

Implementation of Total Quality Management (TQM) in Skilled-intensive Small and Medium Enterprises (SMEs): A Case Study using Analytical Hierarchical Process (AHP)

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Abstract

Leather, garment and textile are a few examples of skilled intensive manufacturing, which require skilled labor and use low technology. In order to face the open competition that arose alongside, some of them resorted to manufacturing strategies that were popular in other engineering sectors. Skilled intensive small and medium enterprises (SMEs) have been still in the introductory stage of implementing manufacturing strategies such as total quality management (TQM). The objective is to identify the importance of critical success factors at the introductory stage to implement TQM. Critical success factors are identified by case study. Based on the longitudinal case study, Analytical Hierarchical Process (AHP) is used as a supplemental decision making tool to identify the importance of critical success factor. Based on our analysis, we identified the critical factors.

Keywords: SMEs; Case study; TQM; AHP

1. Introduction

In developing countries like India, skilled intensive SMEs that have highly skilled using low technology like leather, garment, textile and so forth, are progressively improving their competitiveness (Dangayach and Deshmukh, 2005) because globalization has provided an opportunity to create niche markets (McAdam and Kelly, 2002; Cagliano et al., 2001), provided they survive the open competition that goes along with it (Singh and Jain, 2007). Skilled intensive SMEs are characterized by a huge presence of manual labours that are typically artisan, implying a low level of automation because artisans are traditionally skilled to perform the work. Leather SMEs are at a threshold in introductory stage in TQM implementation and it is also a paradigm shift from feudal conservative to modern

manufacturing system. The introduction phase is an important phase of implementation (Ghobadian and Gallear, 1996). Based on the success/ failure in the introduction phase, LSMEs can strive further for TQM implementation.

Successful implementation of TQM has depended on several factors such commitments of top management, involvement of employee, continuous improvement and the use of appropriate performance measures (Goh and Ridgway, 1994; Ghobadian and Gallear, 1996; Ghobadian and Gallear, 1997; McAdam, 2000; Yusof and Aspinwall, 2000b; Hansson and Klefsjo, 2003; Kumar et al., 2009; Salaheldin, 2009). The choice of appropriate tools and techniques and their role in the success of implementing TQM has been emphasized by later studies. Tools and techniques were supported with critical success factors (Hellsten and Klefsjo, 2000; Yusof and Aspinwall, 2000d; Ahmed and Hassan, 2003; Tari and Sabater, 2004; Bamford and Greatbanks, 2005).

Most of the studies conducted for critical success factor using cross-sectional study in technology intensive SMEs like automobile, electronics and other engineering (Goh and Ridgway, 1994; Ghobadian and Gallear, 1996 and Ghobadian and Gallear, 1997; Husband and Mandal, 1999; McAdam, 2000; Yusof and Aspinwall, 2000; Yusof and Aspinwall, 2001; Hansson and Klefsjo, 2003; Kumar et al., 2009 and Gadenne and Sharma, 2009; McAdam et al., 2010; Kumar et al., 2011; Oliveira et al. 2017; and Anholon et al., 2018). Sharma (2015) modelled enablers for implementing TQM in autoancillary SMEs. There is a paucity of literature which analyzes critical success factor for TQM implementation issues in skilled intensive sectors like LSMEs using a longitudinal study with AHP at the introductory stage. Skilled intensive SMEs have been still in the introductory stage of implementing manufacturing strategies such as total quality management (TQM). The objective is to identify the importance of critical success factors at the introductory stage to implementing TQM.

2. A Case Study of Footwear Manufacturing Company

Company A is a subsidiary of a family owned group of independent business units and has customers world-wide. This company has also been audited and certified as ISO 9001:2000. It is a leather footwear medium-sized manufacturer. It is a leather footwear manufacturer whose primary market is in Europe and America. The nature of each of the markets is different from each other in terms of the production volume, length of product life cycle, customer price, product design, production process and variety during period of observation.

Based on our analysis of various factors pertaining to implementation of TQM, we infer the following failures and its reason.

1. Inappropriate tools and techniques
2. Performance measure as obstacles
3. Insufficient training
4. Improper layout
5. Attitude problems
6. High top management commitment without improper planning

Critical success factors and their performance measure are identified by case study for adopting TQM. Based on the case study, Analytical Hierarchical Process (AHP) is used as a supplemental decision making tool to identify the importance of critical success factor. AHP is done using Super Decision software (Table 1)

Table 1 AHP Analysis for TQM implementation at local level

Rank	Critical Success Factor (Level 1)	Performance Measure (Level 2)		Importance	Rank
1	Top Management Commitment (0.5229)	Allocate budget and resources	AB	0.651229	1
		Monitor progress	MP	0.158814	2
		Control through visibility	CV	0.126099	3
		Planning for change	CP	0.063857	4
2	Tools and Technique (0.2506)	Checklist	CH	0.260066	1
		Pareto Analysis	PA	0.146948	2
		Graph (Run, Pie, Bar)	GR	0.134766	3
		Flow Chart	FC	0.101113	1
		PDCA Cycle	PC	0.100496	2
		Statistical Process Control	SPC	0.077344	3
		Time and Method Study	TM	0.045928	4
		Control Charts	CC	0.040406	5
		Cause and Effect Analysis	CE	0.032245	6
		Brainstorming	BR	0.020797	7

Rank	Critical Success Factor (Level 1)	Performance Measure (Level 2)		Importance	Rank
		Histogram	HI	0.017518	8
		Management Tools	MT	0.011986	9
		Scatter Diagrams	SD	0.010387	10
3	Coordinating Team (0.0976)	Support from Production Team	SP	0.454545	1
		Support from Top Management	ST	0.454545	2
		Utilization of Employee	UE	0.090909	3
4	Training (0.0538)	Training budget	TB	0.658657	1
		Time allocation	TA	0.185164	2
		Problem solving skills	PS	0.156180	3
5	Layout (0.0338)	Worker Movement	WM	0.518995	1
		Process Flow	PL	0.303512	2
		Material Handling	MH	0.177494	3
6	Performance Measure (0.0215)	Rework	RE	0.372070	1
		Defect rate	DE	0.332154	2
		Process Quality	PrQ	0.168248	3
		Product Quality	PdQ	0.058373	4
		Throughput	TH	0.037105	5
		Process Cycle Time	PCT	0.032049	6
7	Attitude of Manager (0.0198)	Manager's Ethos	ME	0.874967	1
		Manager's Control	MC	0.125033	2

3. Conclusions

Most studies point out that the main factor for failure of SMEs is lack of top management commitment. In spite of high top management commitment without improper planning, several barriers like performance measure as obstacles, insufficient training, improper layout and attitude problems of managers are identified for implementation of TQM because of imitation from automotive SMEs. It is extensively reported in literature (Massa and Testa,

2004) that the traditional benchmarking promotes imitation because there is a paucity of research on TQM for SMEs among various sectors resulting in inappropriate imitation. Most of the studies pointed out that SMEs have to strive for adaptation than imitation directly from other manufacturing companies. However, they have only shown by cross-sectional studies. This study provides the detailed understating of how and why for failure of TQM implementation because of imitation from the other engineering manufacturing companies. The limitation of study is size that is very small to generalize the findings. It has to be validated by additional longitudinal studies and a few more LSMEs.

4. References

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