

Process Innovation Reaping Customer Satisfaction

G Rajesh

*Research Scholar, Dept. of Computer Science Engineering,
Sri Satya Sai University of Technology & Medical Sciences,
Sehore, Bhopal-Indore Road, MadhyaPradesh, India,*

Dr. R P Singh

*Research Guide, Dept. of Computer Science Engineering,,
Sri Satya Sai University of Technology & Medical Sciences,
Sehore, Bhopal Indore Road, Madhya Pradesh, India.*

Abstract :

CMC, part of the TATA Group, is a leading Embedded, Engineering and IT consulting firm based in Hyderabad, India. CMC is customer focused with an emphasis on quality which is evidenced through the achievement of **ISO 9001**, **SEI-CMMI Level 5** and **Auto SPICE Level 3** certifications for its operations in all of its delivery centers. CMC has been continuously striving for Process innovation with the ultimate goal of achieving productivity improvements to the delight of customer. CMC observes that process innovation has a direct correlation to the customer satisfaction levels. Coupled with the effective project management, vision driven leadership has shown an increasing trend in the customer satisfaction index.

As a matured organization it was imperative that a sustainable rewarding culture for process improvements was developed and nurtured. Process improvements at CMC are triggered with the objective of improving granular level planning and in order to improve a process we change the tasks. Tasks may be eliminated or combined. The sequence in which they are performed may be changed. The location where they are performed or the people doing them may be changed. And, the method of accomplishing them may be changed, often by changing tools and equipment. When these changes are well conceived they can produce positive results in two ways, - better results and lower costs.

Keywords: CMC, productivity, eliminated, performed...

Introduction:

The Automotive industry predominantly deals with around 80% of code/ components being reused. With the recent bigger turn down in the automotive industry, the challenge and onus is laid on cost effective product delivery. While testing contributes around 30% of the complete development lifecycle, there is tremendous dependency on its outcome for the overall product delivered by the customer to its clients. Therefore, there is great onus and responsibility on CMC not only to complete the customer requirements but also to meet the industry demanding cost and quality objectives. This is achievable amongst other things through Process innovation.

Back ground, Approach , Process Innovations :

Leads across the projects are handling tasks with the focus of process innovation and teams have initiated many improvement steps that resulted in Improvement in quality of deliverables, cycle time reduction and reduction of efforts needed to execute the projects. Proactive risk identification enables

identifying improvements opportunities.

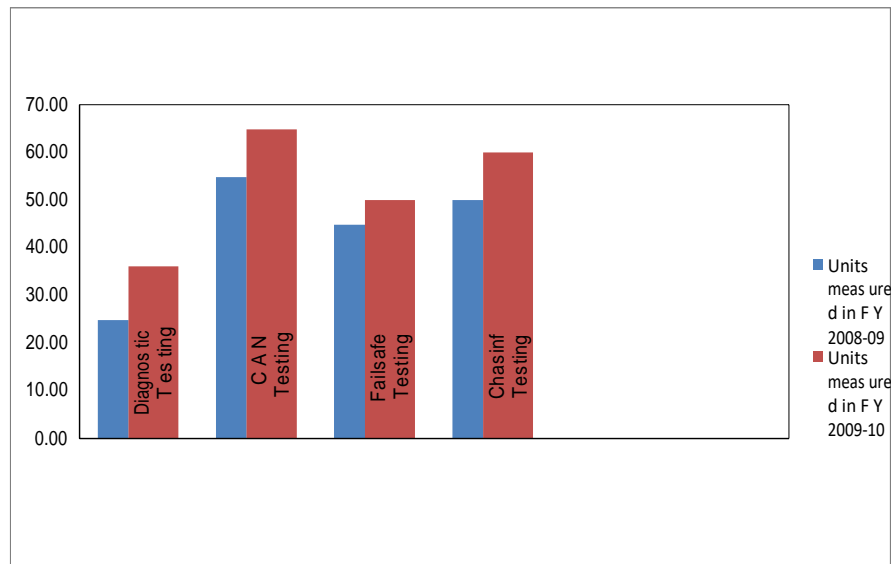
Most often the risk management process plays a pivotal role in enabling improvements, the project teams at the inception of the project are tasked with the job of identifying potential risks (identified by brainstorming and case scenario ways). During the process of identifying mitigation plans, the project teams envisage the option of translating the mitigation plan into an improvement initiative.

Additionally, a detailed analysis of customer feedback (collected from direct and indirect means from about 100+ clients) was performed and this has revealed that the customer delight was primarily because of cycle time reduction and zero defect delivery. Also the root cause analysis (RCAs) performed over low CSI identified the fact that rework and schedule slippage have been

the major contributors. As the automotive electronics group is certified for AutoSPICE, periodic SPICE assessments and SPICE framework training programs have provided the technology teams with a new dimension of improving the engineering processes.

We provide below a few cases that demonstrate the productivity improvements / Process innovations.

- As part of the software development process, there was a huge dependency on the hardware availability for the testing activity to begin, sometimes resulting in schedule slippages. In consultation with the customer, CMC has introduced/ implemented simulation-based development and testing where the hardware peripherals are simulated and this simulation has been used for the testing of ECU software. In this process, most of the software development/ testing can be completed; errors in the software can be detected and fixed before the availability of hardware. This has reduced on-target-testing, debugging time and most importantly rework effort, thereby saving time and cost.
- One of the activities performed under Braking projects is the communications I/O functional testing. This requires a detailed test plan to be prepared from an input file called CAN dbc. The dbc file typically comprises of large number of functional messages used by various nodes in the in-vehicle network. Earlier, this activity of test plan creation was manually done by a tester by reading each signal from the dbc file and copying the same in to the test plan workbook. This activity consumed few days of laborious work and was prone to lot of errors. In order to overcome this problem, CMC proactively came up with an innovative idea of developing a tool that would simply parse the entire dbc format file and populate all the signal requirements in the test plan in few seconds. This idea was very much appreciated by the client and lead to improvement in quality and productivity.
- Air-bag Verification & Validation projects need crash signals as inputs to validate the performance of the Electronic Control Unit (ECU). These signals were earlier generated using the arbitrary waveform generators (AWG). These generators were limited in number and had to be shared among multiple projects resulting in delivery schedule pressures. CMC teams have proactively developed special hardware boards customized for these projects. These are relatively less expensive and can be locally fabricated.



Productivity (no of test cases executed/day) Improvement in each category

The availability of these boards resulted in quicker execution of the projects with less pressure on the teams as the wait-time for the AWGs has been avoided.

- Hardware spy tool is an example of an in-house tool developed by CMC engineers, who have helped in effective usage/ sharing of the CANALYSER/CAN Cards among the teams. Three tier architecture was used for developing this application.

Architecture of the SPY tool

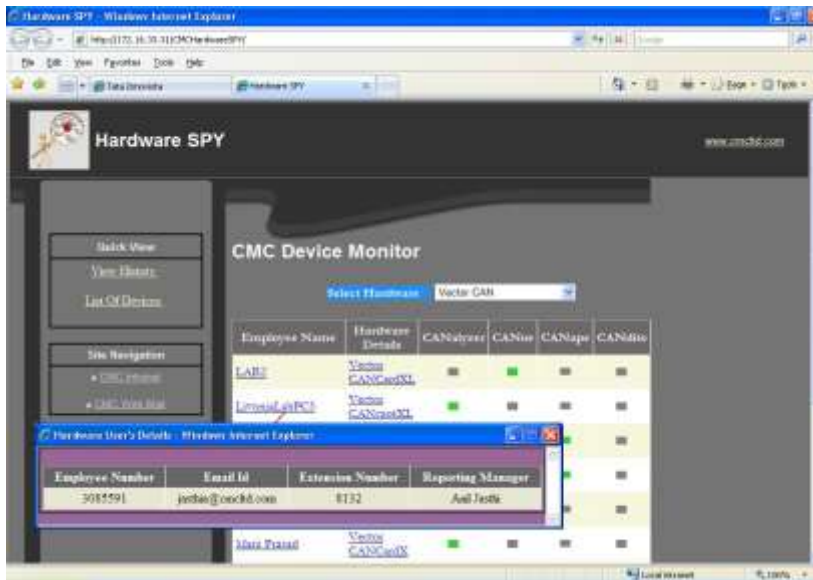
The application consists of the following package.

- Window services developed in VB.NET, which shall extract the details of hardware resource like serial number and PC's Mac address.
- Centralized database server using SQL SERVER 2000 to store hardware's and user's data which always gets updated through the windows services installed in all PCs'.
- Web Application which will display the information of all the available resources, by extracting data from the centralized database server.

This Innovation helps to

- Effectively track and utilize the available 'CAN' Hardware resources across windows network.
- Helps in effectively Plan and execute the projects where hardware resources like digital meters, CAN hardware, Barcode readers, Printers etc. are shared by multiple users.
- Prevents manual tracking of resources there by saving lot of productive time of both the employees and managers

- This has resulted in significant cost reduction (approximately USD 0.6 million in 2 years)



time for a specific customer and this can be deployed across projects

- As part of Design for Manufacturability guide lines process every design need to under go the Conductive Anodic Filament (CAF) violation check. The previous process for CAF violation check script was taking more time for execution and manual interaction was required. CMC has proactively developed new script which has reduced the manual work and reduced the execution time almost 150 times. The previous CAF violation script was executed on exporting the data using report writer which is in Microsoft excel (xls) file. The new script is executed on PCB design application and used the application memory that improved the performance and reduced the manual work of exporting the data into Microsoft excel. This has been well acknowledged and appreciated by the customer.
- The tools used for independent verification and validation did not provide entire set of scripts for code verification to verify compliance for software implementation guidelines. The guideline documents contained the rules derived from experience, where the tools did not really help. So it involved manual verification and more effort. CMC took up the task of updating the scripts database so that this entire manual effort is eliminated. Today we have database that can cater various coding rules besides the Misra.
- In challenging scenarios, where time to market is one of the key aspects of delivery management, the Project Managers had the challenge of optimal utilization of resources, this was augmented with the help of burn down charts, through understanding of the work loads and effectively managing them.
- Routine health checks and reviews have also triggered process improvements in terms of updates to the checklist and training materials.



- One of the key drivers for achieving the process improvements and innovations has been a strong training program – technology coupled with process training with the basic awareness in the delivery team about customer landscape and its drive towards cost/ quality delivery. The HUB SPOKE model approach is being implemented for building the competency levels of the team,
 - Core team in the Automotive Electronics group across the verticals Hardware, Software Verification and validation having expected expertise mobilized internally
 - Each member of core team assigned as a coach and mentor to 4-5 member technical team
 - Ramp-up in any of the verticals is done by adding a new Hub-Spoke Unit (HSU) each time.
 - Mobilization done through lateral hires, up-skilling of internal associates, academic institutes and leveraging alliances.

Conclusion:

It has been observed that process innovation has a direct correlation to the customer satisfaction levels. Coupled with the effective project management, vision driven leadership has shown an increasing trend in the customer satisfaction index. Repeat business and an increase in the employee motivation levels (resulted from internal employee satisfaction survey) have been observed. Organizations need to focus on process improvements as these lead to better motivation and lead up to the challenges for employees to better their performance, thereby leading to an increased customer satisfaction.

