

A STUDY OF THE CRITICAL SUCCESS FACTOR OF QUALITY TOOLS AND TECHNIQUES IMPLEMENTATION: A CURRENT REVIEW

Nur Shafiqah M.S.¹, Mohd Amran M.D.², Khairanum S³

^{1,2,3}Quality Engineering Research Cluster, Quality Engineering Section,
Malaysian Institute of Industrial Technology,
Universiti Kuala Lumpur, Malaysia

Email: ¹shafiqah.sharifuddin@gmail.com, ²mamran@unikl.edu.my, ³khairanum@unikl.edu.my

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Abstract

Quality tools and techniques are also known as QTT are skill or method that can be implemented to particular tasks and they are used to encourage positive change and improvement. QTT is a crucial element of any successful improvement process. Nowadays, the organization is facing increasing competition from global markets. The implementation of QTT in the industry have been long introduced, but not many of the organization can use it with success. So the need for an improved understanding of the critical success factor of QTT implementation becoming more important. This research review and analyzes those critical success factors developed by previous study. Based on a comprehensive literature review, seven constructs had been identified for the CSF of QTT implementation. From the findings, the conceptual framework of CSF QTT is been developed.

Keywords-- Quality tools and techniques (QTT); Critical success factor (CSF)

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INTRODUCTION

Skills, means, methods or mechanisms that can be implemented to particular tasks and used to encourage positive change and improvement are Quality Tools and Techniques or also known as QTT (McQuarter et al. 1995). The use of QTT is a crucial element of any successful improvement process (Bunney and Dale 1997). They affirmed that the significance of the right training at the right time to the right people if the advantage of QTT is to be realized. Examples of QTTs are cause and effect diagrams, flowcharts, control charts, histograms, relationship diagram and Pareto analysis. While the examples of techniques are benchmarking, statistical process control (SPC), failure mode and effects analysis (FMEA), design of experiments (DOE) and quality function deployment (QFD).

QTT is fundamental of continuous improvement. Both of them have specialist and universal applications. Quality improvements are probably to be unsystematic and unplanned rather than thorough in the event if they are not used in a systematic manner. Better understanding of the critical factors for effective and successful QTT implementation becoming the need and more vital (Nilda Tri Putri & Yusof, 2009). However, it can make challenges in their selection, application and successful use in light of the assortment and by their temperament intricacy.

According to Spring, McQuater, Swift, Dale, & Booker, (1998), to comprehend and encourage improvement in any process, the use and application of the QTT within an effective problem-solving methodology are extremely important.

They also added that this is trailed by the application of suitable controls to improve and maintain the improvements that have been made. Mcquater, Dale, Hillman, and Scurr (1995) have listed the key role of tools and techniques in a company-wide approach to continuous improvement, which are enable the processes to be checked and assessed, everybody to become involved in the improvement process, people to take care of their own issues, a mindset of continuous improvement to be created, a transfer of understanding from quality improvement activities to everyday business operations and reinforcement of teamwork through problem-solving.

For the effective introduction, development and implementation of QTT in any organization, one should consider the factors which will drive the implementation of QTT successful in their organization.

LITERATURE REVIEW

The objective of this study is to review the critical success factors of applying the QTT in improvement activities that obtain from the previous study. From the review, this paper will suggest the conceptual framework of QTT CSF to apply the QTT in the organization.

There are 11 references found that discussed on the CSF of QTT in improvement activities. Table 1 show the list of CSF from previous study.

Table 1. CSF from previous study

Bil	Title of Journal	CSF
1	Critical Success Factor for Implementing Quality Engineering Tools and Techniques in Malaysian's and Indonesian's Automotive Industries: An Exploratory Study.[7] (J1)	<ol style="list-style-type: none"> 1. Management responsibility 2. Resource management 3. People management 4. Quality in design and process 5. Measurement, analysis and feedback 6. Supplier management

		7. Customer focus
2	Six-Sigma to operational excellence: role of tools and techniques.[3] (J2)	<ol style="list-style-type: none"> 1. Top management commitment 2. Availability of resources 3. Well-designed education and training programme 4. Rigorous project management approach
3	Comparison of Quality Engineering Practices in Malaysian and Indonesian Automotive Related Companies.[10] (J3)	<ol style="list-style-type: none"> 1. Management responsibility 2. Resources management 3. People management 4. Quality in design and process 5. Measurement, analysis and feedback 6. Supplier management 7. Customer focus 8. Quality technical material 9. Quality jiritsuka/ independent
4	Excellence toolbox: Decision support system for quality tools and techniques selection and application.[13] (J4)	<ol style="list-style-type: none"> 1. Equipped with tools designed 2. Encourage staff to get involved 3. Reliable and complete information
5	The use of quality management tools and techniques: a study of application in everyday situations.[1] (J5)	<ol style="list-style-type: none"> 1. In-depth knowledge of the process 2. Formal training in problem solving techniques 3. Appropriateness of tools selected for use 4. Application simple models at all levels in the organization to aid communication and learning
6	An exploratory study of the use of quality tools and techniques in product development.[14] (J6)	<ol style="list-style-type: none"> 1. Support from top management 2. Systematic process in the whole system 3. Better packaging and marketing of the tools 4. Team cohesiveness 5. Technical expertise of personnel 6. Proper training 7. Commitment 8. Awareness and understanding of potential benefits in the long run 9. Technical competence 10. Team work 11. Synergetic middle management
7	An Empirical Investigation of Quality Tools and Techniques Practices in Malaysia and Indonesia Automotive Industries.[8] (J7)	<ol style="list-style-type: none"> 1. Every person in the company involved 2. Apply related tools and techniques 3. Continuous improvement 4. Teamwork
8	Using quality tools and techniques successfully.[6] (J8)	<ol style="list-style-type: none"> 1. Full management support and commitment 2. Effective, timely and planned training 3. A genuine need to use the tool or technique 4. Defined aims and objective for use 5. A co-operative environment 6. Backup and support from improvement facilitators
9	The implementation of quality management tools and techniques: a study.[4] (J9)	<ol style="list-style-type: none"> 1. Training should be undertaken just-in-time and given in such a way that employees can practice what has been taught in a step-by-step manner 2. Specific training needs to be considered for improvement teams 3. Employ local examples which employees can associate with in training 4. Use a planned approach for the application and use of tools and techniques 5. Ensure management understanding

		<ol style="list-style-type: none"> 6. Do not expect a single tool/techniques to be a solution to all issues 7. Make facilitators responsible for encouraging the use of tools and techniques in everyday work processes 8. Do not underestimate resistance to graphical tools 9. Practice patience and persistence 10. Encourage as many people as possible to become involved in measuring and analysing process performance
10	Benchmarking the use of Tools and Techniques in the Six Sigma programme base on a survey conducted in a developing country.[1] (J10)	<ol style="list-style-type: none"> 1. Support by top management 2. Developing training for tool application 3. Cooperative involvement 4. Support facilitators 5. Availability of resources 6. Rigorous approach to project management 7. Developing a diagram to decide when to use a specific technique or tool
11	Critical Success Factor for Implementing Quality Engineering (QE) in Malaysian's and Indonesian's Automotive Industries: A Proposed Model[9] (J11)	<ol style="list-style-type: none"> 1. Management responsibility 2. Resources management 3. People management 4. Quality in design & process 5. Measurement, analysis & feedback 6. Supplier management 7. Customer focus

There are 72 CSF found from the above references. However, there are several CSF are found repeated in several journals. Thus, after did screening process on the each journal by

removing duplicate CSF, there are actually 25 CSF in using QTT for improvement activities. Table 2 show the list of CSF from previous study after combine the duplicate CSF.

Table 2. Compilation of CSF

No	Critical Success Factor (CSFs)	Frequency of Occurrence
1	Management responsibility	9 (J1,J2,J3,J4,J6,J8,J9,J10,J11)
2	Education and training	6 (J2,J5,J6,J8,J9,J10)
3	Use of tools and techniques	6 (J4,J5,J6,J7,J8,J9)
4	Resource management	5 (J1,J2,J3,J10,J11)
5	Technical expertise of personnel	4 (J6,J8,J9,J10)
6	Staff involvement	4 (J4,J6,J7,J9)
7	People management	5 (J1,J3,J6,J9,J11)
8	Team cohesiveness	2 (J6,J7)
9	Quality in design and process	3 (J1,J3,J11)
10	Measurement, analysis and feedback	3 (J1,J3,J11)
11	Supplier management	3 (J1,J3,J11)
12	Customer focus	3 (J1,J3,J11)
13	Rigorous project management approach	2 (J2,J10)
14	Application simple models to aid communication and learning	2 (J5,J10)

15	Awareness and understanding of potential benefits	1 (J6)
16	Quality technical material	1 (J3)
17	Quality independent	1 (J3)
18	Reliable and complete information	1 (J4)
19	In-depth knowledge of the process	1 (J5)
20	Systematic process	1 (J6)
21	Technical competence	1 (J6)
22	Continuous improvement	1 (J7)
23	Defined aim and objective for use	1 (J8)
24	Co-operative environment	2 (J8,J9)
25	Do not underestimate resistance to graphical tools	1 (J9)

FINDINGS

From above findings, there are several CFS are found having similar focus. For example the team cohesiveness and staff involvement is mainly refer to the people management. Thus, the clusering of those CSF apparently could narrow the focus of

CSF. Therefore, all CFSs above had been re-arranged through one of seven New Quality Tools called Affinity Diagram. This tool is used to systematically segregate all 25 CSFs into a group and a new header of that group is created as shown in Table 3.

Table 3. New header of CSF

NO	New Header	Critical Success Factor (CSFs)
1	Management Responsibility and Leadership	Management responsibility
		Awareness and understanding of potential benefits
2	People Management	Education and training
		People management
		Technical expertise of personnel
		Team cohesiveness
		Staff involvement
		Technical competence
		Co-operative environment
3	Customer Management	Customer focus
4	Supplier Management	Supplier management
5	Quality in Design and Process	Use of tools and techniques
		In-depth knowledge of the process
		Rigorous project management approach
		Quality in design and tools
		Defined aim and objective for use
6	Measurement, analysis and feedback	Systematic process
		Measurement, analysis and feedback
		Application simple models to aid communication and learning
7	Resource management	Continuous improvement
		Resource management
		Reliable and complete information

Finally, after gone through clustering analysis using Affinity Diagram and new header mapping versus source as show in Table 4, authors had proposed in a structured manner on new CSFs framework as shown in Figure 1.

Table 4. Mapping the new header and sources

CONSTRUCT / JOURNAL	1	2	3	4	5	6	7	8	9	10	11	Total
Management Responsibility and Leadership	/	/	/			/		/	/	/	/	8
People Management	/	/	/	/	/	/	/	/	/	/	/	11
Customer Management	/		/								/	3
Supplier Management	/		/								/	3
Quality in Design and Process	/	/	/	/	/	/	/	/	/	/	/	11
Measurement, analysis and feedback	/		/				/		/		/	5
Resource Management	/	/	/	/	/			/		/	/	8

CONCLUSION

In conclusion, critical success factor of QTT implementation is very important to be identified as it helps organizations to implement the QTT successfully. Other than that, any organization that already implements QTT can improve the flaws in their QTT implementation. The conceptual framework is the first draft for the critical success factor of QTT implementation. From the framework, the questionnaire can be developed to confirm the framework from the perspective of industries in Malaysia.

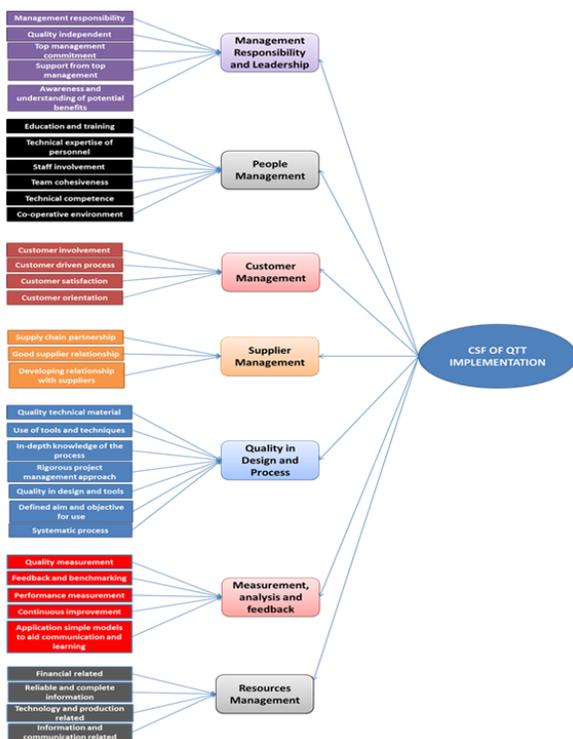


Figure 1. Conceptual framework of QTT CSF

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