Business Process Improvement by Implementation of an Information Technology Solution to Replace a Manual VA/VE Project Execution System

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Abstract

The importance of Information Technology (IT) is growing and in a hypercompetitive market, IT must be used as a strategic asset for companies to succeed. To gain strategic benefits from IT, companies need to be innovative when deploying IT. This can be achieved by reengineering business processes to take advantage of the possibilities that IT provides (Sune Müller, 2012).

The purpose of this paper is to monitor the implementation of VA/VE projects with the help of an IT system to replace the manual process of execution of value enhancing projects. The execution of projects can be done more effectively by introducing concerned stakeholders to a business process management software tool named Cordys. With the help of this tool, project leaders will be able to assign tasks to each notified user with an agreed upon timeline which will then be monitored by the software through task reminders. These reminders will notify the user in advance so that he or she can complete the assigned task in the agreed upon timeline with all supporting documentation required. Notified users can then see the progress of the project at any point of time from anywhere without approaching the project leader.

Various reports (called MIS reports) will be generated (like task wise aging, person wise aging, proposal wise aging etc.) which will help to do the analysis to ensure efficiency of project implementation.

Keywords

Project execution, timeline monitoring, process automation, strategic use of IT, data analysis, Management Information System (MIS) report

Company Profile

Mahindra and Mahindra Limited (M&M) is an Indian multinational car manufacturing corporation headquartered in Mumbai, Maharashtra, India. It is one of the largest vehicle manufacturers by production in India and the largest manufacturer of tractors in the world. It is a part of Mahindra Group, an Indian conglomerate.

Mahindra has been conducting value improvement activities in recent years to maintain cost leadership and they initiated an Integrated Material Cost Reduction (IMCR) department to tack these value improvement activities. A dedicated team of engineers was formed to focus on Value Analysis and Value Engineering (VA/VE) activities to control product, process and other costs by applying systematic Value Methodology principles to achieve a better value proposition for their customers. Since then the IMCR department has been contributing to continuously improving the business performance of the company.

Introduction

The information contained in traditional print materials like books, journals, reports, published works, minutes of the important meetings, manuscripts, cannot easily be preserved forever for many reasons. As years pass, this printed documentation become faded, the medium becomes brittle and finally, totally unusable. Unless we develop alternative arrangements for recapturing and reproducing this printed information in another format, this important data will be lost forever. Fortunately, technological

advances have provided us with suitable alternatives for preserving such valuable information by using information technology which has brought tremendous changes in our lifestyle in recent years.

Mechanical industries are no exception to this fact. To ensure wider access and a long-term preservation policy of scholarly human knowledge, many of the professional organizations and publication houses are moving towards the electronic publication of their print resources (Shekar Bandi, 2016)

Theoretical Background

Below is a process flow (refer to Figure 1) of activities involved in the project execution phase.

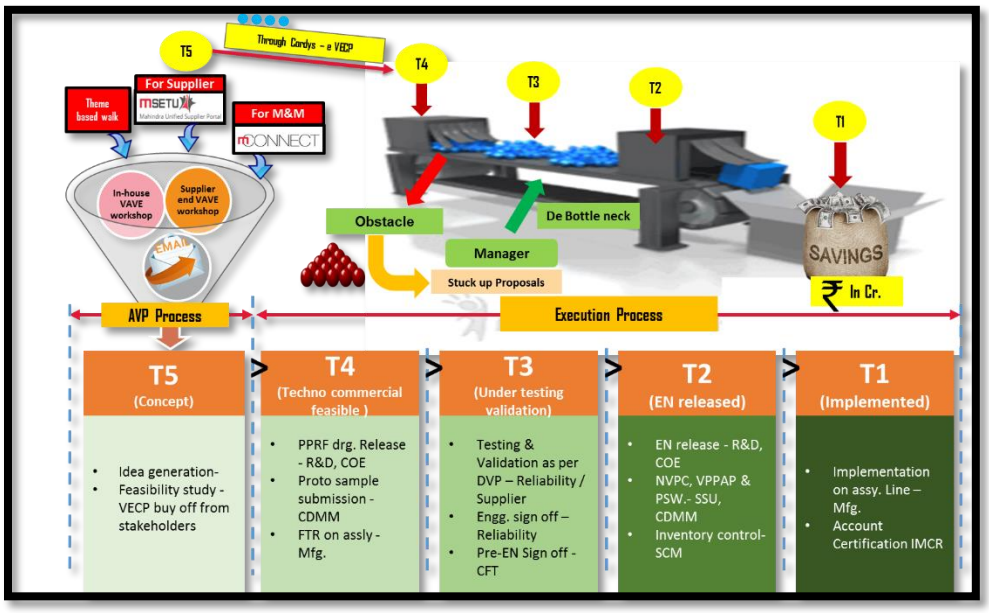

Figure 1: Proposal Execution flow

When a VA/VE idea is received, the project leader reviews the technological and commercial feasibility buyoff from the various stakeholders. Once the idea is technologically and commercially feasible, the project leader forwards the request to the Research and Development (R&D) team to release the Proto Part Request Form (PPRF). Once the PPRF drawing is released, the component development team sends the request to the supplier to confirm the manufacturing feasibility and obtains a quotation for the change. After the quotation is received from supplier for the technological and commercial change, the supplier will submit prototype samples as requested. Next, after the prototype samples are received, a trial run will be conducted jointly by manufacturing and quality team members. In parallel, a Design Validation Plan (DVP) sign-off is completed by a reliability team member, a Centre of Excellence (COE) team member, and a Plant Vehicle Team (PVT) member depending on the part category. Then both vehicle and sample level validation testing is performed where results are shared with the Cross Functional Team (CFT) members and pre-engineering notice (Pre EN) sign-off is completed with R&D, component development , manufacturing, Supply Chain Management (SCM), customer care and quality team, After Pre-EN sign-off, the Engineering Notice (EN) is released and Part Production Approval Process (PPAP) is completed, then Part Submission Warrant (PSW) and inventory control are subsequently completed. Finally, after completion of all of the above activities, the value change proposal will be 100% implemented on the manufacturing floor and notification of the change will be forwarded to the accounting department for actual savings confirmation.

Need of IT monitoring system

To implement the just one VA/VE proposal, the project leader needs to coordinate with 20-25 different CFT members by holding periodic team meetings to monitor the progress and ensure the project timeline is met. This process seems practical if the project leader handles only 2- 3 projects in parallel, but

in reality, they are asked to coordinate 50-55 projects, many at multiple plant locations. This situation makes it difficult to impossible to monitor the timeline for this many projects simultaneously while interacting with potentially more than 200 CFT members located at multiple plant locations on a daily basis. Not only that, but CFT members' priorities and schedules are impossible to predict or verify which leads to delays in project implementation and loss of cash flow savings to the organization.

To overcome this difficulty, Mahindra developed an IT based system which helps to coordinate project implementation with CFT members without doing continuous follow-ups. All users will also automatically obtain reminder notices to complete the task assigned by the team leader. At any point in time, from any location, and without searching for relevant CFT members contact information, each team member has immediate visibility of the status of each project.

IT enabled Process Design

In Cordys, the project leader will assign the task in both series and parallel flow to those responsible to complete certain activities. The team member will then complete the task which is subsequently validated by team leader once that task has been finished and then the project leader will assign the next task in parallel or series flow to another team member through the software which is schematically represented in below diagram (refer to Figure 2).

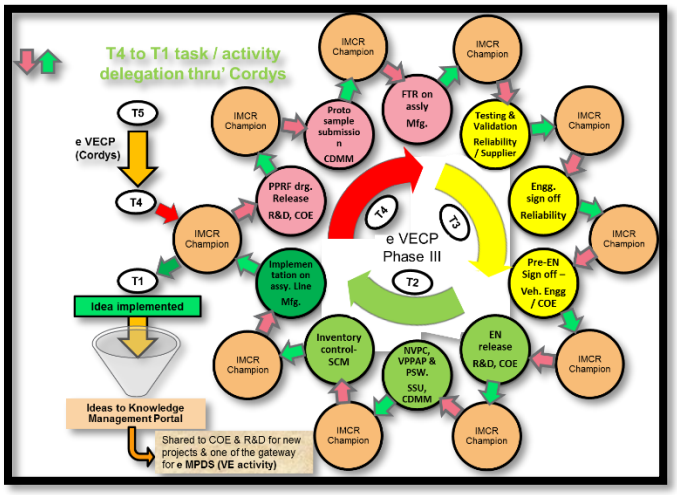

Figure 2: Schematic representation of concept flow

Concept Development

To understand the complexity of the development process, Mahindra developed excel Visual Basic for Applications (VBA) forms (refer to Figure 3) which explains these requirements to the software developer. These VBA forms help us start the actual development without spending too much time in explaining the concept and flow of the required process.

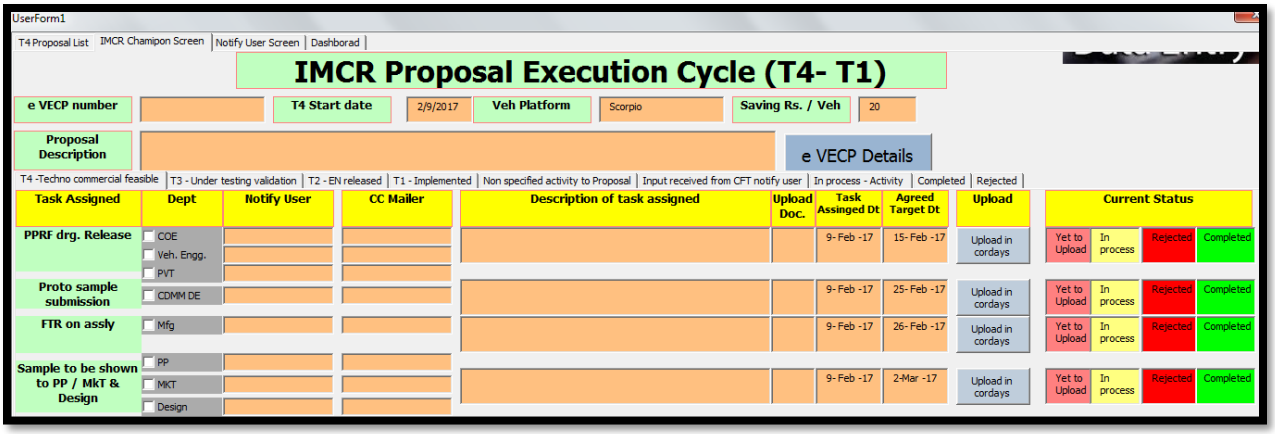

Figure 3: Excel VBA

Implementation of IT Process

Mahindra chose the Business Process Management (BPM) software named Cordys. It empowers business users by facilitating the collaborative alignment of business process implementations with company goals and provides unparalleled control and visibility into process metrics and real-time business activity.

Cordys helps IT managers and developers to rapidly model and integrate their entire enterprise business process landscape, ensuring existing IT assets are fully leveraged. Finally the Cordys platform brings the business and IT worlds together for an efficient integrated project execution solution. (https://bpm.com/vendors/735-vendors-cordys)

Functionality of Process

Once the VA/VE proposal becomes technically and commercial feasible through the IT based system (which is currently in production) the system will automatically fetched VA/VE proposal in to the inbox of T4 to T1 process of individual platform leader followed by auto generated e-mail. here T4 is techno commercial feasible proposal & T1 is implemented on the manufacturing floor.

Then the project leader will initiate the flow by clicking on the “Initiate T4-T1” Button, resulting in the screen below which will be opened (refer to Figure 4)

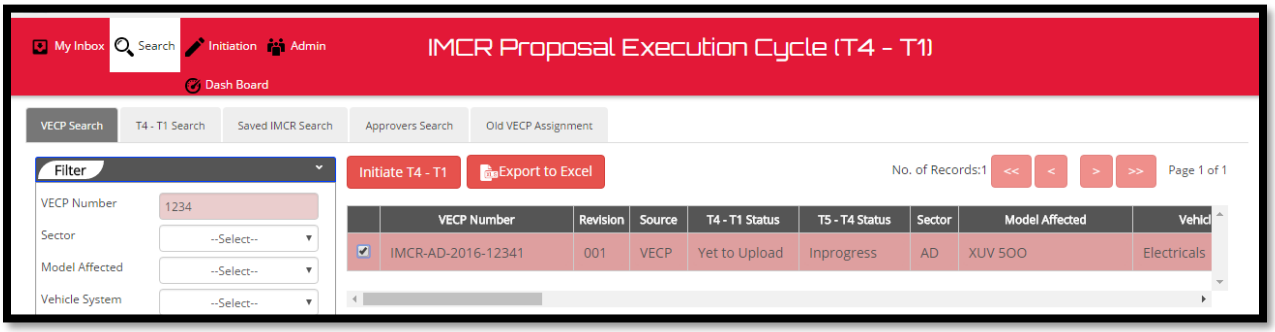

Figure 4: Initiation for T4-T1 process

The team leader will then be able to obtain all of the proposal details like approver remarks, supplier name, savings details, investment details, etc. by clicking on the e-VECP (Value Engineering Change Proposal i.e. T5-T4 process) details button (Refer to Figure 5)

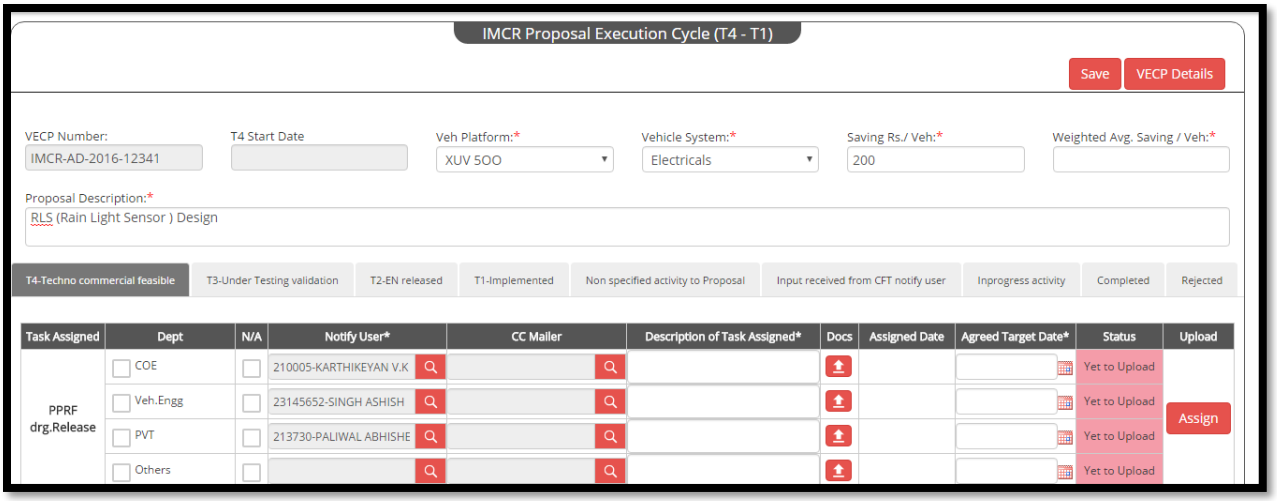

Figure 5: T4-T1 task details

In the T4-T1 flow, some details will be automatically populated like proposal description, savings details, applicable platform, etc. and the following tabs will be displayed:

1. T4-techinical and commercial feasible
2. T3-under testing and validation
3. T2-EN released
4. T1-implemented
5. Non-specified activity to the proposal
6. Input received from the CFT user
7. In progress activity
8. completed
9. rejected

The details of each tab are described below:

Dept. – task assigned to department.

Notified user – Person who is going to work on assigned activity (Preferable operational level person who will execute the project)

CC Mailer – He can view which task has been assigned to the notified user (This could be his Manager or, his subordinate or, the Department Head)

Description of task assigned – the platform leader can describe the task assigned in detail.

Docs – the notified user has the ability to add attachments which might help the notified user to complete the task.

Assigned date – the date on which the task was assigned to the notified user

Agreed target date – the date on which the notified user agreed to complete the assigned task.

Status – status of the assigned task:

- ✓ **Yet to upload** – Task is not assigned to any notify user
- ✓ **In process** – Task assigned to notify user & yet to complete by notify user
- ✓ **Completed**- Task completed by notify user & verified by project leader
- ✓ **Rejected** – Task Rejected by notify user & duly agreed by project leader.

Let's understand the how to assign the task to the notified user with the below task.

“PPRF drawing release” task can be assigned to three agencies COE, Vehicle Engineering, and PVT. The project leader can assign the task to all of them or one of them depending on the requirement by completing all of the required mandatory fields to assign the task. Once the task is assigned to the notified user, The notified user can see the task details through the e-mail hyperlink, or he can open the task through the Cordys inbox (refer to Figure 6)

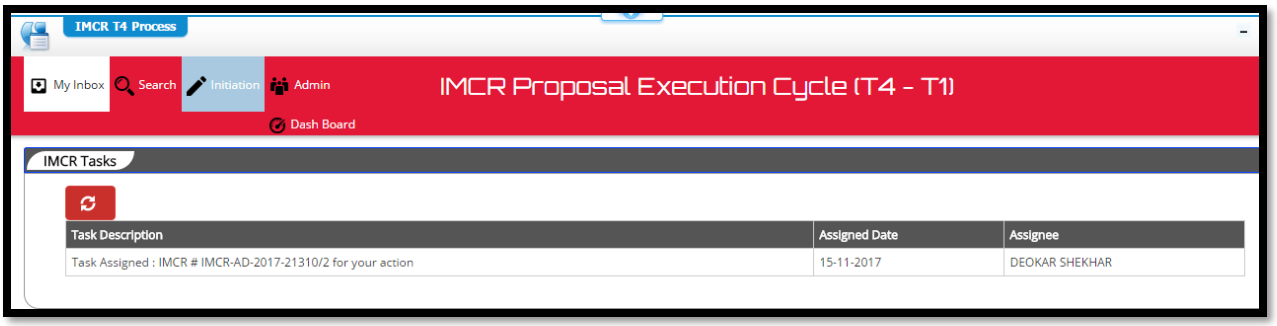

Figure 6: Cordys inbox to open the task

Once a CFT member opens the task, they can see the screen below. (Refer to Figure 7)

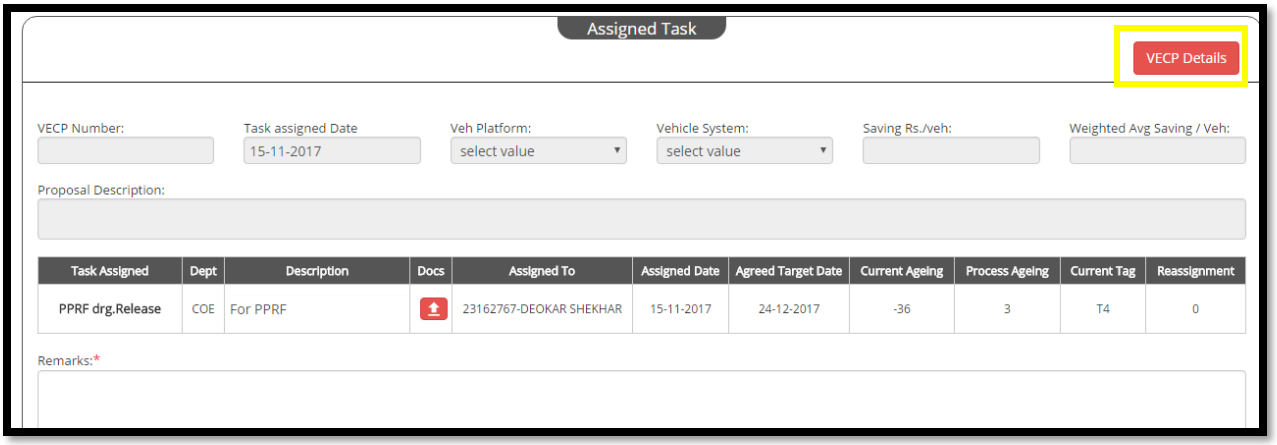

Figure 7: Task assigned details to CFT member

The notified user can see the proposal details by clicking on the VECP details button. The notified user will complete the task by adding his or her remarks and attach any relevant documents as required. Once the task is submitted by the notified user, the task is transmitted to project leader (refer to Figure 8)

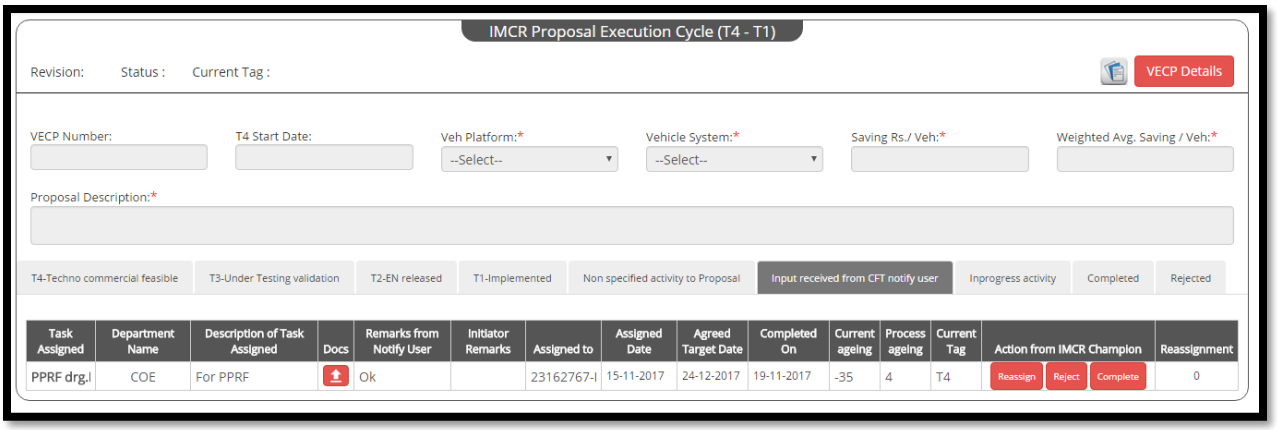

Figure 8: Inputs received from notify user

The project leader can execute the actions below depending on remarks sent by the notified user:

1) **Complete** – If the notified user has completed the assigned activity to 100%, then project leader will complete the task.
2) **Reassign** – If the notified user has not completed the assigned activity to 100%, then the project leader can reassign the task or the notified user can re-submit the task with the comment, "Please assign this task to Mr. XYZ as I am not looking after this project / activity ". In such cases, the project leader can reassign the same activity to Mr. XYZ.
3) **Rejected** – If the notified user completed the task with remarks that the VA/VE proposal failed in testing, validation, etc. If the project leader rejects the task, the VA/VE proposal will be rejected.

Similarly, all tasks will be completed in T4 stage and in the case where any activity is not applicable to the specific VA/VE proposal, the project leader will select the "Not Applicable (NA)" for such activity and complete the tasks. This means in each label, all activities should be either "Completed" or "NA", then the next label activity will have opened. Likewise, the complete proposal will be implemented from T4 to T1 stage.

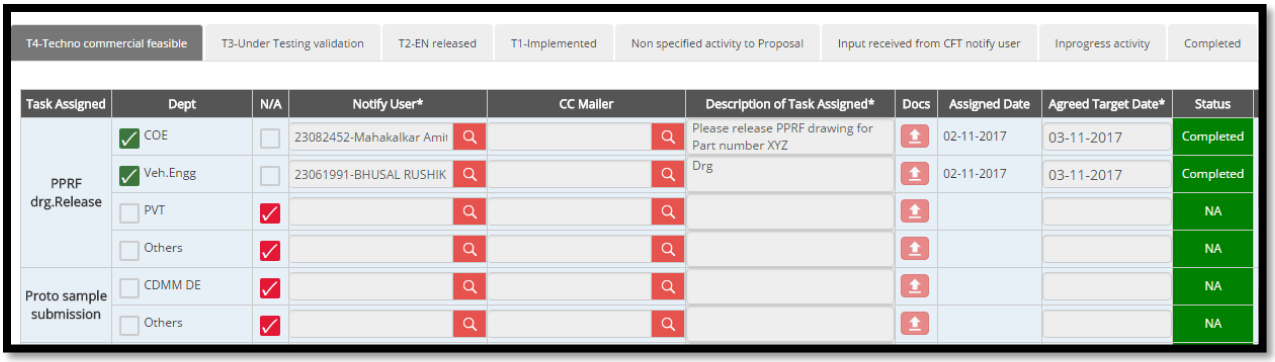

Figure 9: Task details in T4 tag

During the time the VA/VE proposal transitions from the T4 to the T1 stage, if the project leader wants to assign any specific task, which is not identified under any tag, for such cases we have identified a separate label called "Non-specified activity", which is always open until the proposal completes the T1 activities. At this place, the project leader is free to write the task description and select the department. (refer to Figure 11)

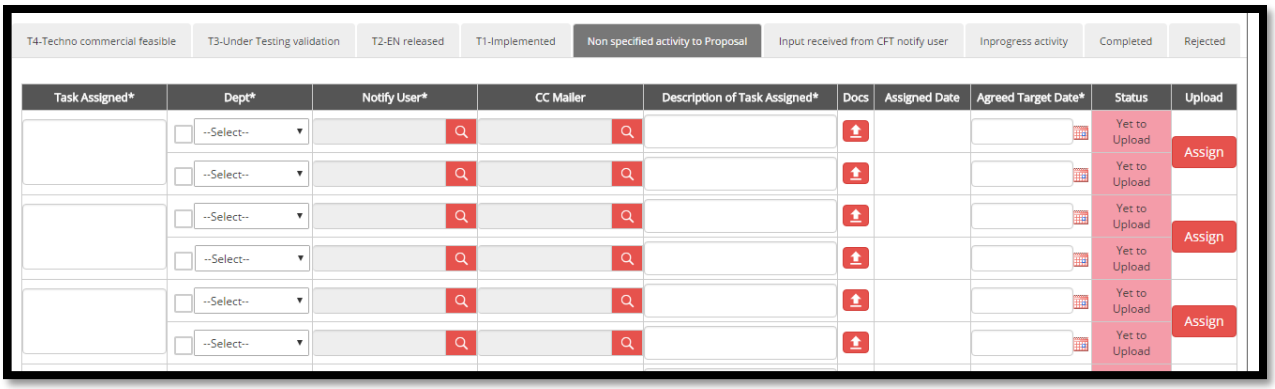

Figure 10: Non-specified activities

One of the major activity mapped under T4 tag is the Design Validation Plan (DVP) sign off. It is observed that 50% of the proposal implementation time is consumed in testing and validating the VA/VE change. In situations where CFT members have differences in opinion related to DVP finalization, the CFT needs to optimize the DVP plan based on their experience. Both simulation and Computer Aided

Engineering (CAE) analysis will save both time as well as cost for testing and validation of the proposal because early proposal implementation will improve the cash flow to the business. Sometimes it is very difficult to obtain approval for the finalization of the DVP test plan from all of the CFT members on any given platform. To overcome such difficulties, we have introduced “DVP inputs from CFT” as one of the tasks in theT4 label. This is where the design validation plan activity will be assigned to R&D, Reliability, PVT, COE, customer care and other departments to finalize the Design Validation Plan.

Once a task is assigned to all notified users in parallel flow and the notified user gives inputs on the DVP requirements, some of the standard tests are mapped for reference (refer to Figure 11 below)

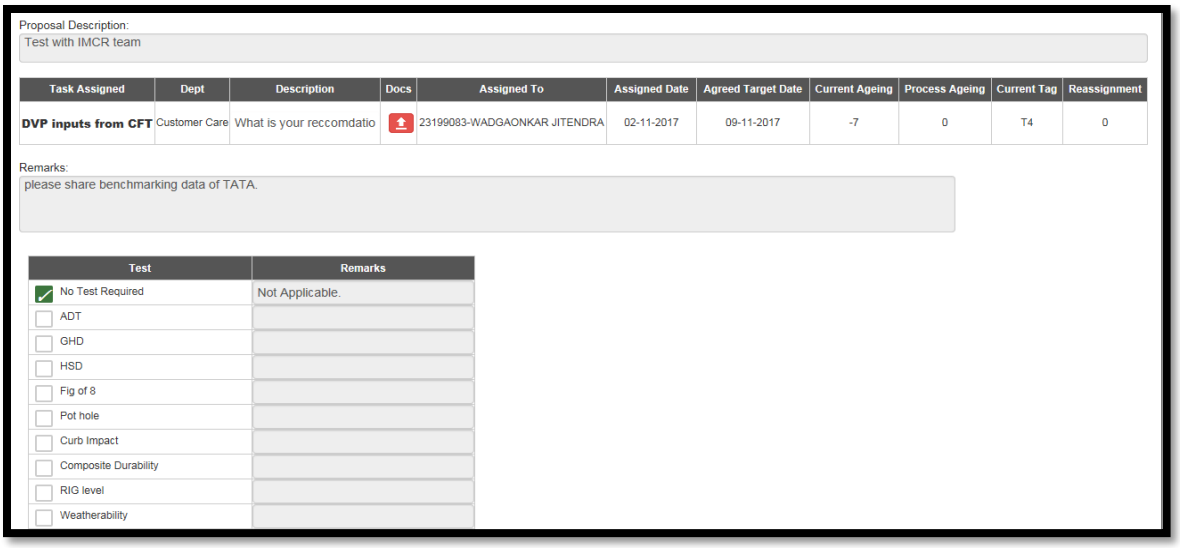

Figure 11: Testing inputs from Notify user

After the DVP input is received from CFT members, if there are differences in opinion within the CFT or if the DVP is overstated, the project leader can forward the task to the Head of Department (HOD) for DVP review and sign-off. The HOD has the benefit to see the recommendations from all CFT members on one screen (refer to Figure 12 below) and based on that, he will determine the final recommendations.

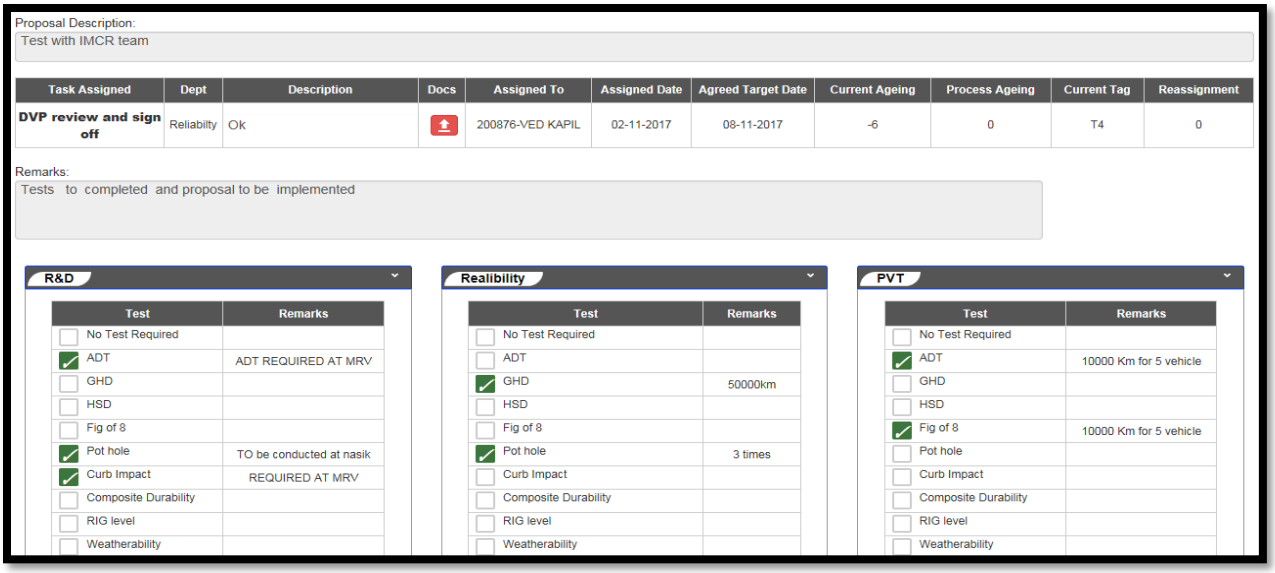

Figure 12: DVP review & sign off cycle

Activity & number of notify users mapped under each tag is mentioned in table 1

Sr. No.	Lebel	No. of tasks mapped	No. of notified users mapped
1	T4-Technological and Commercial feasible	8	27
2	T3-Undergoing Testing and Validation	6	18
3	T2-EN released	4	10
4	T1-Implemented	6	13
5	Non-specified activity to Proposal	8	16
Total		**32**	**84**

Table 1: tag wise task & notified user mapping

MIS reports

Automated Reporting enables you to completely automate report generation for the business. Mahindra has created automated reports across all VA/VE proposals. Report automation eliminates the need to manually generate reports, thus reducing the possibility of errors and freeing up your time in more productive activities like analyzing the data.

With this intension, we have generated the following reports below:

- Person wise aging report
- Task wise aging report
- Department wise aging report
- Tag wise aging report

Advantages

1) Manual coordination will get eliminated
2) Improvement of aging of implementation of a VA/VE proposal compared to the manual Implementation process
3) Person wise accountability will improve
4) MIS will be generated
5) VA/VE project proposal data will be available to all CFT members anytime & anywhere
6) List of VA/VE project proposals will be used for horizontal deployment

Conclusion

In a state of hyper competition, an IT-enabled VA/VE project implementation process innovation is the key to gaining a competitive edge, and furthermore, companies are increasingly being forced to explore new opportunities to utilize the strategic benefits of IT. This goal can be achieved by reengineering business processes and taking advantage of IT in the process. The purpose of this paper was to explore:

1) Opportunities for IT-enabled implementation process innovation
2) Involvement of CFT engagement and usage of their precious time
3) Monitoring cost saving proposals from the technical and commercial approval stage to implementation where Mahindra has improved implementation efficiency (in terms of timeline) of VA/VE proposal by 10 to 15 % which saved @ $ 235,000 USD

References

- Article: Sune Müller, Elisa Møller, Thomas Nygaard, 2012, IT-enabled Process Innovation: A Literature Review, *AIS Electronic Library*
- Book : Shekar Bandi,2016, Mallikarjun Angadi and Shivarama, Emerging Technology and feature of libraries : Issue and challenges, Best Practices in digitization : Planning and workflow processes
- Internet link https://bpm.com/vendors/735-vendors-cordys