



Impact of TQM Concepts in Automobile Industry as a Strategic Advantage – A Review

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1. Introduction:

Over the Past few years, the emphasis in strategic management thinking has shifted away from industry structure and competitive positioning toward internal, firm specific with in strategic group factors (Cool & Schendel, 1988) such as culture (Barney 1968a; Fiol,1991),capabilities (Lawless, Berg and Wilsted, 1989;Stalk, Evans & Schulman 1992),administrative skills (Powell 1992),reputation (Weigelt and Camerer, 1988),know how (Hall, 1992) learning (Senge 1990; Gravin 1993),process improvement(Stalk and Hout, 1990) and organizational climate (Hensen and Wernerelt 1989).The resource theory of the firm has accelerated this shift, asserting that economic rents may stem from any strategic factor-internal, external, economic, behavioural, tangible or intangible-that meets the tests of value, scarcity and imperfect imitability.

Total Quality Management is a management approach that originated in the 1950's and has steadily become more popular since the early 1980's. Total Quality is a description of the culture, attitude and organization of a company that strives to provide customers with products and services that satisfy their needs. The culture requires quality in all aspects of the company's operations, with processes being done right the first time and defects and waste eradicated from operations. Total Quality Management, TQM, is a method by which management and employees can become involved in the continuous improvement of the production of goods and services. It is a combination of quality and management tools aimed at increasing business and reducing losses due to wasteful practices. Some of the companies who have implemented TQM include Ford Motor Company, Motorola and Toyota Motor Company. Today, high quality is absolutely essential to meet customer requirements. The TQM principles express the basic ideas and in this case the specialists have relatively different points of view. J. Juran formulates the following principles: client

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orientation, competitiveness, continuous quality improvement, client-supplier relations internalization, top management involvement. G. Merli places at the basis of TQM the following principles: clients' satisfaction, quality on the first plan, involvement of the entire personnel, continuous improvement. Analysing other opinions as well, we note nevertheless that the majority of specialists agree with the following principles which are at the basis of TQM:

1.1 The Six Basic concepts of TQM are as follows:

1. Focus customer requirements and product/service expectations.
2. Continuous improvement in the process is required.
3. Involve employees in understanding the quality aspects and make them accountable.
4. Treat suppliers as your partners.
5. Top management should be aware of current situation and needs to be committed towards TQM implementation.
6. Develop tracking mechanism for processes and improve it as per business requirements.

2. Literature Review:

- a) Manjunath and Arun Kumar (2013) determine whether the implementation of TQM leads to higher productivity and quality. The study was carried out at General Motors by collecting the primary data from the managers through structured questionnaire. The data was analyzed by descriptive analysis and Anova technique, the result revealed that there is a significant relationship between TQM implementation and high productivity and quality.
- b) Gomes da Silva Jonas; Nezu Kikuo; Ohfuji Tadashi(2002), evaluate 190 companies' performances that have or have not used TQM in Japan. A cross-sectional survey methodology is employed. Thus, seven categories with 80 key elements regarding American MBNQA and ten equations are examined. The main conclusions are that, although TQM remains helpful for Japanese business performance, globalization has created a highly competitive environment where companies using only TQM (or another single management system) will not be able to survive in the long term; and that the examined self-assessment questionnaire, although far from 100% perfect, is a reliable and valid instrument for calculating business performance.
- c) According to Xavier Richet & Joel Ruet (2008) in their study titled "the Chinese and Indian automobile industry" compared the automobile industry in China and India allows us to shed light on the economic processes of emergence at large. There is a stark contrast in the capacities of atomisation of the sector in the two countries. This contrast serves as an analyser of the relationships between the

modes of sector opening and the paths of technological catching-up that is at the core of the phenomenon of emergence.

d) According to Krishnan Viswanathan (2009) in his study titled “Indian automotive industry: opportunities and challenges” analysed the Indian automobile industry is currently experiencing an unprecedented boom in demand for all types of vehicles. This boom has been triggered primarily by two factors (1) increase in disposable incomes and standards of living of middle class families; (2) the Indian government’s liberalization measures such as relaxation of the foreign exchange and equity regulations, reduction of tariffs on imports .this paper presents an introduction to the key players in the Indian automotive industry, a summary of the recent developments and an analysis of the opportunities in the car market.

e) According to Sachin Borgave & Chaudhari J.S (2010) in their study titled “Indian auto component industry : challenges ahead” analysed the Indian Automobile industry is flourishing its twigs worldwide and is close to a fruition of triumph in the global competition. The spine of the industry is its suppliers of auto components and accessories which is also an exclusive industrial segment. Today auto industry is enjoying the benefits while the auto component sector is in its gloom despite of hard efforts of survival. The factors making the differences are unavailability of resources like skilled labour and technology, high cost of production due to inflation and Government policies of indirect taxes such as customs and excise. The paper highlights the challenges faced by Indian auto component industry in domestic and global market.

f) According to Yousuf Kamal & Moriom Ferdousi (2009), in their study on “supply chain management in automobile industry: study of Ford vs. Toyota” analysed the supply chain management practices of two of the world’s largest automobile companies, Toyota Motor Corporation and Ford Motor Company. Analysis was done in the area of each company’s procurement and outsourcing strategies, relationship with alliances, and the use of information technology to obtain competitive advantage and supply chains are also discussed. Study found both the companies are facing International challenges and significant variation in their SCM practices of the two companies. The findings of the study can be useful for the automobile industry.

g) Mark Miller & Andrew Clark (2008), analysed how Toyota a powerful brand failed to reach the top of the global automotive industry ranking , as there was stiff competition in the market and customer preference where changing due to a better service or quality provided by the competitor & how Toyota aims in taking a swift action in accordance with market changes and by increasing the supply of models which were in high demand.

h) Asghar Afsar Jahanshahi (2011), explains the relationship between customer service and product quality with customer satisfaction and loyalty in the context of the Indian automotive industry. The automotive industry in India is one of the

largest in the world and one of the fast growing globally. Customer satisfaction and loyalty are the most important factors that affect the automotive industry. On the other hand, Customer service can be considered as an innate element of industrial products. Customer service quality, product quality, customer satisfaction and loyalty can be measured at different stages, for example, at the beginning of the purchase, and one or two years after purchase.

i) Arpita Khare & Anshuman Khare (2008), explores the role and relevance of CRM in creating sustainable relationships. The discussion focuses on the use of CRM technology in the financial sector in India. It highlights how they are changing their business processes to provide better value to the customer during the interaction. The paper recaps the growing relevance and demand for building relationships with customers and emphasizes the usage of information technology in creating better value for the end user. It also explores the practices being adopted in the financial sector organizations in India in redesigning their business processes to enhance their competitiveness through more meaningful interaction with customers. With information technology setting newer standards of performance, financial organizations able to reorganize their business and services around core processes are the ones that stand to succeed.

3. Role of TQM principles in Automobile Industry:

a) Focus customer requirements and product/service expectations:

The first and the most important characteristic of TQM is the attention granted by the company to the clients. Within the automotive industry as well, quality must satisfy and overcome clients' expectations. The purpose is the identification, then the meeting of all clients' needs. TQM admits that a perfectly built product has a reduced value as long as it is not what the client desires. This is why we say that the quality level is granted by the client. In any case, it is not always easy to determine what a client desires, because the tastes and preferences change. Also, clients' expectations vary from a client to another. For example, in the automotive industry, the preferences change fast, from small cars to four-wheel drive vehicles and then back to small cars.

In the automotive industry the main benefits for applying this principle are the following:

- Increased revenues and market quota obtained through flexibility and a quick answer related to the market opportunities
- Increased effectiveness regarding the use of the organization resources in order to increase clients' satisfaction
- The improvement of clients' loyalty degree which has as a result repetitive business transactions.

The application of this principle will lead to:

- Researching and comprehending client's needs and expectations

- Assuring the fact that the organization objectives are correlated with clients 'needs and expectations
- Communicating these needs and expectations within the organization
- Measuring clients' satisfaction and acting according to the obtained results
- The systematic management of the relation with the clients.

b) Continuous improvement in the process is required

Customer's expectations are always changing and typically rising as quality management begins to yield results. It is important to remember that when customers are assessing quality, they are not simply comparing us to our performance last year, but to every other organization that is serving their needs; from the Department of Motor Vehicles to the supermarket, (2001 B. Abohmed). TQM is mainly concerned with continuous improvement in all work, from high level strategic Specifications quality

Quality of the process result Requirements Specifications Product Expectations Desires Needs Product Principles of TQM in Automotive Industry planning and decision-making, to detailed execution of work elements on the shop floor. It stems from the belief that mistakes can be avoided and defects can be prevented. It leads to continuously improving results, in all aspects of work, as a result of continuously improving capabilities, people, processes, and technology and machine capabilities. Continuous improvement must deal not only with improving results, but more importantly with improving capabilities to produce better results in the future.

One of approaches that can help companies with continuous improvement: the plan –do– study – act (PDSA) cycle and describes the activities a company needs to perform in order to incorporate continuous improvement in its operation. The circular nature of this cycle shows that continuous improvement is a never-ending process.

Let's look at the specific steps in the cycle. Plan The first step in the PDSA cycle is to plan. Managers must evaluate the current process and make plans based on any problems they find. They need to document all current procedures, collect data, and identify problems. This information should then be studied and used to develop a plan for improvement as well as specific measures to evaluate performance.

c) Involve employees in understanding the quality aspects and make them accountable

TQM places a great deal of responsibility on all workers. If employees are to identify and correct quality problems, they need proper training. They need to understand how to assess quality by using a variety of quality control tools, how to interpret findings, and how to correct problems. These are sometimes called the seven means for quality control (cause and effect diagrams, Scatter diagram, flowcharts, Pareto chart, Histogram, Control charts, checklist).They are easy to understand and at the same time extremely useful in the quality problems identification and analysis.

Checklist - In automotive industry checklist facility owners, and technicians, determined there was a need for compliance assistance to automotive repair shops to help them attain or remain in compliance with applicable environmental regulations. Control charts- These charts are used to evaluate whether a process is operating within expectations relative to some measured value such as weight, width, or volume. For example, we could measure the width of a tire. When the production process is operating within expectations, we say that it is “in control”.

A critical aspect of building quality into a product is to ensure that the product design meets customer expectations. This typically is not as easy as it seems. Customers often speak in everyday language. For example, a product can be described as “attractive,” “strong,” or “safe.” However, these terms can have very different meaning to different customers. What one person considers to be strong, another may not. To produce a product that customers want, we need to translate customers’ everyday language into specific technical requirements. However, this can often be difficult. A useful tool for translating the voice of the customer into specific technical requirements is quality function deployment (QFD). Quality function deployment is also useful in enhancing communication between different functions, such as marketing, operations, and engineering. QFD begins by identifying important customer requirements, which typically come from the marketing department. These requirements are numerically scored based on their importance, and scores are translated into specific product characteristics.

Jaguar

After Ford acquired Jaguar, Jaguar’s quality improved rapidly. Smith (2001) attributes this quality improvement to Ford adopting Toyota’s production process at the Jaguar plant. These improvements were not due to product design changes, but to production system changes, which indicates that the production system affects quality.

Ford parts suppliers

Wilson and Sedgwick (2002) report that Ford analysed incidents when defective purchased parts caused Ford to halt shipments of vehicles, and that Ford concluded that ‘manufacturing problems caused 83 percent of these incidents, while design problems caused 17 percent.’

d) Treat Suppliers as your Partners

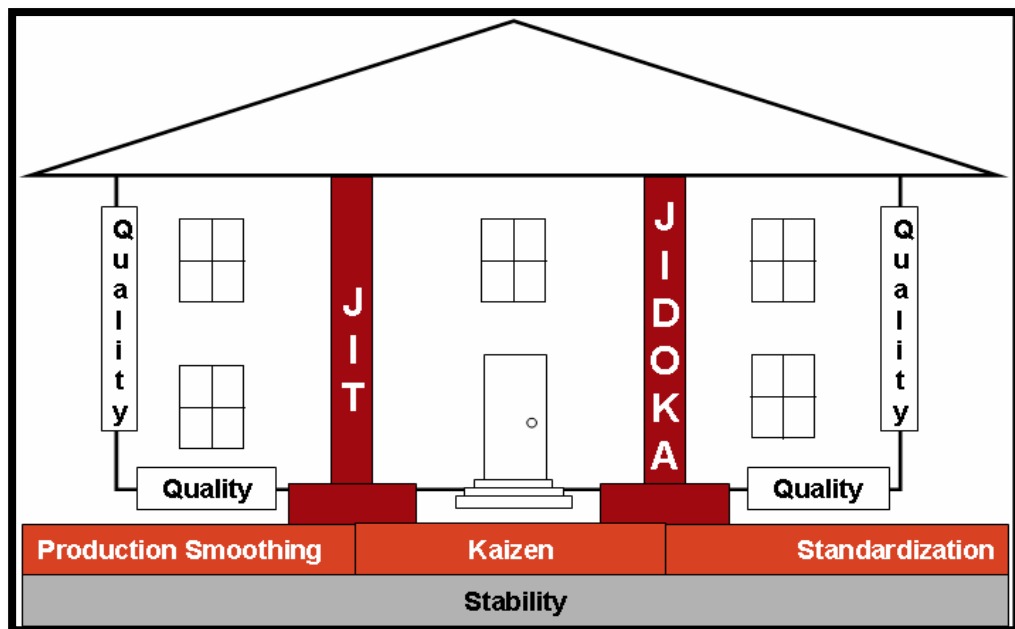
TQM extends the concept of quality to a company’s suppliers. The philosophy of TQM extends the concept of quality to suppliers and ensures that they engage in the same quality practices. If suppliers meet preset quality standards, materials do not have to be inspected upon arrival. Today, many companies have a representative residing at their supplier’s location, thereby involving the supplier in every stage from product design to final production. In order to obtain certain relations reciprocally advantageous we must analyze the following steps:

- Establishing the fields in which reciprocally advantageous relations could be developed between the suppliers and the organization;
- Creating a list with the potential partners;
- Identifying the persons with decision powers within the supplier's organization;
- Forming a team responsible for the development of new relations;
- Developing the mission and objectives which underlie the partnership; the main benefits of applying this principle:
- Increased ability to create value for both parties
- Flexibility and speed of the common answer to the market changes or to the clients' needs and expectations modifications
- The optimization of costs and resources the application of this principle will lead to the establishment of relations able to balance the short term profits with the long term considerations

e) Top management should be aware of current situation and needs to be committed towards TQM implementation

After Japan had lost World War II Toyota's president wanted to catch up with America (productivity and quality) within three years. The two pillars needed to support the TPS are just-in-time (JIT) and autorotation (Jidoka) or automation with a human touch.

Figure 1. The Toyota Production System (based on Sears, Shook, 2004)



The TPS assumes that all processes are stable and therefore under control. It has to be said, that Ohno (1988) does not deliver a strategy to become lean, if a business still has unstable processes, i.e. in a production ramp up phase. Tempel and Holländer (2001) say that Ohno's TPS does not deal well with complex process control problems and does not give an answer to solve complicated problems across the whole value chain. According to Ohno (1988) just-in-time means that, in a flow process, the right parts needed in assembly reach the assembly line at the time they are needed and only in the amount needed. The goal is an implementation of a flow production with zero work-in-progress (inventory). When trying to work just-in-time, people at Toyota experienced that conventional operations management methods did not work well: a problem early in the process always resulted in a defective product later in the process. Parts were produced without regard to the later process steps, which resulted in huge and wasteful inventories.

The second pillar is called autorotation. This principle was invented when Toyoda Sakichi, the company founder, created an auto-activated weaving machine at the end of the 19th century, which stopped instantly if one of the warp or weft threads broke. This human machine intelligence allowed Toyota to enforce three concepts, which led to dramatic productivity improvements.

Jidoka

1) Whenever a defect is produced the machine stops automatically , which prevented a defect from producing more than one defect
2) This fact allowed Toyota to reduce the workforce and implement multi-manning at their machines one operator was able to run more than one machine.
3) At Toyota assembly lines trigger were introduced which allowed operators to stop the assembly line whenever a certain problem appeared which forced management awareness on everyone.

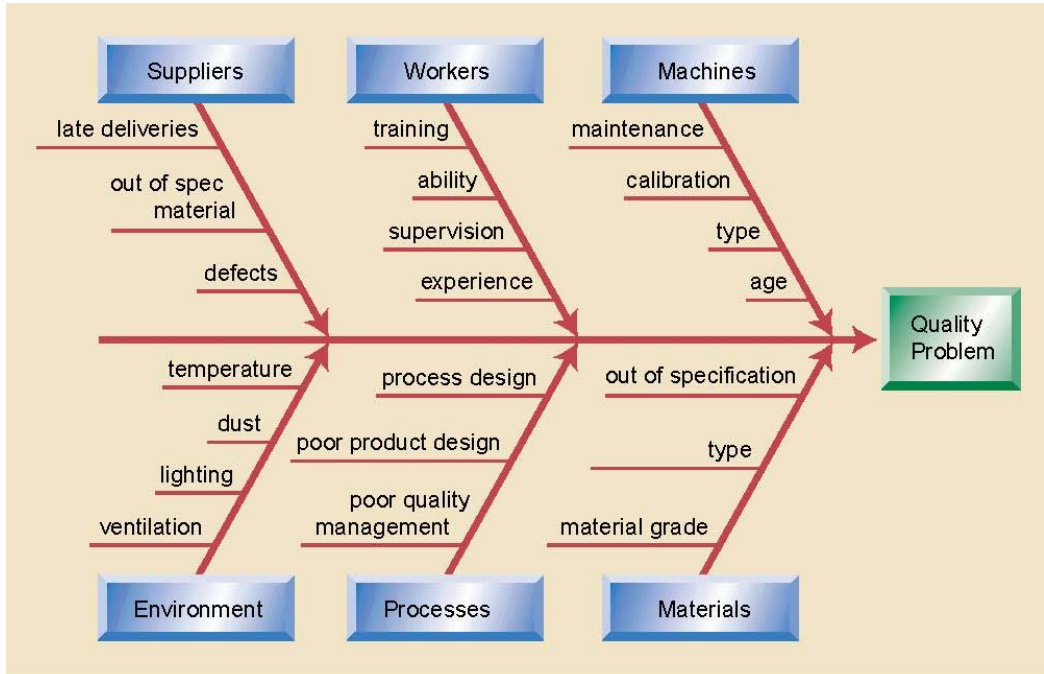
However, only few manufactures have managed to imitate Toyota successfully, even though the company has been extraordinarily open about its practices. Copying only the above mentioned principles seems not to be enough. Gary Convis (Convis, 2001), an American Toyota Motor Manufacturing President calls the TPS an integrated and interdependent system involving many elements: the tools, the philosophy and management. He criticizes that Ohno's theories were misunderstood, because a lot of managers tried to implement the individual elements like JIT or Jidoka instead of the entire approach. It misguides engineers to think that if the tools are implemented they have captured the essence of TPS. In his opinion, Ohno's theory

lacks the direction that the key to successful TPS implementation is the total commitment of everyone in the organisation to make it work. These findings guided him to his TPS triangle model. In the middle of this triangle human development is at the very core of the TPS. It is implemented through example, through coaching and through understanding and helping others to achieve their goals.

f) Develop tracking mechanism for processes and improve it as per business requirements

According to TQM a quality product comes from a quality process. This means that quality should be built into the process. Quality at the source is the belief that it is far better to uncover the source of quality problems and correct it than to discard defective items after production. If the source of the problem is not corrected, the problem will continue. Quality at the source exemplifies the difference between the old and new concepts of quality. The old concept focused on inspecting goods after they were produced or after a particular stage of production. If an inspection revealed defects, the defective products were either discarded or sent back for reworking. All this cost the company money, and these costs were passed on to the customer. The new concept of quality focuses on identifying quality problems at the source and correcting them.

Figure: 2 Cause and Effect Fishbone Diagram
(Source: www.wiley.com/college/sc/reid/chap 5)



To evaluate whether or not a process is in control, we regularly measure the variable of interest and plot it on a control chart. The chart has a line down the center representing the average value of the variable we are measuring. Above and below the center line are two lines, called the upper control limit (UCL) and the lower control limit (LCL). As long as the observed values fall within the upper and lower control limits, the process is in control and there is no problem with quality. When a measured observation falls outside of these limits, there is a problem. As mentioned earlier, TQM is continuous improvement process and need to be practised continuously any delay or downtime in process should be fixed and that mistake should not be repeated.

4. Automobile Industry In India

In recent years the automobile industry in India has grown by leaps and bounds. This phenomenal growth rate is owing to two factors mainly, which are better standard of living of the Indian middle class and a subsequent rise in their disposable income which in turn increases the purchasing power adding to the growth of the automobile industry as a whole and the automobile companies in particular. The sales of passenger cars have increased by three folds than what it used to be five years down the line. Apparently there are 1 million passenger cars already on the Indian roads and the figure only promises to increase as the days go by. Be it small cars, medium cars or luxury cars all have their target customers and all do well in the market so much so that global giants from USA and Japan are entering the Indian automobile sector and working in collaboration with the Indian automobile majors.

The Indian automobile industry is the tenth largest in the world with an annual production of approximately 2 million units. Indian auto industry, promises to become the major automotive industry in the upcoming years and the industry experts are hopeful that it will touch the 10 million units mark.

Indian automobile industry is involved in design, development, manufacture, marketing, and sale of motor vehicles. There are a number of global automotive giants that are upbeat about the expansion plans and collaboration with domestic companies to produce automobiles in India.

The major car manufacturers in India are Maruti Udyog, Hyundai Motors India Ltd., General Motors India Pvt. Ltd., Honda Sael Cars India Ltd., Toyota Kirloskar Motor Ltd., Hindustan Motors etc.

The two-wheeler players in India are Honda Motorcycle & Scooter India (Pvt.) Ltd., TVS, Hero, Yamaha, Bajaj, etc. The heavy motors including buses, trucks, auto rickshaws and multi-utility vehicles are manufactured by Tata-Telco, Eicher Motors, Bajaj, Mahindra and Mahindra, etc. The total market size is 165000 crore.

4.1 SWOT Analysis of Indian Automobile Industry

Strengths

- The world's major car manufacturers continue to invest in India and now the supplier segment is attracting private equity investment.
- India enjoys a comparative cost advantage in labour as compared to western countries.
- Foreign JVs ensure capacity building for local partners, as overseas firms bring expertise. India has vast pool of skilled manpower and qualified engineers among the largest in the world.

Weaknesses

- Local demand is still skewed heavily towards low-cost vehicles, due to low income levels.
- Cost advantage in labour wages is nullified by the fact that we have lower labour productivity.
- We have a higher defect rate about 10 times the world average.
- The Industry has a very low investment in R & D as compared to their foreign counterparts which will their sustainability in the future.

Opportunities

- Global automobile companies are setting up manufacturing facilities in India. Also, many Indian automobile manufacturers have announced their plans to increase the export of vehicles from India.
- Additionally, the introduction of newer technologies such as Electronic Diesel Control Systems to reduce emission levels, safety devices such as Air Bags, Anti-lock Braking Systems, etc. These technologies not only offer increased Safety for drivers and passengers, but also result in greater comfort and better drivability.
- The premium segment is benefiting from higher levels of personal wealth, attracting investment from brands such as Audi, while Tata has expanded the Jaguar Land Rover division into India.
- The commercial vehicle segment stands to benefit from a number of new JVs announced recently, including Ashok Leyland and Nissan, and Isuzu and Swaraj Mazda, while the bus segment is also attracting investment.

Threats

- High tariffs on imports stand to restrict the potential growth of the hybrid vehicle segment, as the cost of the technology is already expensive before taxes.
- Fees for local testing of new models, such as those being encountered by BMW as it attempts to launch the Mini brand, could deter some manufacturers.
- Rising interest rates and cut throat competition.

Concluding Remarks

The principles of Total Quality Management are to seek to satisfy the external customer with quality goods and services, as well as your company's internal customers; to satisfy your external and internal suppliers; and to continuously improve processes by working smarter and using special quality methods.

TQM encourages participation amongst shop floor workers and managers. There is no single theoretical formalization of total quality, but Deming, Juran and Ishikawa provide the core assumptions, as a "discipline and philosophy of management which institutionalizes planned and continuous improvement and assumes that quality is the outcome of all activities that take place within an organization; that all functions and all employees have to participate in the improvement process; that organizations need both quality systems and a quality culture."

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