## Lean Six Sigma Quality Transformation Toolkit (LSSQTT)

The highly competitive global economy is characterized by organizations with high quality products at competitive prices with just in time delivery. Frequently production of one product occurs at various locations around the world, composed of various supplier and customer relationships. The days of one facility providing all functions, and all elements of production being at one location, are rapidly becoming a thing of the past, as is production at the pace of the producer rather than the pace required by the customer.

Excellent quality, obviously, must be accounted for, as part of production, and clearly, organizations cannot ignore the cost of this quality. Customers will definitely require competitively priced products, delivered at high speed and with high quality. Passing along the cost of quality, to customers, simply "buried" in the product cost, as we may have been able to do some years ago, will not work any longer in the competitive future. Organizations wishing to be competitive, now and in the future, must provide high quality products, at low cost, faster than their competition.

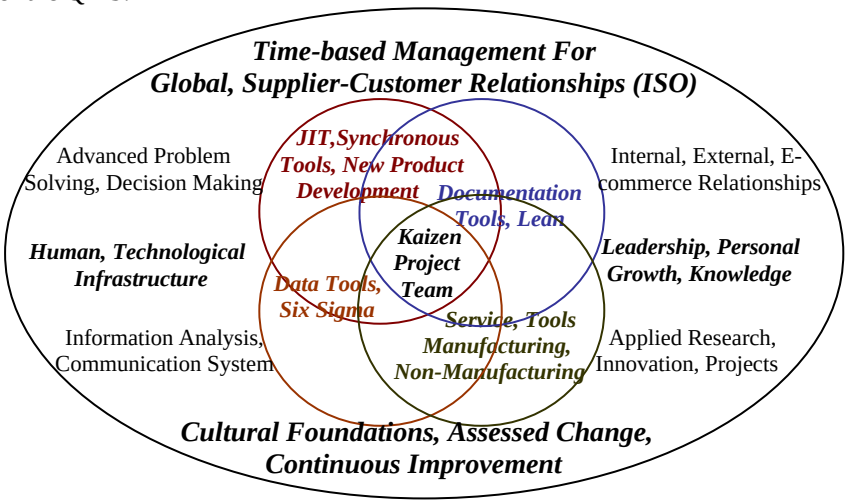
The bottom line is that organizations that simply produce products or services without accounting for quality, in cost effective ways, will not be competitive and they will not survive in the global marketplace. Put another way, organizations must integrate quality systems into their production systems, and this must be done in seamless and value adding ways. International standards must be foundational as part of the quality systems for production globally, and the organization must effectively apply lean and six sigma principles in the quality and production systems. All of this must be done increasingly as part of the broader system. Quality systems can not be thought of as an "add on", another element of what we must attend to because someone says do it. Quality must be a way of life in all that we do, integrated from top to bottom as the overall management system. Management cannot be thought of as a separation from actual value adding elements in production. All must be viewed as value adding systems, collectively identified as the quality management system (QMS).

Part of the key to this rather substantial paradigm shift is to truly empower workers. Particularly at the workplace level, where product is actually having value added, directly, the workers must now increasingly be managers. Changes throughout the organization must be attended to and bring about a cultural paradigm shift necessary to actually shift control and decision-making, in doable and respectful ways, into the workplace. While much will continue to be at the supervisory level, much will be as teams and workers in what used to be shop floor, or if not in manufacturing, the "firing line". The QMS focuses on production, rather than manufacturing solely, since much of what the world demands today is produced but not necessarily manufactured in the traditional sense. Production takes into account virtually any act which attempts to add value, and is not limited to only traditional manufacturing value added functions based on changes in materials. The nature of value adding has shifted to include changes in information as value added, systems for moving information, and assuring effective communications in all that we do as value added services. This is also true since any service industry function can be production, including construction, health care, transportation, recreation, academia, government entities, and so on.

QMS's are applicable to all functions and whether a traditional material based product is manufactured or produced is perhaps irrelevant. What is important is that we are adding economic value to the base of productive activity. While the main interest is on the QMS, obviously other elements and sub-systems are relevant and important as productive outputs. Production is the synthesis of infrastructural and organizational principles and methods used to produce products—relationally interconnecting the QMS. This also acknowledges the extent to which QMS principles and methods have permeated the organization.The various systems rely on standardized processes to assure production of quality products and reduce counter productive forces in the systems and on workers. By being involved, workers have the opportunity to have a direct impact on the design of their production system, the performance required of them and continuous improvement. The QMS, thus, provides the framework for the implementation and further development of other systemic methods. Through consistent, ongoing, implementation and modification of the QMS, organizational competitiveness will be continuously improved.

A model to help facilitate what is being discussed is shown nearby, identified as the Lean, Six Sigma, Quality Transformation Toolkit (LSSQTT). While not a pure model for production, the LSSQTT is a blend of QMS and production elements. Based heavily around the QMS, the LSSQTT is an integrated process and system design, implementation and sustainability model. The LSSQTT model describes how to add value in the process of producing products. The description as a model is deliberate to help illustrate integration of individual principles within a holistic system. Each part is not fully functional as an individual entity, and the resulting integrated model is one that is greater than the sum of it's individual elements. The LSSQTT is also a

functional courseware designed to help define and do continuous improvement and change organizationally, within a context of the QMS.




## *Lean, Six Sigma, Quality Transformation Toolkit*

LSSQTT courseware provides a template for organizations to transform their collective culture, through workers, based on:

- 42 tools digitized for optimum flexibility, use via the internet online, or in traditional delivery.
- Lean, six sigma for variation and waste reduction using team-based "Kaizen" change focus.
- ISO, QS and Baldridge total quality and global “cultural” view, engaged as technical teams.
- Hands-on problem solving, real or simulated applied research projects, critical thinking.
- Courseware “template” facilitates portfolio development and assessment of quality issues.
- Content is structured in MS Word standard “text” long form and power point short form.
- Electronic communication assessing, reflecting on e-commerce issues and opportunities.
- Individual and team leadership in a learning community environment, service oriented projects.
- All tool applications are MS Word “excel” format, user friendly key concepts and examples.

The seven part toolkit series was developed through work with 100's of industries since the 1980’s in various environments. The LSSQTT courseware system, as a template in model form, is the basis for structured discipline, explained graphically on the previous page, and further now.

The outer ring represents the broadest of culture or infrastructure required to conduct quality management system functions and productive work organizationally. Beginning on the upper left, advanced problem solving and decision making; and applied research and innovation projects in the lower right, define technical requirements for an organizational culture, to function as a disciplined system. Human and technological infrastructure are arranged to facilitate technical work of the organization via teams and projects. Information analysis and communication systems, internal and external, provide for e-commerce in the future, both shown at the lower left and upper right, since work in the toolkit is designed to be in electronic teams.

At the center, connected and inter-related data, documentation, service and synchronous tools are required to understand and do QMS’s foundationally. Facilitating basic problem solving opportunities which lead naturally to teaching and learning in team projects, change and growth occur, based on continuous improvement through empowered knowledge, individually and collectively. The nature of change that implementation of QMS’s entails requires involvement of virtually everyone organizationally. Although the QMS can and should be applied across many aspects and functions organizationally, primary focus is team at work place level. Although much of the QMS is broad-based, requiring higher level management decisions and impetus, the team and workplace level are the primary interest in the toolkit model.

The QMS has been initiated under ISO 9000 rubrics, and in many cases now serves as a “umbrella” for the broader quality system. As ISO 9000 certification and registration systems were introduced and implemented in the 1980’s and 90’s, and beyond, around the US and world, this has driven the cause of quality to new heights organizationally and functionally. What was intended to serve as a vehicle for growth and

change in the global marketplace was also a catalyst for change toward a quality focus for all of us in much that we do. This includes our workplace, but also many of the local community-based institutions we are part of.

Various quality initiatives have come, and some have gone. But most have stayed in one form or another, and their impact continues to be felt as part of the broader quality movement and QMS. The quality tools which have risen to the forefront today, now a part of the broader QMS, include statistical process control tools such as variable and attribute charting, capability and gage R & R indeces, generally identified as six sigma or data-based systems; industrial engineering tools such as standardized work analysis, capacity analysis, corrective action, 5'S's, and others commonly now called lean systems; and, quality planning tools for new product development such as process control planning, quality function deployment, part qualification and others commonly identified as synchronous. There are others, and depending on the nature of industrial activity, products produced, resources used, and so on, the point must be underscored that the quality field has contributed huge tools which continue to be refined and applied.

Today's environment of change is a strong and substantive global emphasis, with overtones that cannot and ought not be ignored. The QMS model, defined as LSSQTT, enables and helps us prepare for this global reality. Part of what we must do is use the tools we have evolved in the quality profession in novel and innovative ways to help improve well beyond our workplace only. We must be continuously changing for the good, and developing a culture of learning and transfer of knowledge, grown based on problems solved day-to-day, turned into improvements. When we solve a problem today it should be documented in ways which can be shared electronically with others to help them avoid the same pitfalls, and to therefore enable all to move forward collectively in a partnership for competitive growth. This is certainly also true at the community level. We will see an upsurge in changes at the infrastructural level in the future—changes which will need quality systems and certainly reflective of the QMS type rubrics being discussed here.

The LSSQTT uses data and documentation as the main communication vehicles, collected and housed electronically wherever possible. Data and documentation, are at the heart of the system, used to solve problems and add value in ways which disciplined and knowledgeable workers can do. The best emphasis in the LSSQTT is at the worker and workplace level, recognizing these people are the one's needed to be empowered and grown for future activities and leadership functions. Leaders at all levels will have been groomed out of and based on workplace functions, "where the action is".

Everything in the LSSQTT is about teams. Since we understand that teams composed of diverse and varied talents, many whom will look and speak different from ourselves in the future, will increasingly be our strength organizationally. Teams will be electronic increasingly in the future, and while production will be fixed place, we must understand that learning and growth for individuals first, and then teams, will come increasingly not from the person next to you only in the workplace. Increasingly, we learn from persons we are connected to based on a project or systemic workplace change—but done electronically—from around the world.

Teams will focus not only on getting product out the door in the future, required to pay bills day-to-day. But we will also work synchronously with data and documentation collected and built around day-to-day production in fairly mundane, yet sophisticated and disciplined ways. Information collected must be used for longer term planning and decision-making issues related to new products, innovations, and how to do broad-based organization change as improvement. Teams must focusing increasingly on use of what is learned day-to-day in basic production, and documented in data-driven ways, but we must also be applying what we learn and know in production, as value adding potentials to advance the organization in the future.

***LSSQTT organization and structure.*** The toolkit is organized around seven separate sets focused on different aspects of the model and QMS. Each set is used in different courses, as described briefly below.

***Primer Tools (1-6): Technology Systems Introduced.*** Primer tools introduce and overview Technology Systems and the toolkit system, explained at a rudimentary level. Primer tools are for introductory courses and persons just getting started.

1. Technical Foundations For Industrial And Technological Systems
2. Materials And Processes For Technical Managers
3. Process Engineering, Design And Innovation
4. Cost Analysis And Productivity Improvement
5. Quality Systems
6. Automation And Computer Integration

***Foundational Tools (7-12): Assessing Technological Innovation, Change And Improvement.*** Tools 7-12 focus on technical management, innovation and assessment for change, within broader global forces.

7. Team Building, Communicating The Project: Problem Solving, Improvement, Innovation.
8. Technological Systems' Leadership For Change And Improvement.
9. Infrastructure For Managing Innovations, Problem Solving, And Creativity.
10. ISO 9000 Infrastructure For Standardized Management, Assessment and Decision Making.
11. Robust Design For New Product Development, Innovation And Patent.
12. Lean, Six Sigma Tools: Decision Making As The Engineering Economy .

***Data Tools (13-18): Statistical Process Control, "Six Sigma" Improvement For Lean Systems.*** Data tools focus on improvement and enhanced decision making and problem solving via data applications for process improvement and variation reduction are the focus.

13. Statistical Foundations For Data Based Improvement, Lean, Six Sigma Solutions.
14. Attribute Data, The Obvious Starting Point For Lean, Six Sigma, Service.
15. Variable Data, Comparisons To Attribute Charting For Six Sigma, Lean Service.
16. Basic Measurement, Geometric Relationships, Broader Data-based Issues.
17. Gage Repeatability And Reproducibility (R & R): Inspection And Measurement.
18. Capability, Charts And Quality Characteristics Analysis For Six Sigma And Lean

***Documentation Tools (19-24): Genealogy of Lean, Six Sigma.*** These tools build on data and foundations via documentation for analysis and problem solving in technical management. Systematic analysis focuses on Kaizen techniques for lean environment variation reduction.

19. Genealogy Of Selected Lean, Six Sigma, Quality Management Systems' Tools.
20. Standard Operating Procedures (SOP) For Lean And Six Sigma: Infrastructure For Understanding Process.
21. Quality Management Systems For Continuous Improvement.
22. Synchronous And JIT Production, Lean Six Sigma Best Practices.
23. Total Productive Maintenance: First Line Management For Improvement.
24. Global Technological Learning Organization Culture: Human Resource Development Infrastructure.

***Documentation Tools (25-30): Communication, Management Systems, For Lean, Six Sigma.*** These tools build on data and cultural concepts via documentation for analysis and problem solving. Systematic analysis focuses on Kaizen for lean environments and variation reduction.

25. Kaizen Documentation Foundations For Process Variation And Waste Reduction.
26. Economic Considerations, Cost Related Documentation And Quality Relationships.
27. Ongoing Process Control Plan (OPCP), Standard Operating Procedure (SOP) Communication.
28. Synchronous Production: Enhanced Best Practices, Change, Lean.
29. Failure Mode And Effects Analysis (FMEA) And Quality Functions Deployment (QFD).
30. Total Productive Maintenance, Safety And Ergonomics: Re-engineered Lean Environment.

***Service Tools (31-36): Lean and Six Sigma For Non-Manufacturing Industries.*** Service tools apply data and documentation principles to non-manufacturing and technical service environments for improvement via six sigma and lean for variation reduction in systematic ways.

31. ISO 9000 Maturing: Foundations For Quality Services, Auditing, Lean Improvements.
32. Culture For Service, Communications And Management As Disciplined Opportunities.
33. Documentation For Quality And Productivity Improvement: Lean Foundations.
34. Data, Basis For Kaizen, Six Sigma, Quality Systems, Service.
35. Information Technology, Maintenance And Safety.
36. Innovative Leadership: Managed Service For Change In Lean Environments.

***Synchronous JIT Tools (37-42): Time-based Management For Kaizen And Future Planning.*** These tools help grow talent to lead new product development and robust technical management systems for the future, built on existing data, documentation and service tools, synchronously.

37. ISO 9000, Quality Launch Systems: Supplier Relationships Guiding Our Synchronous Future".
38. OPCP, FMEA, QFD Synchronized As Documentation For Advanced Problem Solving.
39. Data And Documentation For Advanced Quality Planning: Emphasis On Qualification.
40. Robust Design, Reliability And New Product Development.
41. Technical Material And Process Considerations: Innovation, Change, And Applied Research.
42. Advanced SPC, Reduced Variation And DOE As An Improvement System.