market value by 27% per year by 1998. Managing with Six Sigma, according to Allied Signal's Forbes magazine; according to Fortune magazine, the best company in the world in terms of the diversity of the study area; has earned the title of the most admired international aviation company (What Is Six Sigma? Pete Pande, Larry Holpp).



GRAPHICS 1 : Six Sigma History (www.sixsigma-institute.org)

1.2.1 The concept of six sigma

It tries to enhance the nature of the yield of a procedure by distinguishing and expelling the reasons for surrenders and limiting fluctuation in assembling and business forms. It utilizes an arrangement of value administration techniques, for the most part experimental, factual strategies, and makes a unique foundation of individuals inside the association who are specialists in these techniques. Every Six Sigma venture did inside an association takes after a characterized grouping of steps

and has particular esteem focuses, for instance: decrease process duration, lessen contamination, diminish costs, increment consumer loyalty and increment benefits.

There are several definitions to explain the concept of six sigma. Some of the definitions follow.

- It is a statistical measure of the accomplishment of a process or a product.
- Perfection is a near aim of accomplishment improvement.
- A management system to ensure lasting business leadership and world-classic accomplishment. (what is six sigma by Pete Pande and Larry Holpp page 6)

According to Plotkin. H, Six Sigma is a data-driven measurement mechanics. Six Sigma is a quality attempt which focuses on default per million at the Six Sigma level, the prospects a mere 3.4 default per million. (Plotkin H.,"Six Sigma: What It Is? And How To Use It")

According to Issa Bass who is the author of six sigma statistic Six Sigma is based on statistical analysis because it is based on data and is a rigorous approach that guides process improvements through statistical improvements and analyzes. Moreover, The Six Sigma approach to project improvement is project-driven. In other words, areas that show improvement opportunities are identified and projects are selected to advance the necessary improvements.

According to another description, Six Sigma is a meticulous, focused and highly effective application of proven quality principles and techniques. Combining elements from the work of many quality fronts, Six Sigma targets virtually flawless business performance.

In addition, since the Six Sigma approach involves the activities of all personnel, it is important that everyone understands and applies them in the same way. For this reason, Six Sigma is described in detail and operationally as well, reflecting the underlying philosophy.

Sigma is a measure used to determine how good or bad process performance is. Regardless of the type of work done, from automobile production to restaurant operation, it concerns the amount of error that occurs. In fact, we automatically assess

the performance of all products and services we use without realizing it. For example, every time we go to a corner shop, we measure the quality of service according to the "norms" we have developed in purchases we have made at similar stores in previous visits. If you do not find the brands you want on three visits that you have done over the top, if the shop is dirty or the shop assistant is rude, you will record it in your mind. If this is the case, you will think that the store is far away from your expectation and you will start doing business with someone else.

We can express Six Sigma as follows:

- The statistical definition of Six Sigma; to produce 3.4 defective products or services per million pieces.
- Six Sigma is a comprehensive and flexible approach to capturing, sustaining and delivering success to the highest level.
- The unique mechanism that drives Six Sigma is a deep understanding of customer needs; using facts, data and statistical analysis in a disciplinary context; manage, refine and reinvent business processes (Pande et al., 2004).
- Six Sigma is basically trying to reach three goals: improving consumer satisfaction, reducing cycle time, and reducing errors (Pande and Holpp, 2002).
- In Six Sigma, the error can be defined as everything outside the customer's requirements.

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1.2.2 Six Sigma Features, And Principles

The 6S approach is a mix of prior quality methods and consists of the greatest of all. Companies that understand the importance of quality to sustain their property have begun to use the 6S by keeping customer satisfaction on the front line.

As with any method, the 6S quality approach has individual specifications and principles. We could itemize the specifications that allocate 6S from other methods. They follow. (Munro, A. Roderick., 2000.)

- It is philosophy and a goal.
- It focuses on the solution the issue and gives a major superiority in achieving it.
- develops productivity. Quality and effectiveness are among the priorities.
- It is a concrete process with high computability that yields profitable results.
- It is a systematic methodology that decreases changeability.
- Projects are directed by chosen person and trained in 6S methodology. Education is a basic priority.
- It is necessary responsibilities of project teams and clear role descriptions.

The 6S method consists of basic concepts that are combined with achieving the covetable goal, as in other methods. These basic notions that form the power of this method are as follows.

- Focus on customer needs.
- Use comprehensive metrics and statistical analysis to understand how the work is done and to determine the underlying cause (s) of problems.

- To be proactive to remove the change from the middle and continually improve the process.
- Incorporating people into Six Sigma cross-functional teams
- Being comprehensive and flexible.

Customer focused. Six Sigma is concerned with increasing quality. The first step in this process is to define what "quality" means, from the viewpoint of the people most important to their views: customers. An enterprise must measure quality as it does customers. By focusing on a customer, an enterprise can enhance the quality of its products.

Identify Root Causes. In order to, accurately describe a root cause, the process must be fully understood. It just does not mean to understand how a process will work. The procession actually means knowing how it works. What you need to do to achieve this is:

- Having clearly defined targets for data collection

o Define the data to be collected

o The collected data has a defined cause

o Determine which predictions are expected from the data

- Providing accurate communication by clearly defining the conditions
- Make sure the measurements are accurate and repeatable
- Establish a standard data collection system/process

Eliminate Variation. Once you have identified the root causes, make changes in the process to remove the variation from the middle and remove the flaws in the process.

Also, look for ways to remove steps that do not add value to the customer. This wastage will be removed.

Be proactive to define and remove the variation. Do not wait for variations to be clear. Collect the facts, talk to the people and research the data to find the variations that can be accepted in this process, because "the road we always do something".

Teamwork. Six Sigma includes teams and leaders responsible for Six Sigma processes. Persons in the team need to train in Six Sigma methods, including Six Sigma's measurement methods and the remediation tools to be used. They also need communication skills to communicate clearly, make presentations, and communicate with both colleagues and customers. Bringing together teams with members who have a variety of skills and backgrounds related to a process will help to recognize the variations of the team. For example, people should be involved in operations, maintenance, engineering and procurement for a production process.

Flexible and Comprehensive. Six Sigma suppose flexibility in many directions. The management system of the business should not only strengthen the changes but also accept the positive changes. Employees should be motivated to adapt to change. Initially, the benefits of changes should be made clear to workers. This will help create an environment where your changes are more easily accepted. Six Sigma's key is the ability to change or adapt procedures as needed. In short, the process required for change should not be so complicated that workers and management would prefer to work with a very broken process of remediation. Six Sigma also requires problem solutions. Being sure that you understand every aspect of a process - the steps, people, and departments involved - will help any new or updated process to work.

1.3 Sıx Sıgma İmplementatıons In Manufacturıng Sector

The nuts and bolts of Six Sigma are really intended to enhance the execution of assembling industry. It was initially created as a sort of value control particularly for expansive scale producing organizations. The principal reason for this quality control framework was to enhance the assembling forms alongside disposing of the number

of imperfections found in them. As a technique for enhancing both manufacturing plant yield and quality, Lean Six Sigma (LSS) has increased across the board prominence. The approach, which means to enable organizations to make more slender assembling activities and lift item quality to close to 3.4 imperfections for each million openings, has conveyed noteworthy changes and cost investment funds at organizations as differing as General Electric Co., Dell Inc., Xerox Corp., and Johnson and Johnson Later on the philosophy of Six Sigma was reached out to different kinds of enterprises regardless of their size everywhere throughout the world. Initially, when it was created for the assembling part and after that, it gave exceptionally productive outcomes in the administration area (Hospital, back, Hotels and so on.) likewise, it turned into a far-reaching technique for business greatness.

Mamatha et al. (2014) gave Six Sigma procedure in diminishing revamp of the components which develop on account of non-conformance as for the required standard details in the creation shop. In these conclusions, in higher improve time; brings down consumer loyalty and adjust cost. The Six Sigma DMAIC approach has been utilized for the procedure change. This outcome in the diminishing of the revised time and cost. An experiencing childhood in the sigma level from 2.30 to 3.28 and from 3.00 to 3.10 for Left hand and Right-hand Deck separately was accomplished.

Sastry et al. (2011) applied Six Sigma methodology on process improvement and diversification reduction with the implementation of DMAIC. It shows the implementation of Six Sigma in Amara Raja Batteries manufacturing to reduce the production defects like paste rejection. It is a practical work done at Amara Raja Batteries, Tirupati where at first the rate of paste refusal was around 3.09%, which drastically decreased to nearly 2.26% within two months by applying the Six Sigma. Suggestions have been made at the firm to establish the sensors such as paste sensor, jam detecting, door sensors to reduce the scrap anymore.

Chan & Spedding (2001) benefited from the draft of experiment, reaction surface, and neural network meta model approaches to reach the level of Six Sigma quality in the studies about online optimization of the quality level in a production system

Chonghun &Young-Hak (2002) goal to create a facility information system that guided from factory engineers to operators by using principal apparatus (DMAIC) of Six Sigma in their studies. When they set up the system, they used multivariate statistical process control methods as well as DMAIC.

Antony et al. (2006) decomposed successful Six Sigma implementations across the globe to subgroups as manufacturing, service and transactional environments in their book "World Class İmplementations of Six Sigma". In manufacturing sector related implementations, implementations that were done at the chemical factory, steel, and automotive industries were discussed and all implementations are described in detail.

Gupta & Bharti (2013) presented a quality improvement study applied at a yarn manufacturing company based on six sigma methodologies. More specifically, the DMAIC project management-methodology & various apparatus are utilized to streamline processes & enhance productivity

Apak et al. (2012) goal at reuniting authorities of public and private sector in the international strategic planning process by promoting efficient development of the hydrogen economy infrastructure and understanding the contribution of six sigma

approach to energy efficiency in their study. Six Sigma approach was applied to a hydrogen energy plant to increase energy efficiency and explore sustainable energy resources. The authors emphasized that this implementation that goal at promoting the governments supported the use of hydrogen energy is an important initiative

Jin et al. (2011) presented a six sigma-based framework for ensuring high product reliability in the processes of subcontracted production. In the study, it was aimed at extending implementation of Six Sigma in products that were designed and developed to give a quick reply to the needs of the market. The goal that two important paths to improve reliability was customer satisfaction and decreasing cost. Finally, the proposed control mechanism was used for the design of a system in an industrial firm.

Hsu et al. (2011) dealt Six Sigma in TFT-LCD panel sector that had a big share in the Taiwan production industry. To get a manufacturing process that is more quality and had less waste was the goal of implementing Six Sigma to motherboard and display processes that attracted the attention as the decisive factor among companies.

Falcon et al. (2012) researched on minimizing energy consumption in distilling industry by Six Sigma and so earning by cost saving. In distillation processes, 25% of total cost is energy expenditures. In the six sigma project applied for this purpose in a distillation company, again at a rate of 150,000 €/year was provided. In practice, 14 critical inputs were inspected in the analysis stage of the DMAIC cycle and multiple models of indicators for energy efficiency were obtained. These models produce past energy performance of the distillation unit. The authors stated that the method used could be developed by way of applied optimization of furnaces' consumption

Markarian (2004) summarized in her study the implementation process of the Six Sigma in the industry and other sectors and discussed how both large and small companies can benefit from Six Sigma approach. And also, resulting from average

costs of Six Sigma training in small, medium and large companies were dealt in the study.

Sokovic et al. (2005) applied Six Sigma in a firm that manufactures compressor body for process design in their study. They stated which fundamental instruments are processed map and cause-effect matrix. In the study, failure mode and effects analysis (FMEA) was often used. In the relevant article, Six Sigma implementation for the process was examined by way of key process input diversifications and key process output diversifications.

Banuelas et al. (2005) showed in detail how they used the methodology of Six Sigma, how they applied apparatus and methods of it and the resulting profit in their study that goal at decreasing wastes in the process of film coating. As a result of the implementation, they provided the return at a rate of year 50,000 pounds via reducing in raw material, decrease in the cycle time, go up in quality and reduction in examination time.

The potential benefits in manufacturing industry of the Six Sigma approach **(**Pande,2003 P.S, Neuman, R.P, Cavangh, R.R., The Six Sigma Way)

- Cost reduction
- Productivity improvement
- Market share growth
- Customer retention
- Cycle-time reduction
- Defect reduction
- Culture change
- Product/service development

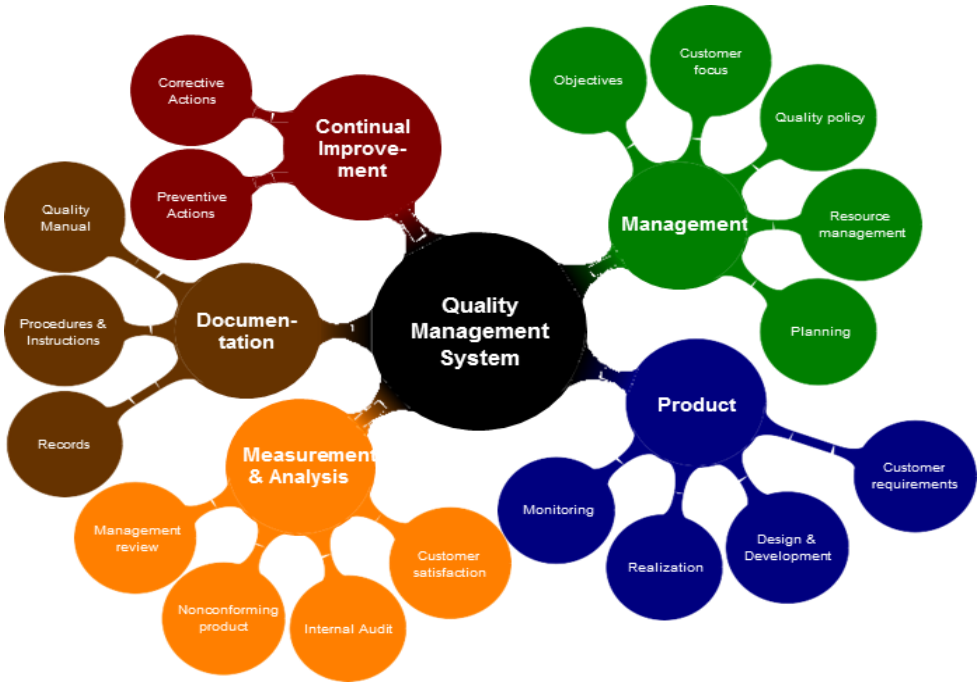
CHAPTER II Modern quality management systems, Six sigma as a way to improve the quality

2.1 Modern quality management systems

The objective of the quality framework is to influence less demanding you to get, to contain and create quality. Quality does not happen unintentionally it must be overseen. Quality frameworks have a comparable goal to the budgetary control frameworks, data innovation frameworks, stock control frameworks and staff administration systems. They arrange assets in order to accomplish certain destinations by setting down rules and infrastructure which if took after and kept up, will yield the coveted outcomes. Regardless of whether it is the administration of costs, Inventory, faculty or quality, frameworks are expected to center the idea and exertion of individuals towards recommended targets.

Managing for quality needs a systems approach that has all parts of a comprehensive product: hardware, software, service and folks processes. Such quality systems square measure designed mistreatment technologies that include:

Applied statistics,method management, responsibleness engineering, data systems, and knowledge base management.



Maintaining a documented quality system

In maintaining a quality system you need to:

- Keep the quality system documents updated with the needs of the business.
- Keep copies of the documents updated with the latest amendments.
- Keep the policies and procedures up to date with the latest industry practices and technologies.
- Keep staff training up to date with current policies and procedures.
- Change policies and procedures to prevent the recurrence of problems.
- Keep the description of the organization including the associated responsibilities and authority compatible with the actual staff relationships and their responsibilities and authority.
- Keep the resources required to implement the policies and procedures compatible with the actual resources available.

Business changes

In order to keep the system up to date with the needs of the business you will need to review the system when changes occur in the business. This review may be carried out at the same time as the management reviews described in Part 2 Chapter 1; however, since these reviews may be scheduled on a periodic basis, you should not allow the system to become outdated. The system should always reflect what you do and should remain ahead of actual practice rather than lag behind it. You should therefore integrate your system review with the business review so that changes in the business are implemented through the quality system rather than as an afterthought.

Amendments

It is a fact of life that people don't put a high priority on installing amendments to documents in their possession. Some will carry out the amendments immediately on receipt whilst others will allow them to pile up in the pending tray. To keep copies of your documents up to date you should adopt a method of issuing changes that minimizes the effort required to amend copies of documents. There are several options

Staff changes

When you set up your quality system as part of its implementation you should train staff in the application and use of the various documents. The system may not change as frequently as the staff so as new staff enter the organization or change roles, they need to be trained to carry out their jobs as well as possible. This training needs to be a continuous process if the standards of quality are to be maintained with a fluid workforce. You will therefore need a means of identifying when staff changes occur so as to schedule their training. These training plans are as much a part of quality system maintenance as staff induction and development. Therefore, provision needs to be made in your procedures to ensure this occurs.

State of the art changes

To keep your policies and procedures up to date with the latest industry practices you should provide a means of identifying new developments. This can be done by scanning journals, attending seminars and conferences, and generally maintaining an awareness of developments in quality management and technologies relevant to your business.

Improvement changes

Internal audits, corrective action plans and management reviews may all indicate a need for the documented policies to be changed or staff to be trained in order to prevent the recurrence of problems. This is by far the most frequent cause of change - certainly until your system has stabilized. You will need a method of making such changes promptly if the problems are not to recur.

Organization changes

A common failing of many quality systems is that the organization structure, job titles and responsibilities are out of date shortly after they are issued. Managers often believe that the organization charts in the quality manual are there simply as a publicity aid and not as a definitive statement. Managers also prefer to be free to change their organization when it suits them and not to be constrained by a bureaucratic system. Most managers will announce a change in their organization, then rely on the quality manager to change the charts in the quality manual. To avoid conflicts you need a method whereby managers change the charts then announce the changes in their organization, and not vice versa. Again, if you employ a quick change procedure such as that described above, managers will find no advantage in by-passing the system. One way of limiting the effects that organization changes have on the quality system is to make the system immune to such changes. By avoiding job titles, locations, department names and other labels that are prone to change you can minimize the impact of organizational change on the documentation. To achieve such immunity you need to use terms such as design authority, manufacturing

authority, inspection authority etc. instead. If you need to be specific then you can do so in a Quality Plan or Organization Manual which translates the authorities into department names or job titles. Thus in the case of reorganization you need only change one document instead of many

Resource changes

Policies and procedures, including the processes they define, require human, material and financial resources to implement. When you introduce the policies and procedures for the first time you need to take into account the resources that will be needed. It is of no use to issue a new procedure that requires new equipment, new skills and many more people if no one has made provision for them. Likewise, when procedures change you need to consider the impact on resources and when resources are reduced you need to consider the impact on the procedures. Managers may inadvertently dispose of old equipment or acquire new equipment without giving consideration to the procedures or instructions which specify the equipment. Some procedures may be 88 Quality system designed around a certain facility or around a particular department, section or even a particular person or skill, although every attempt to make them immune to such changes was taken. In times of a recession certain pruning may have to occur which may affect the implementation of the procedures. You therefore need to be vigilant and identify the effects of these changes on your procedures and take prompt action to maintain them in line with current circumstances. Rather than dispose of procedures that have become obsolete due to such changes, archive them because you may be able to resurrect them when circumstances improve.

(Quality Systems Handbook David Hoyle p87- 88-89-97)

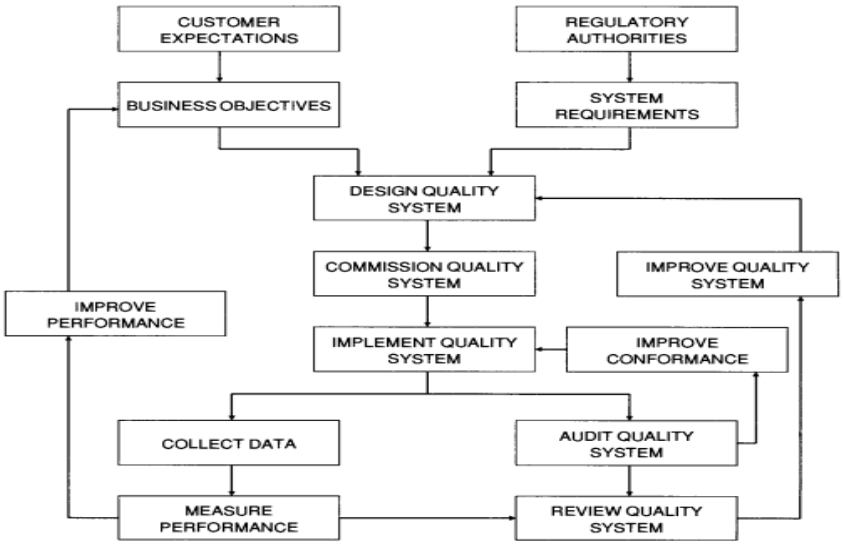


Figure 2.3 Quality system life cycle model

2.1.1 Statistical quality control

Control Table

The control chart is an intelligent starting point for processes such as model subtraction or problem-solving by collecting data from sample observations. A control chart is a simple form of use and understanding that shows which events occur and how often they occur during production. The control tables are organized into two different groups according to the process characteristic:

1. Quantitative (measurable) properties
2. Classification according to the qualitative (Counting and Visual Separation) error group.

Pareto Analysis

Errors may be classified in terms of impact or correction costs on product performance. Pareto analysis shows which problems need to be addressed first. This diagram is being applied by quality groups in order to direct efforts to the most productive areas and make the right decisions. (Akın, 1996).

The Pareto chart is a quality improvement tool that is based on the Pareto principle, the principle that 80% of an outcome comes from 20% of its inputs. Vilfredo Pareto,

an Italian engineer, and economist, first observed the 80/20 rule in relation to population and wealth. At the beginning of the 20th century, Pareto noted that in Italy and several other European countries, 80% of the wealth was controlled by just 20% of the population.

Using Pareto Charts for Quality Control

Pareto charts can be used in several different ways, including:

1. To analyze the frequency of problems or defects in a process
2. To analyze broad causes by examining their individual components
3. To help focus efforts on the most significant problems or causes when there are many
4. To help communicate the significance of problems or causes to others

Cause-effect diagram

Cause and effect diagrams are one of the most used quality tools for teams working on problem-solving and process development. It is also called Ishikawa diagram in the name of Kaoru Ishikawa, one of the professors of the University of Tokyo, who was the first fisherman or the first person to develop this tool in 1943. For every step in the process or for each problem, it is possible to get down to the smallest extent by going from the general causes and to reveal the basic information for revealing the cause. A diagram is an effective tool in explaining which causes lead to the final result. (kagemeitüsitesi, 2006).

Error Density Diagram

The error intensity diagram is an image showing the finished product from various angles. The types of faults are marked on this diagram showing the images of the visible parts of the product. It is observed where the imperfections are concentrated in the result of the individual inspection of each product and these defects are marked in the diagram with the relevant places. Unnecessary error types can be divided into categories and each error can be displayed in different color, symbol or pattern. Thus, the type of defects concentrated in the area of the product or in which region is determined and measures are taken to prevent them in the production process (Kartal,

1999). The Error Density Diagram is an effective tool for descending the causes of the problem.

2.1 Six Sigma Improvement Models

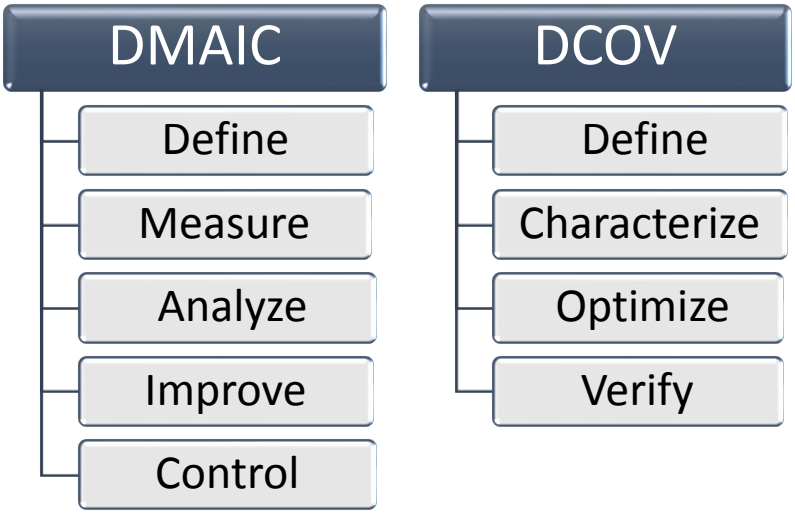
Improving the standard of processes and maintaining acceptable levels of performance quality are vital factors within the success of any organization. Over the years, businesses adopted completely different ways so as to enhance, management and manage the standard of their merchandise and services, however, none of the standard management ways may rival Six letter of the alphabet. it's surpassed all the opposite ways in growing quality because it emphasizes additional on the utilization of applied mathematics ways.

Sigma is the Greek letter related to standard deviation. But, it takes different definitions and explanation when used as in Six Sigma, such as; a philosophy, a benchmarking comparison, a symbol, a metric of comparison, a vision, a methodological approach, a particular value and an aim.

Six Sigma's goal is to enhance customer satisfaction and company performance. For this, changes must be made in systems and processes that affect customer satisfaction and company performance positively. However, it is not possible to implement these changes without proper planning. Planning requires good predictive ability. In addition, the estimate should be base on knowledge about the subject. Knowledge cannot be developed on the basis of internal motives. For this reason, data collected using the scientific method should be use for the development of information. There are a number of improvement models which used to apply the scientific method to business operations

This convoluted definition and expectation have contributed to the confusion of a standard definition with many commentaries. The overall importance of the Six Sigma methodology may be view from an appraisal as well as prevention

methodology. There are two models of Six Sigma methodology. They are DMAIC and DCOV model.



Six Sigma methodology with some of the main philosophies in the world of development, one can see some of the differences.

Comparison of two leading improvement philosophies (Fuller, 2000)

	DMAIC	DCOV
Purpose	Problem focused	Problem avoidance
Steps	Define Measure Analyze Improve Control	Define Characterize Optimize Verify
Criticism	System interaction not considered. Therefore, processes improved independently	System interaction considered. Therefore, processes improve holistically as a system
Goal	Reduce variation	Optimize design to meet customer's functionality

The DMAIC Model is necessary improvement models for the Six Sigma problem-solving approach. It stands for Measure, Analyzes, Define, Improve and Control. Basically, this model helps in the following: to know what is necessary for the customer, center around the target, minimize variation, and decrease fears.

The DCOV model is the second important part of the Six Sigma methodology which focuses on avoiding. The first deals with problem resolution as in the appraisal mode that is where we use the DMAIC model. The second deals with prevention and that are where the DCOV model becomes useful. It stands for Optimize, Define, Verify, and Characterizes. Basically,the model helps in the following: defining what the customer needs, wills, and expectations; defining the specifications for the specific needs, wills, and expectations; optimizing the specifications for the specific needs, wants, and expectations.

DMAIC Model

The DMAIC Model is one of the essential improvement models for the Six Sigma problem-solving approach. According to Pande, Neuman, and Cavanagh (2002), they defined DMAIC model as it is given below:

- Define - the problem and what the clients requirements.
- Measure- the faults and process operation
- Analyze- the information and finding of the problem.
- Improve- the process to remove causes of the faults.
- Control- the process to make sure faults do not iterate.

Define

During the DMAIC definition phase, projects are selected and the products and processes to be developed from the activities are defined from the work field.

The aim of this phase is to define the purpose and scope of the project.

- The selected project is suitable for your capabilities and capabilities,
- It is highly likely to create a higher quality and reduce costs
- It can be summarized as a clear and possible numerical description of the problems (kaliteofisisitesi, 2006).

Define the concept of the Six Sigma project team to address the problem that will be addressed. This stage also sets out the critical basis for organizing the team; identifying roles and responsibilities; set goals and milestones; consider the steps of the process.

According to Blakeslee (1999), the key points of this stage can be summarized.

- Cause and effect prioritization and project planning
- Project Scoping
- Voice of the customer (Blakeslee, J.A. (1999).)

According to Hahn(2000), There are five substeps within this stage, each one having its own focus and linkage to the customer.

1. Define the problem
2. Identify the customer
3. Identify Critical To Quality (CTQs)
4. Map the process
5. Scope the project and update project charter (if necessary) (Hahn J.G., N. Doganaksoy, & R. Hoerl. (2000).)

Measure

At this stage, information that explains all aspects of the current situation is collected. The most critical factor at this stage is the correct determination of what or what to measure. Otherwise, you will spend money on labor and resources, and there will be pages of data that have no use. Similarly, in order to determine opportunities for remediation of a certain process error, the problem areas must be correctly identified

and methods to be used should be selected in the light of this information. (kalitedernegisitesi, 2006).

This stage focus to develop the information gathering plan; to define the Key Process Input Variables (KPIV); to show baseline measures of process capability and process sigma level.

There are seven substeps of measures stage. (Patterson, 1999):

1. Perform graphical analysis
2. Identify measurement and variation
3. Conduct data collection
4. Develop data collection plan
5. Determine data type
6. Conduct baseline analysis
7. Perform measurement system analysis

The sub-steps of measure set up the requirements of variation and measurement. They are including the kinds and sources of variation and the impact of variation on process performance; various kinds of measures for variance and the criteria for setting good process measures; and the different kinds of information which gathered and the essential characteristics of each information type.

In the improve information gathering plan substep the team improves and documents their plans for gathering information. Moreover, for optimum results at least, the following should be considered. (Osborn, 1999):

Osborn, B. (1999). Reliability data analysis section. Proceedings: Quality and Productivity Research Conference, General Electric and Rensselaer University, Schenectady, NY.

Analyze

Variable sources or critical variables are determined using data to determine key process inputs that affect process outputs during the analysis phase. For this purpose, the detailed process map includes brainstorm, cause result diagram, matrix, analysis, statistical process control etc. related to input-output, vehicles. (Işığıçok, E. (2005))

There are four substeps of analyze stage. (Hahn 2000)

1. Perform capability analysis
2. Choose analysis devices
3. Apply graphical analysis devices
4. Define sources of variation

1.Perform capability analysis are used for association the current performance level of the process being examined. This baseline capability used to verify process improvements through the Improve and Control phases. A capability is specific as a short-term sigma value so that comparisons between processes can be made.

2.Choose analysis devises permit to a team to look at the complete set of graphical analysis tools to determine how each tool might be used to conceive details about process performance and variation.

3. Apply graphical analysis devises. Graphical analysis endorses to the technique of applying a set of basic graphical analysis tools to a set of information to produce a visual sign of performance.

4. Define sources of variation sustain the process of narrowing and focusing which start with project selection. The team will use the results produced by graphical analysis to objective sources of variation.

Improve

The aim l of the increase phase in the DMAIC is to implement the developments and to measure the effect of the developments. Depending on the structure and size of the

problem, the suggestions can be classified as short and long-term. Subsequently, the before and after of the improvements are compared.

Develop is to generate information, design, pilot and implement developments, and validate the improvements. Perhaps the most necessary items in this step are the process of brainstorming; the improvement of the should be processed map; the review and/or generation of the current Failure Mode and Effect Analysis (FMEA); a preliminary cost/benefit analysis; a pilot of the recommended action; and the preliminary implementation process. Design of experiments (DOE) is an effective methodology that may be used in both the Analyze and Improve stages.

Control

Control is to institutionalize process or product developments and monitor continually performance. This step is the place where the transition from improvements to controlling the process and maintaining the new developments takes place. Of course, the transition is the transferring of the process from the project team to the original owner. To facilitate a smooth transition and provide the team's work sticks, a detailed control plan must be developed.

Upon completion of the control step, the process owner will understand performance expectations and what corrective actions should be executed if measurements drop below the desired and anticipated levels. Finally, at the completion of the control stage, the team is disbanded while the Black Belt begins the next project with a new team.

STAGE	ACTIONS	AIM
Define	*Defining customer's requirements, understanding the high-low levels of and calculating the saving opportuni*	*With the distinct efforts defi issue or a problem*
Measure	*Validating integrity of data and ident the key inputs*	*Understand the entire proce performance and also know measures for quality improv*

Analyze	*Leveraging statistical tools and esta the quality improvement plan*	*Validation of process in o ensure performance impr*
Improve	*Successfully implementing the improvement plan, improving proc capability and calculating financi impact*	*Improve the entire perfor*
Control	*Finalizing the improvements implemented, document updating, validating stability of process*	*Implementation of quality control measures*

2.2 Six sigma and industry quality management relationship

Six Sigma may be a business administration technique which plans toward moving forward those calibers for methods Toward minimizing Also, in the end, evacuating those errors Also varieties. The idea about six sigma might have been acquainted by Motorola clinched alongside 1986, Yet might have been popularized by Jack Welch who consolidated those techniques for as much business methods toward all electric. The idea about six sigma originated under presence At a standout amongst Motorola's senior executives complained about Motorola's terrible nature. Bill Smith inevitably figured the procedure In 1986.

Nature assumes a paramount part in the triumph What's more disappointment about an association. Neglecting a critical perspective such as quality, won't tell you to survive in the long run. Six Sigma ensures unrivaled personal satisfaction about items by uprooting those defects in the methods Also frameworks. Six Sigma is An procedure which aides On moving forward those Generally speaking techniques What's more frameworks Eventually Tom's perusing identikit What's more, in the end, uprooting the obstructions which could prevent those association on arriving at the levels about flawlessness. As stated by sigma, any sort challenge which goes over On an organization's techniques may be recognized with a chance to be an abandon and necessities with made wiped out.

Associations working on six sigma make uncommon levels to workers inside the association. Such levels are called as: “Green belts”, “Black belts” et cetera. People confirmed with At whatever from claiming these belts would regularly masters have done six sigma methodology. As stated by six sigma whatever methodology that doesn't prompt client fulfillment may allude should Concerning illustration a deformity Furthermore need with be wiped out from that framework to guarantee unrivaled personal satisfaction for results Also administrations. Each association strives tough will uphold fantastic nature about its brand and the transform about six sigma ensures the same by uprooting Different defects Furthermore errors which come in the method for client fulfillment.

There are two different approaches to the relationship between Six Sigma and TQM. According to the first approach, Six Sigma can be thought of as a more advanced and more effective application of TQM. The financial results measured and reported in Six Sigma use more comprehensive statistical data analysis techniques. The client focuses on requests, needs and concerns, and uses project management tools and techniques (Kwak and Anbari, 2004). Therefore, we can express Six Sigma with the following formula

Six Sigma = TQM + Stronger customer concentration + additional data analysis tools + financial results + project management

There is a system certifying that the continuity of product and service quality can be ensured in companies that implement TQM. Through this certification system

called ISO, various standards are established and published for product, service, and system. ISO certification is a standard that

The second approach sees Six Sigma as an advanced and effective methodology of TQM. (Sokovic vd., 2005)

In short, while some scientists and authors distinguish Six Sigma as TQM, others have stated that Six Sigma is not new, TQM is another name.

There is a close relationship between Six Sigma and TQM. It must be acknowledged that TQM has provided the necessary acceleration for the emergence of Six Sigma. (Sokovic vd., 2005)

The blurring of TQM starts with the concept of quality. Quality is a part of many companies with specific responsibilities in terms of quality control or quality assurance. These departments are focused on bringing the discipline to a stable state in many processes that improve processes. In such a case, the concept of quality is a blurred concept for many people. Although Six Sigma has similar challenges in this regard, Six Sigma follows the approach of sharpening blurry concepts with simple messages that are repeated over and over again.

Ford Motor Company is a company that has implemented both Six Sigma and Total Quality Management. Compared to the two applications, Six Sigma indicated that TQM is a more structured and profit-oriented approach.

(Anthony vd., 2005).

There is a system certifying that the continuity of product and service quality can be ensured in companies that implement TQM. Through this certification system called ISO, various standards are established and published for product, service and system. ISO certification is a standard that defines an effective quality management system. When the establishment meets the requirements of these standards, it can obtain the ISO certificate. The Six Sigma expert does not have a system of documentation in black belt, black belt, green belt breeding programs. Growing human power is an important component of these programs. But the more important and difficult one is that the "management model" is being adapted to this plan. And training is necessary, but not enough. In this regard, educated generations should be involved. Successful companies have to create their own training and certification systems.

We will compare Total Quality Management and Six Sigma approach in terms of subject and strategy; While the theme of the Six Sigma approach is customer satisfaction and profitability, TQM's issue is to provide quality products besides customer satisfaction. In terms of strategy, Six Sigma approach tries to apply high quality and low error rate in all processes of the company while TKY is trying to provide standards in the process of the operator. (Guilhon vd., 1998).

TOTAL QUALITY MANAGEMENT AND VARIOUS VEHICLES AND TECHNIQUES USED IN THE SIX MONITORING APPROACH

Under this heading, the most used of the various approaches and methods used in TQM and Six Sigma implementations will be briefly mentioned.

Flow Diagrams

Flow diagrams are the representation of the problem by shape. It is used to identify any mistakes in the production process, repetitions, and steps that do not benefit. This is done by comparing the actual flow and ideal flow of the process. The diagram of the state of the process applied must be drawn. If everything goes well, the flow diagram of the state of the process is plotted and the two diagrams are compared to determine where the problem appears to be. (kobifinanssitesi, 2007).

Poka-Yoke

Poka-Yoke is a Japanese word and corresponds to a word of error. It means taking precautions to prevent the fault from the beginning. With Poke-Yoke, it means trying to design a product that works on the job, something that will not cause an error in the production process. Reduces the cost of poor quality and quality control by providing pre-processing detection of the incorrect entry. (Aktan, 2007)

Taguchi Metodu

The Taguchi Method is an experimental design method that minimizes product and process variability by selecting the most appropriate combination of the levels of

factors that can be controlled versus uncontrollable factors, both in the process and in the process. In addition to being effective in improving the quality of products, this method allows you to get better results with much less trial than quality improvement. (Canıyılmaz ve Kutay, 2003).

Quality Function Propagation

Quality Function Deployment (QFD) Unlike the others, QFD is a planning process that helps not only a tool but also other technical tools to operate effectively and complement each other and to bring out the priority issues. It is a customer-based approach and helps businesses gain customer focus. QFD is a quality technique and a process. QFD is a quality method that essentially transforms customer requests into measurable performance changes, an optimized process and a good distribution, customer-focused and teamwork that helps to achieve sales channels. (Güllü, E. ve Ulcay, Y. (2002))

Quality Circles

Quality Control Circles, also known as Quality Control Circles. It is a small group of volunteers who work in the same professional activity or work in the same unit, ranging in number from 5 to 10 people. In the functioning of the Quality Circle, the problem to be solved in the first stage must be diagnosed. The problem to be examined by the members of the circle is selected, the problem is analyzed and the solutions are suggested. Management will review the solutions and the appropriate ones are applied by the circle members and, if necessary, by others. The latest results are evaluated by circle members. (Efil, 1999).

CHAPTER III Industrial Quality and Management Systems in Azerbaijan and Application of 6 sigma in the Azerbaijani industry

3.1 Mechanisms Of Quality Management And Improvement İn Azerbaijan Industry

The main goal of the project, which has been misunderstood in the direction of "State Program for Industrial Development in Azerbaijan in 2015-2020", is to raise the level of quality of information in enterprises and to promote quality standards. It establishes a new and principled approach to the quality problems of existing industries and organizations in Azerbaijan. The high quality of industrial products is important not only for producers and consumers, but also for the country's economy. Product, business and service quality, sales volume and profitability increase, which increases the export potential of the country and leads to increased chain life and prosperity and living standards. Increasing the quality of industrial products is an important issue by implementing complex systematic and orderly measures at different levels of the production process. The following results can be summarized below.

1. It is possible to estimate the actual properties of a qualitative industrial product. There is a need to quantitatively assess the demand for these properties.
2. There are no flaws to meet the requirements of the consumer sent to the consumer, ie the product supplied with the product.
3. Improve the organizational and technical level of production and management, taking into account the needs of consumers and market conditions.
4. Targets and responsibilities for the management of industrial products must be remarkable at all levels of management, and the most effective criteria for achieving them is the payment of the consumer's demands.
5. A systematic approach to product quality management should be the most effective method of achieving quality objectives.
6. Quality management should be handled within the framework of management knowledge in general and should be based on scientifically substantiated principles for quality management to meet the increasing demands of consumers,

since quality management is an impact process on the relevant management bodies.

7. The establishment of complex systems for the management of industrial products should be based on single organizational and methodological provisions. However, the elements of these systems need to be treated as a lower system (semi-system) and each system as a separate element on its own, higher level. The product quality management system should have a specific purpose and have a function that defines the nature of the interaction of all elements accordingly.
8. Quality management should be based on organizational, methodological, legal and regulatory documents.
9. It is essential that every employee be conscious and active, and most importantly, be innovative in the development and maintenance of industrial products and workmanship.
10. Leaving a high quality product is an incentive to reduce the material capacity of industrial products, save raw materials, and ensure efficient use of labor resources and opportunities.
11. In order to bring the quality of manufactured industrial products to world standards, the examination and application of advanced experiences and applications in our country and abroad should also be of great importance.
12. It is necessary to prepare mass, uninterrupted and systematic way to upgrade the skills of the staff and consumers.
13. The ability to effectively implement industrial product quality management requirements is the understanding of the nature of all processes in industrial enterprises.

All international standards applied in Azerbaijan are almost the standards of the management system and include:

1. ISO 9001: 2000 - Quality Management System
2. ISO 14001- Environmental Management System

3. HACCP - Food Safety Standard
4. ISO 22000 - Food Safety Management System (HACCP and ISO 9001 combination)
5. OHSAS 18001- Occupational Health and Safety Management Standard

SOCAR-AQS LLC, ISO 9001: 2008 Quality Management System, ISO 14001: 2004 Environmental Management System, OHSAS 18001: 2007 Occupational Safety and Security Management System and API Spec Q2, Integrated Management System Based on Requirements for 1st Edition (IOIS).

This ISA policy covers the enterprise's objectives, the nature and scale of the entity's ten security, environmental impacts of the enterprise's activities and the products and services of the enterprise, and the integration of integrated drilling and well servicing services

The basic provisions of the IOEX Policy are:

1. to continuously improve processes to meet the requirements of internationally accepted standards and to enhance the effectiveness of the ISMS;
2. To ensure the health and safety of our employees;
3. Preventing environmental pollution during our activities;
4. Establishment of organization activities in accordance with AR legislation and other requirements of the operator concerning technical safety and environmental aspects;
5. Establish a basis for the preparation and verification of the objectives of the IOs;
6. jointly planning the work of structural units to increase the efficiency of well construction;

7. Increase the reliability of existing equipment and equipment and apply new techniques and technologies at an opportunity;
8. Provide the highest level of customer satisfaction and clarity;
9. To establish a management system that aims to maximize the potential of our employees and maximize the investment in their development;
10. To adjust the professionalism of our employees to the requirements of international standards;
11. To form an initiative team in the implementation of innovations in all areas of activity.

The senior management of SOCAR-AQS LLC shall ensure that the policy is communicated and communicated to employees within the organization, certified, implemented and maintained and approved and maintained by third parties and the public.

Inter Gas Service LLC is the first among the private companies in the Republic of Azerbaijan and operates in accordance with IQNet and DQS European standards.

In 2011, our company revised in 2011 with the ISO 9001: 2008 Quality Management System, ISO 14001: 2004 Environmental Management System and BS OHSAS 18001: 2007 Occupational Health and Safety Management System Certificate.

Inter Gas Service LLC has been operating in the oil and gas sector of the Republic of Azerbaijan since 2007. Over the past period, it has been a reliable partner in the design, construction and maintenance of gas pipelines, warehouses, gas stations and stations. There are Licenses issued by the Ministry of Emergency Situations of the Republic of Azerbaijan and the Ministry of Economic Development of Azerbaijan and allowing the execution of the above-mentioned activities.

It should not be forgotten that the "Ulduz" factory is the first Azerbaijan company to receive the BRC, IFS standards. The FSSC 22000 and PAS 220 standards were developed by the world's leading companies NESTLE, UNILEVER, DANONE and

KRAFT, and the Ulduz Factory was awarded this certificate in Azerbaijan for the implementation of these standards.

At this time, the activity of the Star Chocolate Factory is fully compatible with FSSC 22000 (Food Safety Standard), PAS 220 (New Food Safety Standards for Food Manufacturers).

At present, : “Azneftkimyamash” JSC has 9 subsidiaries and 4 branch institutes:

- Baku oil refinery plant;
- "Baku Worker" machine-building plant; -
- Surakhani machine-building plant; -
- Sabunchu Scientific-Production Association; -
- B.Sardarov machine-building plant;
- Zabrat Machine Building Plant;
- Baku oil refinery plant; -
- Balakhani machine-building plant; -
- Sabail Machine Building Plant; -
- Azerbaijan Scientific Research and Design Institute of Petroleum Mechanization (AZİNMAŞ); -
- Azerbaijan Institute of Mechanical Technology; - "
- Neftmach "Special Constructor Bureau; -

Institution of Azerdemankatsh project. At present, these enterprises and organizations successfully manage the quality control of the equipment manufactured in accordance with ISO 9001-2000 certification. At the same time, most of the oil and gas equipment is produced in accordance with the specifications of the American Petroleum Institute (API).

3.1.1 Objectives of the State Statistical Committee of the Republic of Azerbaijan for Quality in 2018

In order to establish a quality management system in the statistical system, to improve the efficiency of observation management and to facilitate management, the main objectives of the SSC for 2018 are as follows:

- Taking measures to achieve a wider user audience by maintaining relevance, spreading data and metadata in a standardized manner;
- Continue work on improving the performance of local statistical bodies in line with the requirements of ISO 9001: 2015; and the establishment of the PIU in other local statistical bodies, including the State Statistical Committee's Quality Management System (QMS);
- Minimizing the mistakes made in the initial information by improving quality control schedules, further improving the quality of data;
- Continuation of statistical processes and ERP electrification;
- Continuously updating ICT equipment of the statistical system;
- Necessary measures for the development of the National Statistical Classification system in accordance with international standards;
- Providing statistical information support for the timely and quality execution of the tasks arising from the "Transformation of our world: the Agenda for Sustainable Development until 2030";
- Timely and qualitative performance of the strategic roadmap for the national economy and key sectors of the economy for the statistical authorities;
- Timely and qualitative implementation of the "Azerbaijan 2020: looking to the future" development concept on the responsibilities for statistical bodies;
- Take appropriate measures in connection with the implementation of the tasks outlined in the "national action plan for the promotion of the open government for 2016-2018";
- Ensuring timely and high-quality performance of the measures envisaged in the statistical work program;

- Necessary measures to implement the recommendations given in the "global assessment of the national statistical system of Azerbaijan";
- Performing relevant work in this direction to maximize user satisfaction and study user needs;
- Providing users with the requirements and wishes of the types and quality of statistical products in accordance with the requirements of the legislation, and conducting relevant inquiries for their review;
- Take appropriate measures to maintain and improve the information security system;
- Taking relevant measures to update software prepared on the state register of statistical units;
- Carry out control of the application of rıa documents and take relevant corrective action when there are discrepancies;
- Further expansion of relations with mass media;
- Timely and qualitative performance of 2018 workforce census in the republic of Azerbaijan for 2018.

3.2 Perspective Capabilities Of Applying Six Sigma İn Quality Assurance And Enhancement İn Azerbaijani İndustry. (Basf Company)

The Six Sigma management approach has been implemented by many businesses. In Azerbaijan, this system is very new. The Company has started to introduce this new system. Vast is a Caspian Chemicall LLC company.

BASF is the largest German chemical company in the world. The world's 100-year-old articulation is dead. Activity areas of BASF: chemistry, plastics, agricultural products, construction chemicals, oil, and gas. BASF Kaspian is a chemical company based in Europe. Since 2006, it has been operating in Azerbaijan (Sumgait).

The company owns all the construction works of the patented construction chemistry companies: concrete materials, water insulation materials, water insulation systems, floor fillers, flooring systems.

BASF Caspian YKS MMC is a 100% subsidiary of BASF SE and is part of the BASF Group of Companies. BASF Caspian provides business and construction sites in the Republic of Azerbaijan with high-quality materials produced by advanced German technology.

BASF Caspian YKS MM is a leading provider of chemical reagents and compositions for customers operating in the construction industry. The manufactured chemical additives, thanks to constant innovation and individual decisions, provide ready-made concrete additives, successful businesses for the production of precast concrete.

Since 2006, the construction materials factory has been launched in Sumgayit city. Among the products are concrete additives, glue for ceramics, granite, and marble, materials for repair of concrete, waterproofing systems, roofing and flooring polyurethane coatings and other chemical products.

The Concern's portfolio of proposals includes oil and natural gas, as well as chemicals, plasmas, special chemicals, products for rural areas and fine chemicals. BASF is a reliable partner, helping companies achieve success in many different areas. The high-quality products and "well-thought" systems offered by the BASF concert play an important role in addressing global challenges such as climate protection, energy efficient use, food production, and communication. In 2008, the sales volume of the company was 62bn. the total number of BASF employees (according to the data for the end of 2008) was about 97,000. BASF shares are traded and traded on Frankfurt (BAS), London (BFA) and Surixin (AN) stock exchanges.

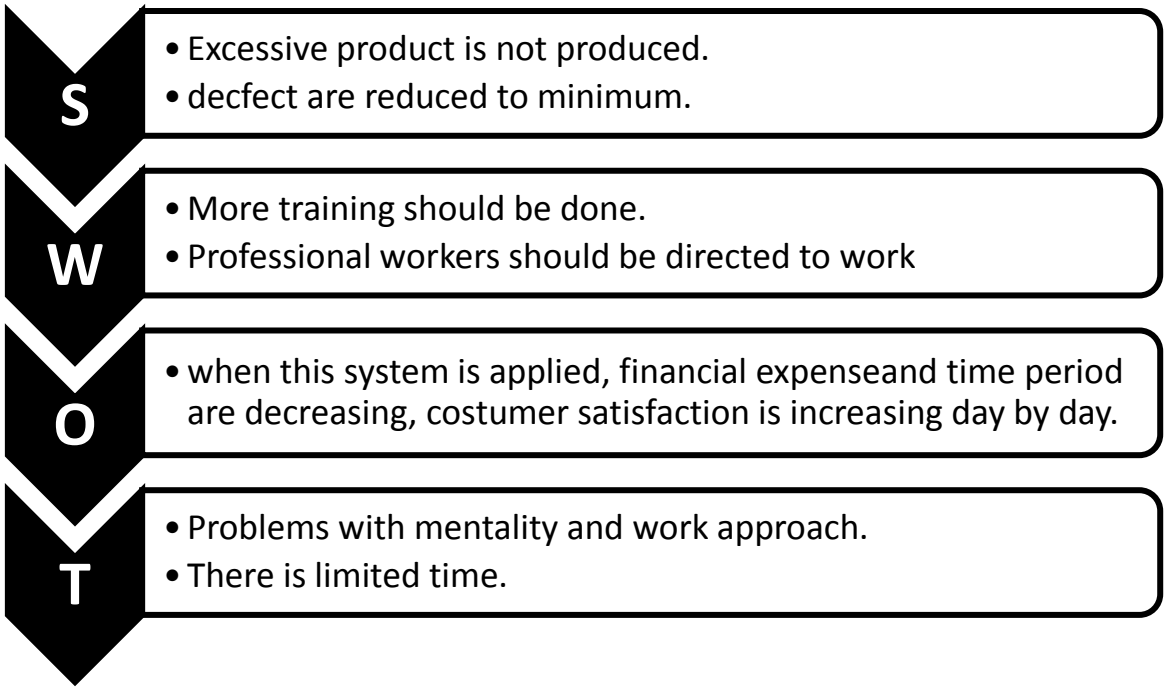
The beginning of the practice of Six Sigma in company

Six Sigma has been initiated in the company since BASF 2017 and is currently underway, Special persons are leading this process. Training is always held and people are taught the whole process.

The system of six sigma applying in a company.

Six Sigma and Lean System have been used together in recent years.

Lean and Six Sigma is a metrology that is widely used and strategically used by many well-known companies and companies in the world, rooted in the United States and Japan. While the lean system is essentially trying to lift the waste from the in-process and non-value elements, the Six Sigma process provides support for the stability and continues to perform at high performance. Thus, companies that successfully implement both gain superiority in revenue and expenditure by gaining efficiency.



Lean six sıgma is applied to quality and production areas.

There are some changes after applying six sigma. It can show them the following examples.

- Lean six sigma reduce the defective goods after applying.
- The customer creates conditions for increased satisfaction.
- Reduction in inventory by 25%
- Increased satisfaction with the muster

- FPY (first pass yield) has recently reached 100%

(FPY is the percentage of depreciation of the first production quality test)

Another indicator of quality is that the organization continuously presents its products or services in accordance with customer expectations. Products and services that are beyond customer expectations are considered to be defects and are damaging to the company exactly. Six Sigma's continuous improvement (continuous improvement) methodology is constantly being implemented in the form of steps towards excellence. Six Sigma gives you a set of systematic and durable tools, not spontaneous and one-off activities, and this will put you ahead of the competition.

It is impossible to achieve these objectives through the introduction of internal quality management systems. In Azerbaijan, the application of six sigma is practically not implemented by international firms, but only by international companies

The main goals of the production process are the prevention of human and technology-based resuscitation and a waste of time in Azerbaijan with the use of renewable technologies

The prospects for applying Six Sigma in Azerbaijan are quite broad. Thus, the renewed Azerbaijani industrial system has to shift to the production of more qualitative and durable industrial products in the increasing global competition. The adoption of the Six Sigma will allow the Azerbaijani industrial companies to produce less productive quality products. The main goal here is to provide more and more quality products to the domestic market, while at the same time entering global markets, Azerbaijan's brand-new brands are more stable and acceptable.

Suggestions.

- The examination of the implementation capacities of the six sigma production processes involves the establishment of a partnership between the industrial firms and the 6 sigma international training center.
- Supporting people who implement of 6 sigma and supporting their participation in 6 sigma certification programs.
- State support and stimulation of the application of six sigmans to achieve higher quality product production in industrial parks and operating companies established in Azerbaijan
- Providing institutional and financial support to international firms and certification companies.
- Not only in production, but also in the process of sustainable development modeling in all processes using six sigma

CONCLUSION

Every economic unit in which the production process exists has theoretically opportunities to improve process competence, and when it is considered in this direction, Six Sigma can be applied wherever there is a production process. However, the Six Sigma approach should not be limited to the units involved in the production business. We can say that Six Sigma is applicable in every field where there are losses and opportunities. However, the viability of Six Sigma, which deals with the production business, will be easier to observe and examine than other business lines. From this point of view, a few features are noteworthy when separating into a service and production sector.

In this study we have learned that the 6 sigma philosophy and its industry are well-known principles. At the same time, one of the main goals was to understand the role of 6 sigma in the industry's enhancement of quality. Although 6 sigma are mainly applied in the western industry, six sigma are already used in industrialized economies. This is a system that allows you to always look inside the trends of the industry and is used in every process to improve quality from the beginning to the end of the production process.

It supports general quality management of modern production systems and sustainable development combined with lean system.

One of the most important results is that the renewable Azerbaijani industry has 6 sigma envelopes that can be expanded in the verification period..It shows that the need for a system that can support modernization and transition to better quality production systems can be met with 6 sigma.

During the research, it is apparent that there is six sigma for the application of two part:

1. continuous development
2. re-formulation.

Even though these processes in the industry are completely separate, the capacity of the six sigma is one of the most effective ways to reach both ends.

Qualitative constraints in the manufacturing process are typically human driven by method or environment, and the main issue here is to have Nails with fewer edges. The complex application of the squeezing 6 sigma conditions for finding and resolving the boundaries of any factor. Of course, this system is new to Azerbaijani production traditions, and the most important factor for this is human resources.

In our research, we observed that there were very few companies in Azerbaijan with 6 sigmanl complex applications.

This is largely due to the lack of knowledge of the 6 sigma philosophy to firms, the lack of training in the teaching systems, lack of proper credibility and financial difficulties.

However, , it should not be forgotten that the added value of the 6 sigma in the production will ultimately be superior to any industry company.

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