

MATURITY MODEL AS A BUSINESS PROCESS IMPROVEMENT METHODOLOGY FOR AUTOMOBILE PARTS MANUFACTURERS: A CASE STUDY

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ABSTRACT: *Twenty first century is the growing age of designing effective business improvement strategies to streamline the processes in order to be more productive, quality preferred, faster, flexible, cheaper and competitive. Fickle customer demands have permanently increased the business process uncertainty. In such conditions it is a dire need to reconfigure the processes of the business to ensure the ultimate customer satisfaction by crossing the bridge of quality, productivity and time. To explicate the business improvement strategies, in this paper the framework is proposed for Process Improvement maturity model to develop the best practices. This research is based on the case study of an ABC manufacturing Company followed by case study research attributes. The Framework for the maturity model is developed after the identification of critical success factors and linked with the Maturity levels. This model is presented in a structured way to assist the managers and practitioners to formulate and execute the right plan as per the requirements and targets of their organizations.*

KEYWORDS: Maturity Model, Business Process, Critical Success Factors, Organizational Performance.

1. INTRODUCTION:

Today in the 21st century, fickle customer demands drive the manufacturers to be more efficient and effective in their Business process rather than to use the old conventional techniques. Increasing competition, changes in stakeholder requirements and new technologies are driving business organizations for rapid and significant changes. In order to respond to such changes and survive in the complex business environment, business organizations are constantly striving to improve and manage their business processes (BPs)[1]. A process is any activity that receives an input and using the organization's resources, generates a certain output for an internal or external client. [2], [3].

The word Business Process Improvement was first cited in H. James Harrington book 1991 named as "Business Process Improvement-a breakthrough strategy to meet total quality, Productivity and Competitiveness". He defines BPI as a well defined and systematic advancement to streamline all underlying processes of an organization to gain ultimate level of efficient results along with the satisfaction of all involved stakeholders.

Generally any BPI activity involves three steps which are as under:

- The very first step for BPI implementation is to define the existing structure and try to identify the gap / key improvement areas to improve Quality
- The second step put emphasis on determination of Actions that would ultimate adds value to the current process and aligns the system to attain desired level of output.
- After determination of proposed actions, all involved stakeholders may need to be ready for the implementation to meet the set goals and objectives, using the variety of suggested tools available within the BPI Methodology. It is said that the critical success factors in any BPI effort is to manage the people.

To explicate the business improvement strategies, in this paper the framework is proposed for Process Improvement maturity model to develop the best practices. This research is based on the case study of an ABC manufacturing Company suffering from problems of large defect PPM, High Rework

Rate, Large internal Failures and large number of warranty claims.

2. LITERATURE REVIEW

2.1 Business Process Improvement:

"A business Process is a logical Organization of people, materials, energy, equipment, and information into work activities designed to produce a required end result" [4]. Business Process improvement aims to eliminate all failures, number of defects, delays, breakdowns, long cycle times and cost of Poor quality. [4]

BPM involves not only identifying, designing and executing business processes, but also their interaction, analysis and optimization. [5] also points out that BPM actions should not be regarded as isolated projects, but rather as a continuous effort by organizations to optimize their processes.

Achieving better results greatly depends upon managing complex, large and critical business process with intensive care. It may cover supply chains, Purchasing, procurement and distribution. [4] Strategy-making assists firms in managing change and uncertainty by developing suitable strategic options [6]. The conventional poor performance indicators have to be eliminated with strong urge and must be replaced with the current Business Management models to remain competitive in nature [4].

The mindsets of the organizations have to change along with the industrial revolution. For example, a company has more employees with the designation as "rework clerk" than "clerk". Most of the time, the imbalance in the titles given to the employees may also become the cause of the quality deterioration and loss in customer[4].

Business Process improvement is characterized into three levels, the planning, transfer and operational management and these three levels have been distributed into five activities defining, Determining, Establishing, Conducting and Designing [4]. In this context Process improvements must be defined in terms of increased customer satisfactions as a result of higher quality products and services[7].

Following things have to be improved:

1. Reduction in wastages (Non Value added activities)

2. Reduction in Errors

- 3.
4. Meeting customers' expectations
5. Make the process more safer and error free
6. Make the process more satisfying to the person doing it.

There are several different approaches towards improvement. This research shall explicate the Business Process Maturity Model as in Improvement strategy.

2.2 Maturity Model - As an improvement strategy:

The word maturity means the goals one organization achieves or wishes to achieve by using capabilities, knowledge, management and learning skills[8]. In Management perspective, maturity means the developed stage of the organization and to reach at the level of maximum development, the maturity concept is evolved from the conventional strategy of control to new modern strategy of improvement. Maturity has been defined differently as that maturity can be measured by appraisals and can be defined as "extent to which organizations have defined, managed, measured and continuously improved processes". The implementation of Maturity models are always supported by quality tools and techniques i-e Seven Quality tools, Six Sigma DMAIC concept, etc.

2.4 Understanding and Explication of Development of Maturity Models:

Some of the Maturity Models are explained as literature Review to understand the Development, Execution and controlling of maturity models. For this i have selected the two out of them as listed below:

2.4.1 Capability Maturity Model-Integrated:

CMMI is the model developed for the development of software but later on this maturity model also targeted the areas of business management, processes and project. CMMI models are based on two parts. The first part is the development of the continuous representation of maturity framework and the second one is based on the staged representation of the framework. It provides wide flexibility to researchers to define and mold the continuous and stages representations as per their requirements or the practices of the organization[14].

2.4.1.1 Continuous Representation of CMMI:

The first step in the development of the maturity model is to analyze and state the critical success factors which will be going to assess in all the maturity levels one by one after achieving every next maturity level. This development of the critical success factors have been done as a result of the GAP analysis conducted in the premises of the organization. This first step in the development of the maturity model is called continuous representation.

2.4.1.2 Staged Representation of CMMI:

Staged representation of the maturity model describes the maturity levels along with their definitions.

i. Initial (Level-1):

Initial level is the basic level of organizational maturity where organizations are unable to meet the targets and goals and cannot satisfy their customers. The shortcomings are addressed in this area and subsequent actions are planned then.

ii. Managed (Level-2):

This stage of the maturity model involves the preparation of the documents and their formats after the discussion of all involved stakeholders.

iii. Standardized (Level-3):

At this stage the process are cleared to all involved stakeholders and things have been standardized involved all technicalities.

iv. Quantitatively Managed (Level-4):

This stage involves the usage of statistical process control in order to check the variations and to make strong analysis on the process efficiency.

v. Optimized (Level-5):

Optimized level is the maximum developed followed by the actions and planned made by all involved stakeholders but it does not end over here but it readily involves the continuous improvement strategy into it and in this way just like PDCA this cycle goes on [9].

Another maturity explicated in this research paper is Process Maturity Model the details of which is as under.

2.4.2 Business Process Maturity Model (BPMM):

The BPMM describes an evolutionary continuous improvement roadmap that guides organizations as they move from immature, inconsistent state to mature, disciplined processes. It helps identify process deficiencies in the organization and guides the improvements in logical, incremental steps.

Introducing BPMM as a standard will address at least five current challenges to the success of Enterprise systems[10]:

- It identifies the weak processes and workflows and compares its strength with the standards.
- These models give the organization confidence of accuracy and validity of the implemented system.
- Enable managers to make a smooth system flow that ultimately pose ease on every stage.
- It paves path for addressing the suppliers and their product and also make the organizations to assess their suppliers.
- It gives worthy information to managers to make systems more agile and competitive.[11]

Effective evaluation techniques are very important to check the strength of implemented roadmaps. Same is the case with BPMM. BPMM can be evaluated by using following methods and techniques;

- a. Product Dimensional analysis.
- b. Supporting processes that contribute in making the quality product.
- c. Focus interviews from the process owners.
- d. Managers of the organization.
- e. Quantitative data that is used to check the characteristics and the state of the process.
- f. Qualitative attributes are also used to assess the maturity of the Business Organization and the successful implementation of the Maturity Models.

2.5 Benefits of Maturity Model:

Many Organizations have attained the level of maturity by using the best practices in their operations. According to [10]"performance of mature business organizations improves constantly." Regardless the size and nature of organization,

processes and capabilities increase with maturity leading to many benefits. Immature organizations may perform better one time but cannot sustain the practice because of less efficient processes. The organizations opt the maturity models for their improvement is good enough to produce good quality products. Maturity models are always implemented for continuous improvement in Business step by step by considering their weak areas for improvement.

3. RESEARCH QUESTION AND METHODOLOGIES

3.1 Research question and methodology:

The core objective is to investigate a set of critical success factors and develop a maturity model for the business improvement, with a special emphasis on the role of critical success factors in every phase of the maturity model. The Research question under investigation is:

RQ1: What are the main critical success factors which shall be answered to address best quality in automobile parts manufacturing industry along with the evaluation of every factor in different phases of Business Process maturity model?

contextual richness and complexity.[12]. In order to capture accurate reflection of the issues under investigation semi-structured interviews with the stakeholders and facilitators of the project were conducted. The one of the non probability Sampling Technique known as purposive or judgmental sampling used in collecting data from the customers to analyze the strength of implemented improvement methodology in terms of customer satisfaction [13].

3.2 Construct of Maturity Model: A Case study

3.2.1 Organizational Demography:

ABC Company was established in 1983 with the facility of precision machining and press work ability supplying its parts to Original Equipment Manufacturers (OEMs) as Tier 1 supplier and other engineering sectors of the country. They provide services of tooling for making dies and molds in the market. ABC manufacturing company is also equipped with CNC Wire-cut, EDM, and CMM machine in their tool room and Hi-Tech Paint Shop with conveyor system.

ABC manufacturing company has following statistics in terms of employees, Managerial and Non managerial Staff, Technical and Non Technical Teams, total Number of Parts and Customers.

In line with the exploratory nature of this research, a case study method was opted to capture its corresponding

Table 1: Demography of the ABC manufacturing Company

Total No of employees	Managerial staff	Non Managerial staff	Technical staff	Non Technical Staff	Total Number of Parts	Total number of customers
370	37	333	352	18	238	Indus motors Pak Suzuki Honda Atlas Cars Atlas Honda Ltd

3.2.2 Framework Development of Maturity Model for Automobile Parts manufacturers:

ABC manufacturing Industry was suffering from the problems of high Defect Parts per million, Large Rework rate, more internal failures and large number of warranty claims remedy to which are set as the target to the development of the maturity model.

For achieving the best results and on the Basis of the literature Review of the subject, the Gap analysis of ABC

manufacturing company conducted and highlighted the critical areas against which a business improvement maturity model has been developed.

The GAP analysis was conducted against the Deming 14 points on the basis of the problems faced by ABC manufacturing Company. All the areas were observed very carefully by watching the complete working and operation on the products

Table 2: GAP Analysis of ABC Manufacturing Industry.

Deming's Point	ABC Company Shortfalls against Standards
Create a constant purpose toward improvement	<ul style="list-style-type: none"> ■ ABC Manufacturing company suffering from following areas: <ul style="list-style-type: none"> ▶ Dysfunctional organizational structure ▶ Inefficient use of human and technological potential. ▶ Low management Commitments towards improvement ▶ Autocratic style of management ▶ No dedicated teams for Kaizen Activities
Adopt a New Philosophy	<ul style="list-style-type: none"> ■ ABC manufacturing company was not fully adopted the new improvement methodologies and have not implemented the quality Tools. ■ Lacking in understanding of the quality tools and techniques for

	making an environment for continuous improvement.
Inspection for Quality	<ul style="list-style-type: none"> ■ Technical Failures were increasing and customers were totally unsatisfied from the performance. ■ DPPM was increasing day by day due to no Inspection plan for the incoming, in process and final inspection areas. ■ There were no defined SOPs for inspection. ■ There was no any calibration facility for the tools and manufacturing equipments. ■ No inspection Sheets were formed to Check the parts ■ No proper Tolerances were defined properly ■ No limit Samples were available for verification of the parts.
End Proactive Awarding of Business based on Price Alone	<ul style="list-style-type: none"> ■ ABC manufacturing company has to look for the new modern manufacturing equipments or machines for producing good quality parts.
Improve Every Process Constantly / Forever	<ul style="list-style-type: none"> ■ There were no process flow charts available. ■ Process Quality control Tables(PQCTs) were not developed from the drawing standards ■ There were some PQCTs but not as per the standardized formats not including the critical areas and the important dimensions as per the fitment. ■ No Failure Mode and Effect Analysis (FMEA) was the practice in the company. ■ Employees were not aware of the working procedure of the parts. ■ Mishandling of Parts was the common practice ■ Mixing of OK and Not Go (NG) parts was the biggest problem. ■ There was no proper inspection sampling Plan ■ No Operating standards (OPS) ■ No Work Instructions (WIS) ■ No Root Cause Analysis (RCA) ■ No use of statistical Techniques for data Evaluation ■ No quality Reporting ■ Welding Jigs and fixtures were not calibrated. ■ There was no any maintenance plan for dies and molds ■ There was not any Proper color coding implemented in the production shops to visualize the OK and NG parts. ■ No concept of Group Technology. ■ Improper Shop Layout Plans ■ No Daily Quality Meetings
Institute Training/ Use training on the job	<ul style="list-style-type: none"> ■ ABC employees lacks in training about all areas including quality, Calibration Inspection, Pre-delivery Audits, Quality Audits, Documents formation and Data Reporting.
Adopt and Institute Leadership	<ul style="list-style-type: none"> ■ ABC has an autocratic style of leadership.
Drive Out Fear	<ul style="list-style-type: none"> ■ Being an autocratic type of Organization, the decisions are made on the upper tiers of management without taking the employees on board.
Break Barriers between Staff Areas	<ul style="list-style-type: none"> ■ ABC lags in effective departmental communication.
Eliminate Slogans, Exhortations and Targets	<ul style="list-style-type: none"> ■ ABC lags in the guidance system direct the people exactly what the organization is? What are the motives and objectives? How these objectives can be achieved? How the people have to work? What should be their intentions?
Eliminate Numerical Quotas	<ul style="list-style-type: none"> ■ ABC often compromises in achieving its numerical objectives to exceed in competition with her competitors.

Remove Barriers That Rob Pride of Workmanship	<ul style="list-style-type: none"> ABC departments lags in harmony, teamwork and focused approach towards Organizational objectives
Institute Programs for Education and Self Improvement	<ul style="list-style-type: none"> Non adherence to training policy. There were no apprenticeship and training plans for the employees.
Put Everybody in the Company to Work for This Transformation	<ul style="list-style-type: none"> ABC Company was not taking its employees on board and not aware of the management polices and business strategies related to production and Quality.

After conducting GAP analysis, the business improvement maturity model was developed. There are two steps involved in the development of the maturity model.

3.2.2.1 Continuous Representation:

The first step in the development of the maturity model is to analyze and state the critical success factors which will be

going to assess in all the maturity levels one by one after achieving every next maturity level. This development of the critical success factors have been done as a result if the GAP analysis conducted in the premises of the ABC manufacturing company. This first step in the development of the maturity model is called continuous representation.

Table 3: Critical Success Factors

Critical success Factors			
Sr #	Assessment Areas	Sr #	Elements
1	Business Policy & Organization	1-1	Senior Leadership and Management
		1-2	Organizational Hierarchy
2	Quality System and Process Control	2-1	Quality control
		2-2	Quality Assurance System
		2-3	Specifications Control
		2-4	Design Control
		2-5	Inspection Standards
		2-6	PQCT
		2-7	OPS
		2-8	Internal Audit
		2-9	Quality Education
3	Manufacturing Equipments and Process Control	3-1	Manufacturing Parameters Control
		3-2	In Process Inspection
		3-3	Treatment of NG Part
		3-4	Emphasis Process Control
		3-5	Process of jigs , tools
		3-6	Manufacturing Equipments Control
		3-7	Mold Management
4	Inspection & Reliability Test	4-1	Final Inspection
		4-2	Reliability Test
		4-3	Measurements/OA Instruments
		4-4	Calibration
		4-5	Defect C/M
		4-6	Special Acceptance
		4-7	Material Stock Control (Issuance)
		4-8	Material Stock Control (Inspection)
5	Quality Education & Training	5-1	Quality Education
		5-2	Training

3.2.2.2 Staged Representation:

The next step in Maturity Model is to describe the maturity levels which will be going to achieve as a success ladder. The data is collected on the basis of the critical success factors in

all these five levels elaborating the every individual stage status based on which the improvements were suggested to get the better results in terms of low DPPM and the supreme customer satisfaction as shown in fig 2.

3.2.3 Framework of Maturity model:

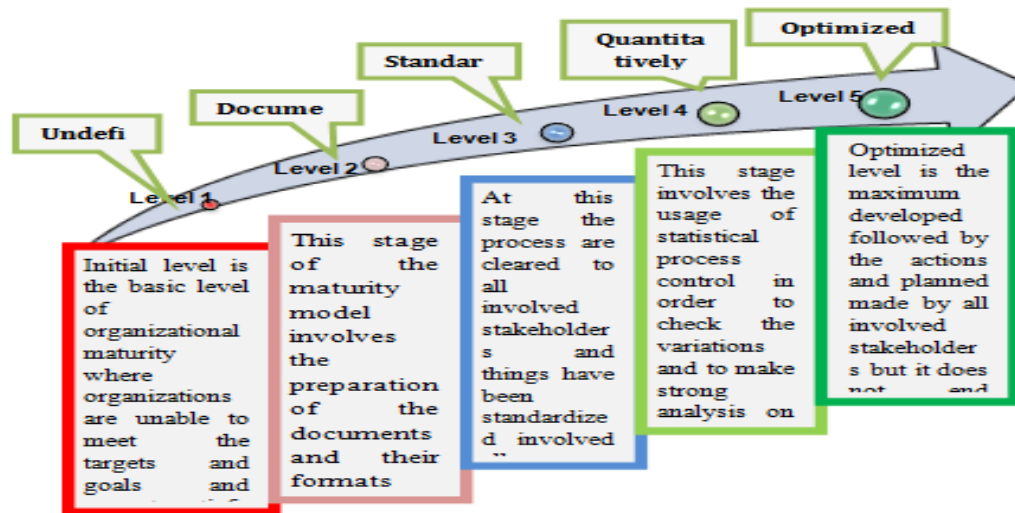


Figure 1: Staged Representation of Maturity Model

Table 4: Maturity Model for ABC Automobile Manufacturing Industry

Critical success Factors								
Sr #	Categories	Sr #	Subcategories	Initial	Documented	Standardized	Quantitatively Managed	Optimized
1	Business Policy & Organization	1-1	Quality Policy					
		1-2	Business Organization					
2	Quality System	2-1	Regulation					
		2-2	Quality control					
		2-3	Quality Assurance System					
3	Design & Spec Control -1.Spec Control -2.Design Control	3-1	Specifications Control					
		3-2	Design Control					
4		4-1	Inspection Standards					

	Standards Control	4-2	PQCT					
		4-3	OPS					
5		5-1	IPP Control					
	Parts Control	5-2	Lot Control					
		5-3	Identification Control					
		5-4	Parts Supplying Control					
		5-5	Stock Control					
6		6-1	Manufacturing Parameters Control					
	Process Control	6-2	In Process Inspection					
		6-3	Treatment of NG Part					
		6-4	Emphasis Process Control					
		6-5	Process of jigs , tools					
7		7-1	Manufacturing Equipments Control					
	Manufacturing Equipments Control	7-2	Mold Management					
8		8-1	Final Inspection					
	Final Inspection & Reliability Test	8-2	Reliability Test					
9		9-1	Measurements/OA Instruments					
	Control of Inspection Tools & Instruments	9-2	Calibration					
10		10-1	Defect C/M					
	Defect C/M & Special Acceptance	10-2	Special Acceptance					
11		11-1	Material Stock Control (Issuance)					
	Material Control	11-2	Material Stock Control (Inspection)					
12	Internal Audit (QAV-I)	12-1	Internal Audit					
13		13-1	Quality Education					
	Quality Education & Training	13-2	Training					



After the development of the continuous and staged representations, these two areas were incorporated and developed a structured framework for the implementation of maturity models and help the practitioners to formulate the right strategy as per the requirements of the organization as shown in fig 3.

The developed framework for the maturity model is as under:

4. ANALYSIS, FINDINGS AND DISCUSSION:

This analysis has been made on the role of critical factors and evaluation of every factor in the Maturity levels of the developed maturity model. It also illustrates how this study expands the boundaries of BPM research and offers insights into the role played by participants' critical success factors in the actual improvement of the BP and the methodology adopted in this case study organization.

4.1 Analysis of Business Improvement Maturity Model under Research Question and methods:

In this research number of discussions has been conducted with the variety of people that led to the identification of stakeholder groups and their representatives for participation in the workshops. Collaborative analysis has done and different workshop sessions have been held in order to get the

right information and data from the involved stakeholders. The Analysis is explained as under:

4.2 Exploratory Analysis

Every individual improvement area is exploratory analyzed as under:

The business maturity model implemented in the ABC engineering company established the existing business process and products mature enough that the system achieved the 80% compliance with the product quality and achieving the demand and supply targets effectively.

ABC Engineering Company along with the collaboration of their respected customers reached to the good levels of

- Low defect PPM
- Low Rework Rate
- Less internal failures
- Minimum warranty claim

The following graph shows the customer satisfaction upon implementing business maturity model against the product compliance.



Figure 2: Customer Satisfaction Vs Product Compliance

It has been observed as an achievement in our research that ABC engineering had achieved the desired level of defect PPM though implementing the practicable business maturity model. The following graph represents the achieved goals in an understandable way.

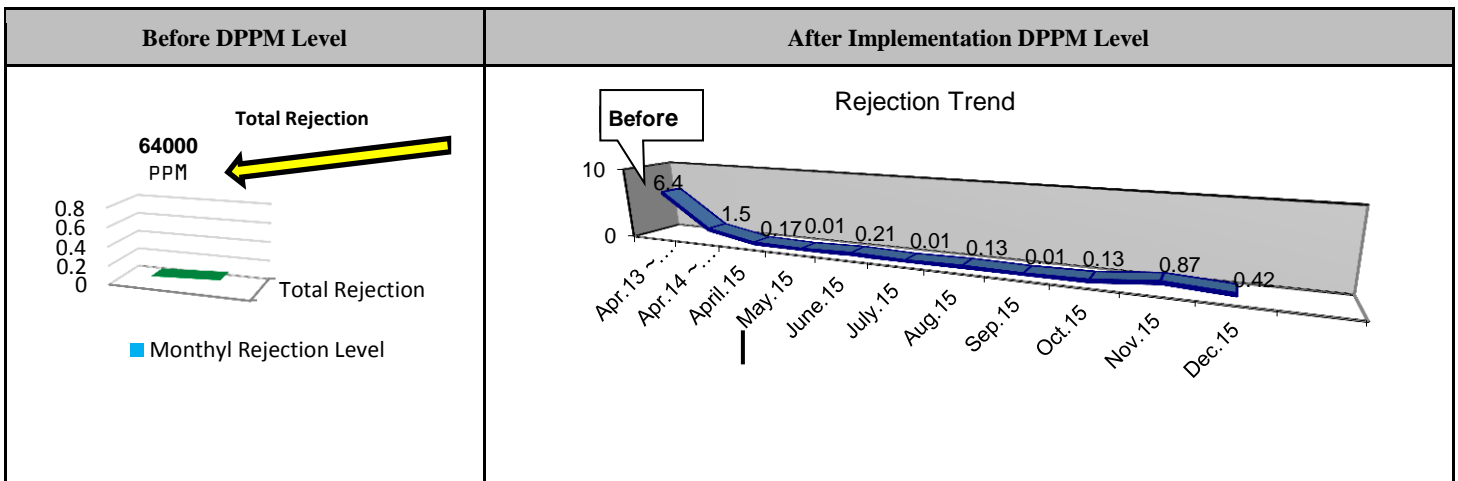


Figure 3: Rejection Trend or DPPM Level

Every Critical area is explored individually and analyzed in detail as under:

- Organizational environment has been evolved from the conventional management practices and the concept of multifunctional teams induced into the system.
- Senior management appreciates the working toward improving quality in particular and maturing business in general.
- Kaizen activities started to take labor class workers on board by contributing in the improvement activities.
- All SOPs are standardized after consultation of the critical dimensions from the drawings. Tracking of the SOPs started and Material flow judgment become the order of the day. Group Technology concept started. Single part and its child parts production started on the line wise production. Reduction in work stations and enhancement of quality accomplished.
- PQCTs, OPS, FMEA documents are prepared and verified from the Customer, sealed from the Customer and become standardized. Process inspection and Final inspection started as per the PQCTs, OPS and FMEA. Analytical skills have been developed among the employees. Rapid remedy actions started. Original reporting along with the defects and reason of defect occurrence started.
- Work instructions are prepared and verified from the Customer. Work instructions displayed on the shop floors for employees in an easy understandable language.
- In process inspection started. Documents have been established on the Pull system Technique. Well trained Quality Inspectors deployed for controlling the defect occurrence in process. FIFO implemented (First In first Out).
- SOPs for the defected parts finalized and separate areas allotted for the defected parts placement on shop floors to avoid any kind of OK, NG part mixing and outflow of defect to the customer.
- Jigs and Fixtures of the process are well maintained and calibrated as the dimensions of drawing. Calibration plan also introduced and implemented.
- Equipments' are calibrated and calibration certificates have been developed
- Final Inspection area identified and managed along with the final inspection sheet. Quality Gate Developed. Limit Samples are displayed on every station. Status wise gauges developed and implemented. Corrective and Preventive action request started which greatly empowered the system and achieved the good quality in result.
- Data analysis started by using SPC techniques and other Data analysis tools. Root Cause analysis being presented in Quality Circles and Top Management Meetings
- Calibration documents and setup developed and installed. Plans developed. New Calibration well maintained staff deployed. Outsourcing and internal calibration started. Certification ensured. Calibration Data analysis become the practice.
- Recruitment policy has been established. Concept of Right person for right job evolved.
- Employee's trainings started. Both on Job and Off Job trainings started. Employees are trained and further latest

technology and quality training become started. Not only this, the ethical trainings also initiated to strengthen the system in all aspects.

4.3 DISCUSSION:

The Following discussion is made on this research study which is as under:

- Business process improvement maturity models are very flexible and one can mold it as per the requirements of the organizations. The stages can be redefined with the suitable names.
- After the implementation of Business Improvement Maturity model ABC manufacturing company was able to achieve the customer satisfaction. The OEM sent the Monthly Defect PPM Analysis report in which it is presented that the defect PPM level reached to the level of 3 sigma approx.
- The Six Sigma DMAIC and 7 QC Tools – ingredients of the maturity model form the foundations for the continuous representation of the maturity models.
- Improvement Is a key stone to achieve the streamline processes and quality products
- Organizational top management commitments and the improvement oriented mindset increase the system sustainability.
- Implementation of PQCTs, FMEA, RCA, OPS, WIS, process controlling and inspection & Testing reliability are the vital few's which majorly contributes into the system maturity
- Implementation of QMS and DMAIC steps incorporated within maturity levels (Initial to optimize) may effectively elaborates the gradual quality improvement and the achievement in getting the customer satisfaction.
- The development of theoretical framework and questionnaire was done with the intention to know the maturity model roadmap and its evaluation in terms of system Compliance with Product Quality.
- This Research helps automobile manufacturing industry to have the analysis of Critical success factors in their business organizations working in the same domain like ABC engineering company and its customer (OEM).
- ABC manufacturing Company was unable to achieve the desired level of DPPM before the implementation of Business Improvement Roadmap but after the complete study of the literature and doing the GAP analysis of the ABC manufacturing company revealed the wastages that were highly contributing in DPPM and customer dissatisfaction. The GAP analysis also helped to trace out or highlight the critical improvement areas required to look carefully in detail.

4.4 Future Recommendations

Such practices of Improvement pave the path for the success of the organization that directly or indirectly contributes into the national development. Manufacturing Industries of Pakistan are lagging in number of areas so far and there is dire need to come up with the research about the improvements for the stability of the industry. We are still focusing on the service sector organization. No doubt service sector organization has their part in national development but

product industries are also needed the expert's opinions and suggestions for improvement. As far as the automobile area is concerned, no four wheel vehicle has been produced in Pakistan so far which can be compared with the international quality products. So being an engineering management researcher, I recommend to the engineers, managers and academic researchers to do empirical research and try to find out the real problems of manufacturing industries. Maturity Model application is very less used in automobile industry so I also recommend that there is need to find out the more accurate and precise improvement models for the researchers and also discuss the limitation of it as well.

4.5 Research Limitations:

There can be several possible limitations to this study. In this research the sample consists of only one customer (OEM) members working in the Pakistan. Under such circumstances the results which are being derived may not be representative of the all automobile parts manufacturers of Pakistan. However, the results have been analyzed after structured interviews and data triangulations under the context of the case study research attributes. As it only depends upon the researcher observations so there is chance of research biasness exists. It must be clear that the number of potential variables may differ from industry to industry. In this research the effectiveness of the company's system in capturing customer satisfaction through implementing maturity model as an improvement strategy observed in this case.

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