The Impact of poor quality in South African automobile manufacturing industry leading to customer dissatisfaction

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Abstract

Quality can never be compromised in any industry hence manufacturing industry are more likely to suffer the consequences of poor quality the dwell more on producing tangible products and neglecting quality. Manufacturing automobile industries tend to have production problem due to lack of proper quality management systems and production system. SA automobile manufacturing industry has had numerous mechanical and electrical problems in the following vehicles: Ford Kuga, Focus, Transit Connect and Tourneo. Ford Kuga-have an engine compartment which made the car to burn while being driven and customers burning to death leading to a recall on the 3rd of February 2017. Ford Focus, Transit connect, Tourneau- have a potential risk in the cracking of the pressure plate leading to a recall on the 20th of March 2018. Ford Figo and Ikon- have a potential fire-risk which is caused by a power steering fluid leak which can result in the fume being emitted from the engine compartment, leading to a recall on the 23rd June 2017. These problem leads to customer injuries, death, dissatisfaction and loyalty of the customers lost leading to buying from the competitors. Due to all of the potential risks identified SA automobile manufacturing industry has had safety recalls for as a precaution measure. The industry analysis of the problems that lead to the recall is necessary because firstly, the company needs to understand the root cause of the problems and find ways to eliminate it. Secondly, a quality circle would be very essential, analysis of operations cost and effective and profitable business management. Thirdly, benchmarking must be done on the automated assembly and manufacturing process (compare how processes are done at other international automobile manufacturers). Fourthly, Just-In-Time, lean manufacturing principles (Kaizen) POKA –YOKE.

Keywords
Quality, SA automobile industries; Ford

1. Introduction

1.1 Background

The content of the research will be based on improving the production system leading to elimination of defects and an effective inspection of goods before being transported to external customers. Production system is cohesive socio-technical system this also includes manufacturing and logistics for the car manufacturing company and an interaction with customers and suppliers for effective input. This system will assist in, automobile manufacturing industry to be able to maximize efficiency and a fault-free process. The industry is an American motor company that was established

by Henry Ford on the 16 June 1903. It is known to be the fifth largest automaker. The industry has now expanded and have an assembling plant in South Africa, since 1967. . Quality in a manufacturing automobile industry is very important as it can lead to damages affecting the company's image and placing customers' lives at risk. Quality must be prioritized from the initial manufacturing process to the finished product in order to produce a standard product which complies with the ISO 9000 (Quality management system). Due to the industry having poor quality inspection for their automobile this has led to numerous safety recalls for precaution measures for the following automobiles: Ford Kuga, Focus, Transit Connect and Tourneo which has led to customer dissatisfaction (injury of customer, customer engagement and decrease in customer confidence/loyalty).

1.2 Research problem

Quality can never be compromised in any industry hence manufacturing industry are more likely to suffer the consequences of poor quality the dwell more on producing tangible products and neglecting quality. Manufacturing automobile industries tend to have production problem due to lack of proper quality management systems and production system. SA automobile industry has had numerous mechanical and electrical problems in the following vehicles: Ford Kuga, Focus, Transit Connect and Tourneo. Ford Kuga-have an engine compartment which made the car to burn while being driven and customers burning to death leading to a recall on the 3rd of February 2017. Ford Focus, Transit connect, Tourneau- have a potential risk in the cracking of the pressure plate leading to a recall on the 20th of March 2018 .Ford Figo and Ikon- have a potential fire-risk which is caused by a power steering fluid leak which can result in the fume being emitted from the engine compartment, leading to a recall on the 23rd June 2017. These problem leads to customer injuries, death, dissatisfaction and loyalty of the customers lost leading to buying from the competitors. Due to all of the potential risks identified the industry has had safety recalls for as a precaution measure. The company analysis of the problems that lead to the recall is necessary because firstly, the company needs to understand the root cause of the problems and find ways to eliminate it. Secondly, a quality circle would be very essential, analysis of operations cost and effective and profitable business management. Thirdly, benchmarking must be done on the automated assembly and manufacturing process (compare how processes are done at other international automobile manufacturers). Fourthly, JUST-IN-TIME, lean manufacturing principles (Kaizen) POKA –YOKE.

1.3 Research goal

The goal behind this research is to link quality management system to automobile industries by identifying quality management systems clauses and principles that could aid in quality production by introducing failure mode effect and data analysis to eliminate defects and errors leading to customer satisfaction. The goal of this research is to also implement production system that automobile industries can use to hinder the failing of their systems.

1.4 Research objectives
- To evaluate the financial implications of poor quality in the automobile industry and time loss by the application of Toyota production system.
- To increase the availability and effectiveness of existing equipment by reducing the need for further capital improvement by analysis of previous historical records of product defects, equipment failure that led to accidents (ford) this will be done by the application of Total production system.
- To analyze further the Toyota production system and how other automobiles industries can use their 13 pillars.
- To Identify and study the QMS clauses, principles and its guidelines for overall improved plant performance.
- To analyze the effect of TPM and QMS on productivity, quality improvement, employee's development, engagement of internal and external customers and organizational culture change.

1.5 Research questions
- What are the causes of poor quality in automobile industries and how can it be reduced or eliminated using TPS?
- How can automobile industries apply TPS effectively and efficiently including external and internal customers?
- How will the 13 pillars of Toyota Production system assist in eliminating defects and errors to assist in eliminating recall?
- How can we link causes of poor quality with clauses in order to implement them and how to improve plant performance?

- How to change the internal and external customers perspective and also change organization culture by introducing to them ISO 9001:2015?

2. Literature review

2.1 The impact of vehicle recall on automobile market

According to National Safety Council (NSC) in 2016 more than 40 000 people died in traffic crashes, which was the highest since the 2007 count (Akdeniz and Calantone, 2017). A lot of cars have been recalled over the years from different companies. According to Wheels24; Toyota SA alone has recalled over 70 000 vehicles dating back to 15 years ago. People's lives have been affected by this recalling of vehicles in a sense that they perceive the car bands and the quality to perform differently. Although a cars main purpose is to take you to whatever destination of your choice, you are to feel safe whilst doing so. (2017, Coach. K., Dilts. K., Ferguson. R., Fisher. L., O'malley. S., Uhlending. S.). This has affected manufacturers and suppliers as they are the ones who are losing on profits and will have to see to it that they fix these cars. This could leave them not having to make any profit at all because that money will have to be used for the faults and investors not getting any returns (Nath. T).

2.2 Quality

According to Munichre in June 2015, Toyota responded to the poor quality of airbags from its supplier being Takata and had them recalled. Many other carmakers followed them after they had done so. Car manufacturers are the ones who usually announce the vehicle recalls as they would be concerned about losing their reputation (Bachlin, 2015). The method used here is a qualitative one as data was collected. This goes to show that Toyota cares about their brand image and it wants to associate itself with offering quality for its customers. It's often expected that when something is of good quality, it performs better and is therefore efficient. Branding is everything, it is important that brands are always protected. A brand is what makes the customer remember the product as it would be the first thing they see. Brand loyalty is something that many customers value because when they look at brands, they look at what the brand offers them or benefits which they can associate themselves with. Whether it is they want to drive a luxurious car just so that they can be classified as someone who has expensive taste, or they buy a not so expensive car which would focus more on safety or speed. It's all up to the consumer. (Lui, 2017). The paper is qualitative; customers are always loyal to their favourite brands because of the benefits they receive or because they want to portray a certain image of themselves. When the brand is affected negatively customers will not want to associate themselves with such brands.

2.3 Assessment of the cost of quality in automobile industry

Had a study done on the cost of poor quality analysis for automobile industry? (Prof.S.N.Teli, 2012) The paper uses various techniques to quantify the value that poor quality has on the automobile industry. The purpose of this paper is to present COQ using Part per Million equivalents (PPMeq) to determine rejected parts and their associated manufacturing cost. Total costs will be evaluated on the point of view from cost of good quality and cost of poor quality. Ultimately for any organization profit maximization and total cost reduction while keeping quality consistently high is the goal. A well-defined and harmonized cost system will ensure that the goal is achieved for the organization. If quality problems are not resolved early then the higher the cost will be the closer the product or service get to the customer or end user. The research was limited to the automobile industry however, practical implications have been produced from the research, it mean this research can be practically implemented in real life scenarios.

2.4 Cost of poor quality analysis to evaluate for automobile industries: Case Study

With a Poka-Yoka analysis being done by (M.Dudek-Burlikowska, 2009)they stated that a decrease in the cost of waste will result in the profit being marginally improved. Therefore, the International Journal of Engineering Research and Applications (IJERA) 2012, claimed cost of poor quality would help in analysing the operating costs for effective and profitable business management. Tools used for quality management were sigma tools of statistical process control and capability processes. The focus is on whether costs would be non-present if the manufacturing process was perfect. Various modules were used and compared to see which best worked in the automobile industry. Findings concluded that over awareness of quality tools lack depth in India. Limiting costs of waste will marginally improve profits. Total quality management would be best to use when assessing quality and costs. Total quality management is holistic and

insures all variables that contribute to final quality is evaluated and given the attention it need for quality to be managed competently

3. Research Methodology

With regards to data collection, a mixed method (Qualitative and Quantitative method) will be used with how the recall affects customers; and Production figures together with cost and revenue.

3.1 Data collection

Questionnaires and observation will be used and assist in obtaining statistical information about the research problem, in gathering information from the affected internal and external customers to be able to establish the problem and find ways to eliminate the error. To be able to have an effective results, questionnaire will be anonymous allowing an individual to be honest and able to express themselves. The will consist of both open and closed-ended. The results of the questionnaire will be presented in the form of tables and charts.

4. Data Analysis

4.1 Analysis of Customer Engagement-Loyalty Based on Ford, Hyundai and Toyota

The analysis will be based on Ford which has the most car being purchased over the 30 years with an overall of 104 700 000 million cars purchased and overall cars recalled is 97 000 000 which lead to a recall rate of 94%. The recall rate clearly highlights the negligent of implementing quality management and production system to minimize defects in the production process and focus on increasing the total turnover. Quality management and production system to assist in error detector:

- Poka-Yoke- this is part of the manufacturing process known as mistake proofing which stops the production process completely when it detects an error. This focuses on maximizing efficiency and fault-free process.
- Just-in-time- This is a pull system that mainly focuses on the different processes in the assembly line focusing on providing with the quantities of items that they need when the need them. This avoids not being able to provide a process with all its needs for production leading to a defect.
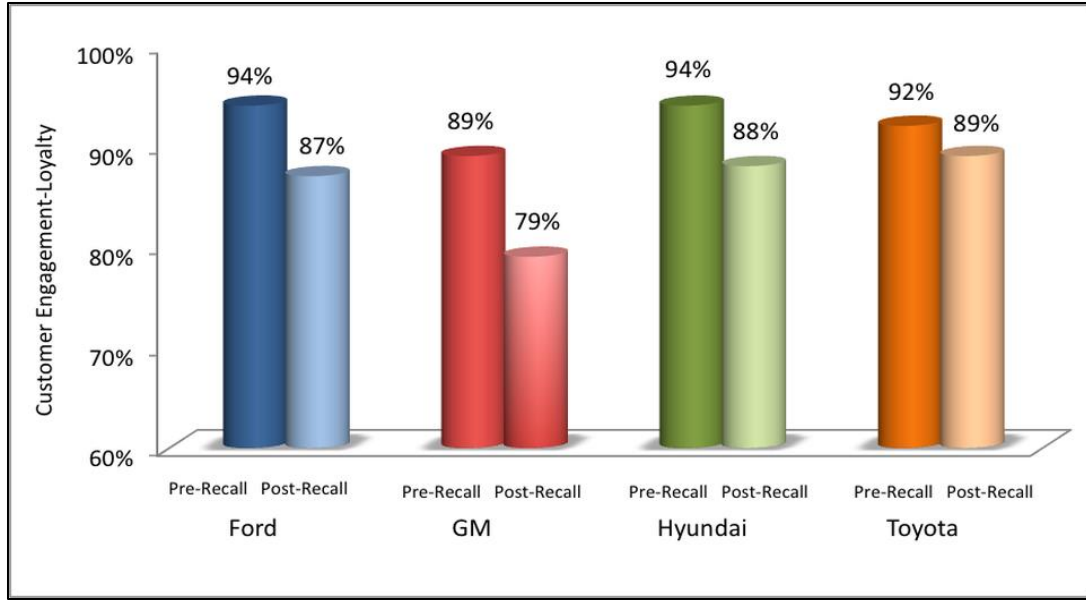
Figure 4.1:   Analysis of Customer Engagement-Loyalty Based on Ford, Hyundai and Toyota

The analysis will also be based on the car manufacturing companies namely: Ford, Hyundai and Toyota. The pre-recall of Ford cars are the auto brand customers and the post-recall of cars at Ford are collected from the customers with cars recalled. Ford has 7% decrease after their recall meaning customer loyalty has had a significant drop. This has affected the customer's willingness to support the brand and decrease their loyalty.
Factors that lead to a decrease to customer engagement and loyalty
- Failing to keep up with customer expectations
- No unique relevance to customers
- Not incorporating customers input when designing a product
- Failure to account to a mistake and find compensation to be able to regain trust

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Retail sales, industry volume, and market share in each region and in certain key markets within each region during the past three years were as follows:

	Retail Sales (a) (in millions of units)			Industry Volume (b) (in millions of units)			Market Share (c) (as a percentage)		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
United States	2.6	2.6	2.6	17.8	17.9	17.5	14.7%	14.6%	14.8%
Canada	0.3	0.3	0.3	1.9	2.0	2.1	14.4	15.4	14.9
Mexico	0.1	0.1	0.1	1.4	1.6	1.6	6.4	6.2	5.3
North America	3.0	3.0	3.0	21.5	21.8	21.5	14.0	13.9	13.9
Brazil	0.3	0.2	0.2	2.6	2.1	2.2	10.4%	9.2%	9.6%
Argentina	0.1	0.1	0.1	0.6	0.7	0.9	14.9	13.6	12.8
South America	0.4	0.3	0.4	4.2	3.7	4.2	9.6	8.8	8.9
United Kingdom	0.4	0.4	0.4	3.1	3.1	3.0	14.3%	14.0%	13.8%
Germany	0.3	0.3	0.3	3.5	3.7	3.8	7.3	7.6	7.7
Russia	0.0	0.0	0.1	1.6	1.5	1.6	2.4	2.9	3.1
Turkey	0.1	0.1	0.1	1.0	1.0	1.0	12.6	11.4	11.9
Europe	1.5	1.5	1.6	19.2	20.1	20.9	7.7	7.7	7.5
Middle East & Africa	0.2	0.2	0.1	4.3	3.7	3.6	4.4%	4.5%	3.9%
China	1.1	1.3	1.2	23.8	27.5	28.2	4.7%	4.6%	4.2%
Australia	0.1	0.1	0.1	1.2	1.2	1.2	6.1	6.9	6.6
India	0.1	0.1	0.1	3.5	3.7	4.0	2.1	2.4	2.2
ASEAN (d)	0.1	0.1	0.1	1.4	1.5	1.6	6.0	7.0	7.6

Figure 4.2: Ford Retail Sales, Industry Volume and Market Share

An analysis based on Middle East and Africa. Due to retail sales for the past 3 years there has been a drop of 0.1 million units, industry volume has a drop of 0.7 million units and Market share has 0.5% decrease, the drops are due to customers dissatisfaction and the unwilling ability to engage with the company leading to a negative effect in the values mentioned above. This affect the overall turnover and the ability for the company to maximize its profit. To bring an improvement to the current situation ways decreasing the defects must be implemented and transparency to the customers in terms of acknowledging the recalls and the mistake and ensuring the mistake won't occur again will gain customers trust and loyalty back.

Manufacturer	Recall Campaign	Component	# of Vehicles Recalled
Ford Motor Company	81V008	Parking gear	21,000,000
Ford Motor Company	96V071	Ignition	7,900,000
General Motors LLC	71V235	Engine mounts	6,682,084
General Motors LLC	14V400	Ignition switch	5,877,718
General Motors LLC	81V025	Control arm	5,821,160
Honda (American Honda Motor Co.)	14V351	Air bags	5,394,000
Ford Motor Company	05V388	Deactivation switch	4,500,000
Ford Motor Company	09V399	Deactivation switch	4,500,000
Toyota Motor Corporation	09V388	Pedal entrapment	4,445,056
Ford Motor Company	72V160	Shoulder belts	4,072,000

Figure 4.3: Ten Largest Vehicle Recall

The analysis is based on the ten biggest automobile industry recall, Ford Motor Company (SA) appears to having the most recalls 5/10 meaning a 50% dominances. With the following component leading to recall: Parking gear, Ignition, Deactivation switch and shoulder belts the total number of cars recalled were 41,972,000 between the year 2000-2014.

Figure 4.4 Ford Stock Reaction to 830,000 Vehicle recall

The analysis is based on how Ford (F) stock will react to 830,000 vehicle recall with the 830 000 vehicle recalls that happened between beginning January 2016-March 2016.The recall did not only affect the company's image but had an impact in economy as well. The market had a negative reaction to the recall and this was bad news for the company because of the loss of faith in it by the stakeholders and investors. A drastic drop occurred after the recall and a fluctuation of the market occurred once the cars were repossessed and error were identified and rectified.

5. Conclusion and Recommendations

5.1 Recommendations

Production System

This is an integrated socio-technical system that comprises management philosophy and practice. Maximizing production efficiency through the elimination of waste.
How will it assist in detecting the errors and reducing recalls?

- The 13 Production Pillars will assist in order for Ford to reduce its recalls by allowing the employees to be well equipped and understanding the philosophy behind each pillar so that when an error occurs the workers are able to identify and stopping the production process to prevent producing cars with defects leading to safety recalls.
- 13 pillar of production system (Farr, 2014)
- Konnyaku Stone- This is used for smooth unpainted body panels and removes imperfections.
- Poka-Yoke- this is part of the manufacturing process known as mistake proofing which stops the production process completely when it detects an error. This focuses on maximizing efficiency and fault-free process.
- Hansei- process that identifies and learns from mistakes, to prevent them from occurring again.
- Andon- Visual aid that emphasizes when action is needed. This is usually activated by a button that stops the automatically stops when a worker pulls it.
- Jidoka- Equipping the operators to stop production when something suspicious is detected. This prevents the waste of producing defective items.
- Just-in-time- This is a pull system that mainly focuses on the different processes in the assembly line focusing on providing with the quantities of items that they need when the need them. This avoids not being able to provide a process with all its needs for production leading to a defect.
- Heijunka- This means having the right amount of required parts to produce a car to create a smooth production process.
- Kaizen- This serves as a concentration for continuous improvements and also serves as a way to eliminate waste to efficiency optimization. This gives a voice to individuals and also train them in order to be able to identify an area of improvement.
- Genchi Genbutsu- This is giving an individual who works in a specific production process an opportunity to identify a problem and solve it themselves. This allows you to know the work environment and processes so when a problem arises you can advise the best solution to solve it.
- Nemawiashi- Information for a possible improvement is shared with the team in order to involve them in decision making so everyone opinion is considered to come up with a better solution for implementation.
- Genba-Where the actual work is done, the philosophy behind this believes that all action and processes must be transparent.

5.1.1 Implementation of Total Quality Management

TQM- This is a principle that every worker must commit to maintaining high standard of work in every aspect of an organization. Components TQM (Jones, 2018)

- Customer focus- This is based on understanding customers need so you produce products that meet/ exceed customers' expectations. This information can be gathered through market studies and research groups. With the gathering of the customer focus information it will lead to increased revenue and improve customer loyalty.
- Continuous improvement- The concept of continuous improvement involves wen a defect or error is identified a study must be done in order to rectify and understand the cause of the study.
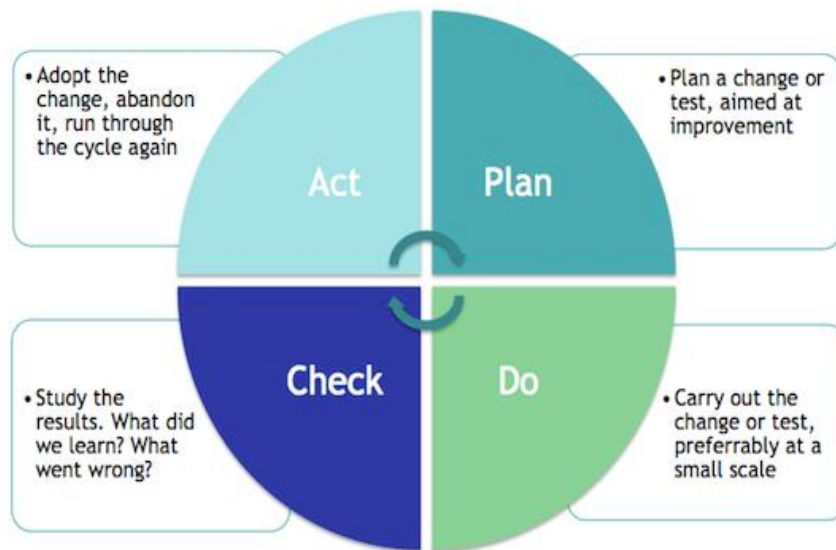

Figure 5.1 PDCA Cycle

- Employee empowerment-This is giving an employee a degree of independence and responsibility for decision making regarding their task. This gives the employee an opportunity to be able to make decision for a production process. Employees must be well trained.
- Quality tool- They must also receive extensive training to help them understand access quality via quality control and measurement tools. Its gives the employee the ability to interpret finding and interpreting it.

5.2 Conclusion

- It is quite clear that there is a drastic effect in the automobile industry causes by the poor quality in production system, total quality management and quality management system; having read the contextual above. This has caused a drop in consumer confidence due numerous errors on the vehicle recalls leading to customer injuries and death not only has it affected consumer confidence but has affected the investor confidence in Ford. This bring a huge question towards the government as to how much quality control are put into place as a state to ensure private companies are producing quality products to ensure customer safety.

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