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Design and development of Pricing web application for Auto Component Manufacturing Industries

Tharun Saagar T[1] and S. Anu Priya[2]
PG Student, Department of Computer Applications[1]
Assistant Professor, Department of Computer Applications[2]
Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai, Tamil Nadu, India
tharunsaagar@gmail.com and anupriya.scs@velsuniv.ac.in

Abstract: *The project aims to simplify the process of quoting the best price for potential orders by facilitating timely adjustments to different Costs in response to market demand & evolving customer expectations. The ability to effectively managing the pricing and quoting processes is essential for business success. The significance of those aspects prompted the Proactive Solutech India Pvt. Ltd. for undertaking the Pricing~Pro project to streamline its approach. This project will prepare pricing proposal by adopting an efficient and scientific method to handle the RFQs (Request for Quotation) from different industrial Customers. The objective of Pricing~Pro project is to develop a systematic and data-driven approach to prepare pricing proposals tailored to the specific needs and requirements of diverse customers. By integrating key concepts such as cost analysis, margin optimization and profitability assessment, Proactive Solutech aims to improve its quoting process and ensures sustainable growth & success in the competitive industrial manufacturing market. Through this project, Proactive Solutech endeavours to solidify its position as a leading provider in the industry by delivering value-driven pricing solutions that align with customer expectations and market trends.*

Keywords: Pricing, Quotation, Request for Quotation, EoI – Expression of Interest, Cost of Goods, Cost Analysis, Make-or-Buy, Margin, Profitability, RoI – Return on Investment

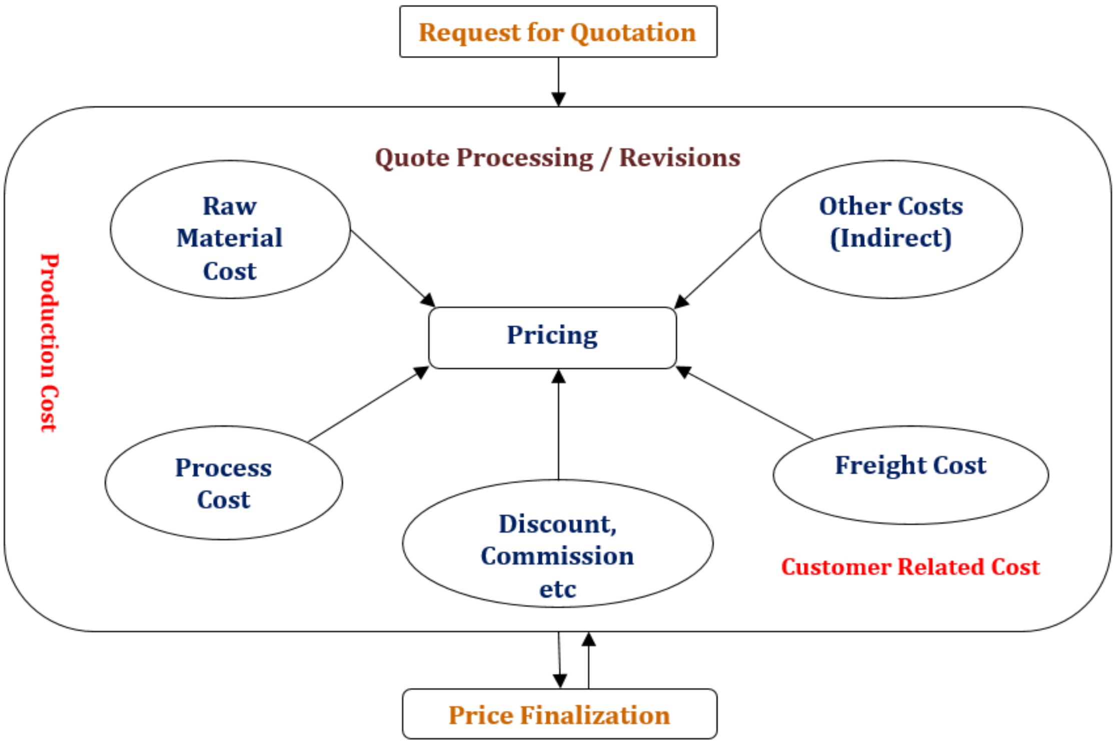
I. INTRODUCTION

The request for quotation (RFQ) is a business process in which a company or entity requests a quote from a supplier or manufacturer for the purchase or production of specific products or services. The manufacturer/supplier will prepare and submit a viable & profitable price quotation after considering all the costs like Raw material, Man-power, Machinery, Tool & Die, depreciation, Volume of Business, Margin, Marketing, Warranty and Service.

The business negotiations would have multiple rounds of discussions. The supplier / manufacturer may be required to rework the quoted price by considering revised specifications, clarifications and sometime may give-up his margin for a reputed client to win the deal. All the required calculations are being done in spreadsheets and followed by the rule-of-thumb. This is where we are placing our **Pricing~Pro** to quickly get the various inputs and scenarios and simulate the revised pricing with accuracy and speed.

The RFQ system is a quoting tool specifically designed for manufacturing companies. The typical pricing flow starts with an RFQ (Request for Quotation) from the customer or a manufacturer. The marketing team forwards this RFQ to the Engineering and Purchase teams for their inputs. Costing team use other team inputs and its own inputs like other administrative costs to work out a selling price (simulation). The cycle finally ends when this selling price is submitted to the customer. Depending up on customer's approval or rejection of this particular price, this cycle could go on for a number of iterations.

Functional Overview



II. LITERATURE REVIEW

Authored by Professor Robert M. Schindler, *paperback book for the Pricing Strategies: A Marketing Approach, Publisher : SAGE Publications Inc; 1st edition (10 November 2011) ISBN-10 : 1412964741, ISBN-13 : 978-1412964746*

This book provides the pricing framework and the below key concepts are covered

- Provides a simple, consistent framework for setting and managing prices, applying Thomas Nagle's idea of a price-change breakeven analysis
- Uses intuitive mathematical techniques and only a small number of formulas and mathematical concepts, to reduce student anxiety and reinforce understanding
- Focuses on consumer needs and behavior, showing how the practice of pricing benefits from a customer focus as much as do marketing practices such as advertising or product design
- Includes examples and illustrations that students can relate to from retail businesses and small businesses that are easy to understand and illustrate basic pricing principles
- Grounds pricing discussion in practical theory, making consistent use of a small number of key concepts that students can master and therefore use

Authored by Mr.Graeme Lamb, *A pocket revision guide for the "Principles of Costing unit", part of the AAT Level 2 Certificate in Accounting, according to the Q2022 standard, in operation from 1st September 2022. ASIN : B0CGMJ7156*

As an experienced accountancy lecturer and AAT-qualified bookkeeper Mr.Graeme Lamb, Covers the nuances of effective Cost Management, and explains in detail about

- Costing systems

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- Cost classification and behaviour
- Overhead Cost
- Manpower costs
- Inventory valuation
- Asset Depreciation
- Budgeting and calculations

Authored by Ms. Marlene Jensen, *A Step-by-Step Guide to Pricing Strategy - "Setting Profitable Prices", Publisher : John Wiley & Sons Inc; 1st edition (12 March 2013),*

As written by an experienced author, this book details the Time-tested strategies for making the best possible pricing decisions and gaining an unbeatable competitive advantage Pricing is one of the most important and difficult marketing problems companies face when launching new products.

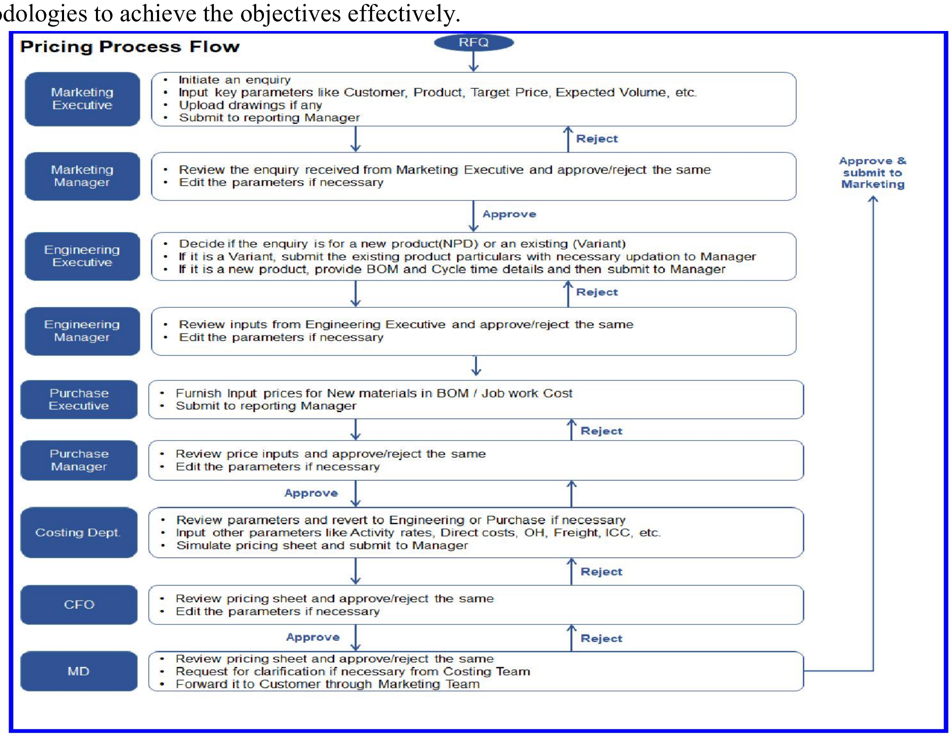
*Authored by Dr.R.Jayaram and Dr.Balasubramanian, "*AN INDUSTRY NOTE ON UNLOCKING THE POTENTIAL OF INDUSTRIAL ENGINEERING IN COST OPTIMIZATION"

As an experienced Professors explains in detail about,

- The application of engineering principles
- Techniques of scientific management to ensure high levels of productivity at optimum cost in industrial enterprises.
- Work on Productivity improvement
- Cost reduction methods

III. PRICING METHODOLOGY & PROCESS FLOW OVERVIEW

By synthesizing insights from the above literatures, the knowledge could transform the development of a robust framework for the Pricing~Pro project, ensuring alignment with industry standards and the integration of cutting-edge methodologies to achieve the objectives effectively.



IV. MODULE DETAILS

4.1 Managing RFQ

Marketing Executive : Marketing executive can initiate an enquiry by clicking on the '+' button on the bottom right corner of the dashboard. A BPM flow has to be chosen from the list while creating a new enquiry. This will decide the entire flow of the enquiry. After this, a new entry shows up in the dashboard of the user. On clicking on this entry, the user is taken to the 'Enquiry item' screen. The user then has to input certain basic details of the enquiry as shown below. Drawings or other files can be attached here. The remarks entered by each user and the files attached in this screen can be viewed by all of the subsequent users in their respective screens. If the executive is creating an entry for a new product, the product code field can be left blank. Engineering executive will create new product master when the enquiry goes to him/her after marketing manager's approval. Chat button on the right can be used by any user as required. The history button on bottom of each screen will display the time and date of approval by all previous users. Once the 'Confirm & Handover' button is clicked, the enquiry is hidden from the dashboard of the current user and is displayed in the dashboard of the next user in the flow.Marketing Manager **:** This user is also taken to the 'Enquiry item' screen from dashboard. The manager can modify the inputs, add/remove attachments, send message to the executive, and approve/reject the enquiry. If rejected, the enquiry again appears in the dashboard of executive and he has to rework and submit again. If approved, the enquiry goes to engineering executive.

4.2 Product Design

Engineering Executive : The user is first taken to the product verification screen from dashboard. Engineering executive has to decide if the enquiry is for existing or new product. If it is a new product, the enquiry still remains with the executive and the user is taken to Product wise – Enquiry screen. Clicking on 'Create Product' button opens Product Master in a pop up window. The executive has to create a new product master entry with all the required parameters. After this, the fresh BOM and cycle time details have to be keyed in. If it is an existing product, the existing BOM and cycle time details are sent to the engineering manager for approval.Engineering. The engineering manager is taken to the 'Product wise enquiry' screen which displays the existing BOM and cycle time. The details can be modified if necessary. The enquiry can then be approved or rejected

4.3 Material Handling

Purchase Executive: Enquiries approved by engineering manager will be received by purchase executive. All the materials in the BOM submitted by engineering will be displayed here (Material Price enquiry screen). The prices present in the 'Material Price' or 'Material Price – Customer' screen will be used. If a particular material is not already present in these screens, zero will be displayed by default and it can be edited by the user. Purchase Manager Can view/modify the inputs from purchase executive and approve/reject the same

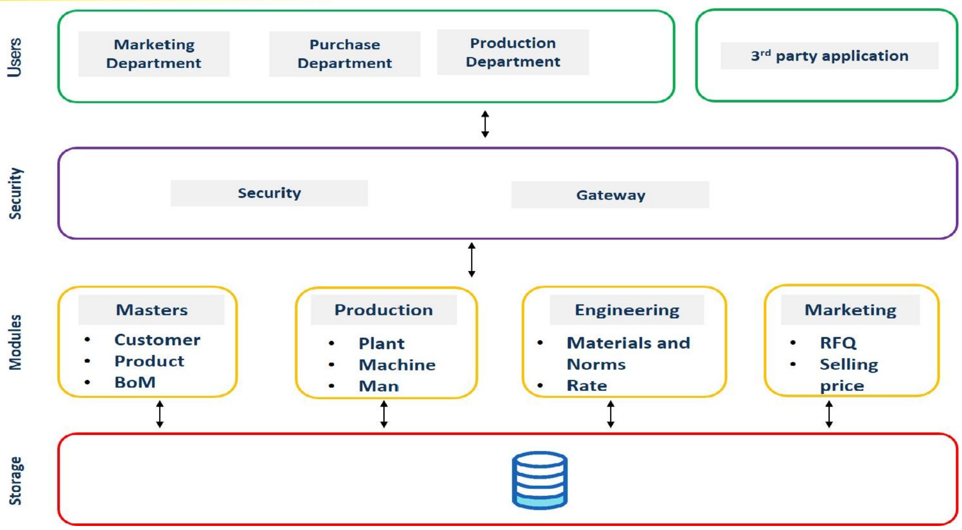
4.4 RFQ Simulation

Costing executive performs simulation based on inputs from other users. When the simulation screen is opened through the BPM flow, most of the fields are filled automatically from the previous inputs. Simulation tab is also filled automatically and there is no need to process again. Costing executive has to modify only direct cost and customer cost tabs. As mentioned earlier, costing executive, costing manager, and MD can view complete history in the simulation screen. Costing executive can the reject an enquiry and send it back to engineering or purchase team. The approved simulation is sent to costing manager. Costing manager can make changes to the simulation and approve/reject the same

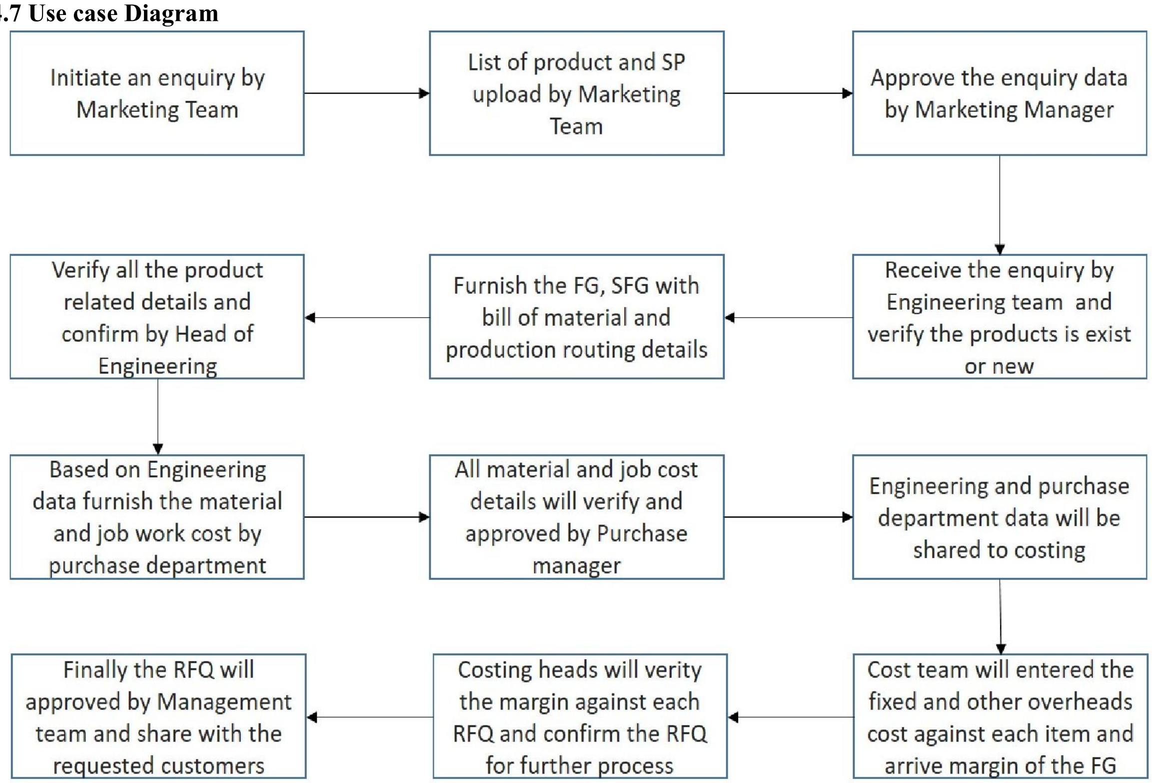
4.5 RFQ Approval

Management can view the final simulation submitted by the costing manager and can approve/reject the same. The approved simulation is finally received by marketing executive for submitting to the customer. This time marketing executive opens the enquiry in 'Customer Confirmation' screen. In this screen, marketing executive can view/download the simulation report for sending to customer. If the customer approves the pricing sheet, the flow ends there. If the customer rejects and requests for a revision, the marketing executive can send the enquiry again to the costing executive who can then modify it himself or send to engineering/purchase for revision of their inputs

4.6 System Architecture



4.7 Use case Diagram



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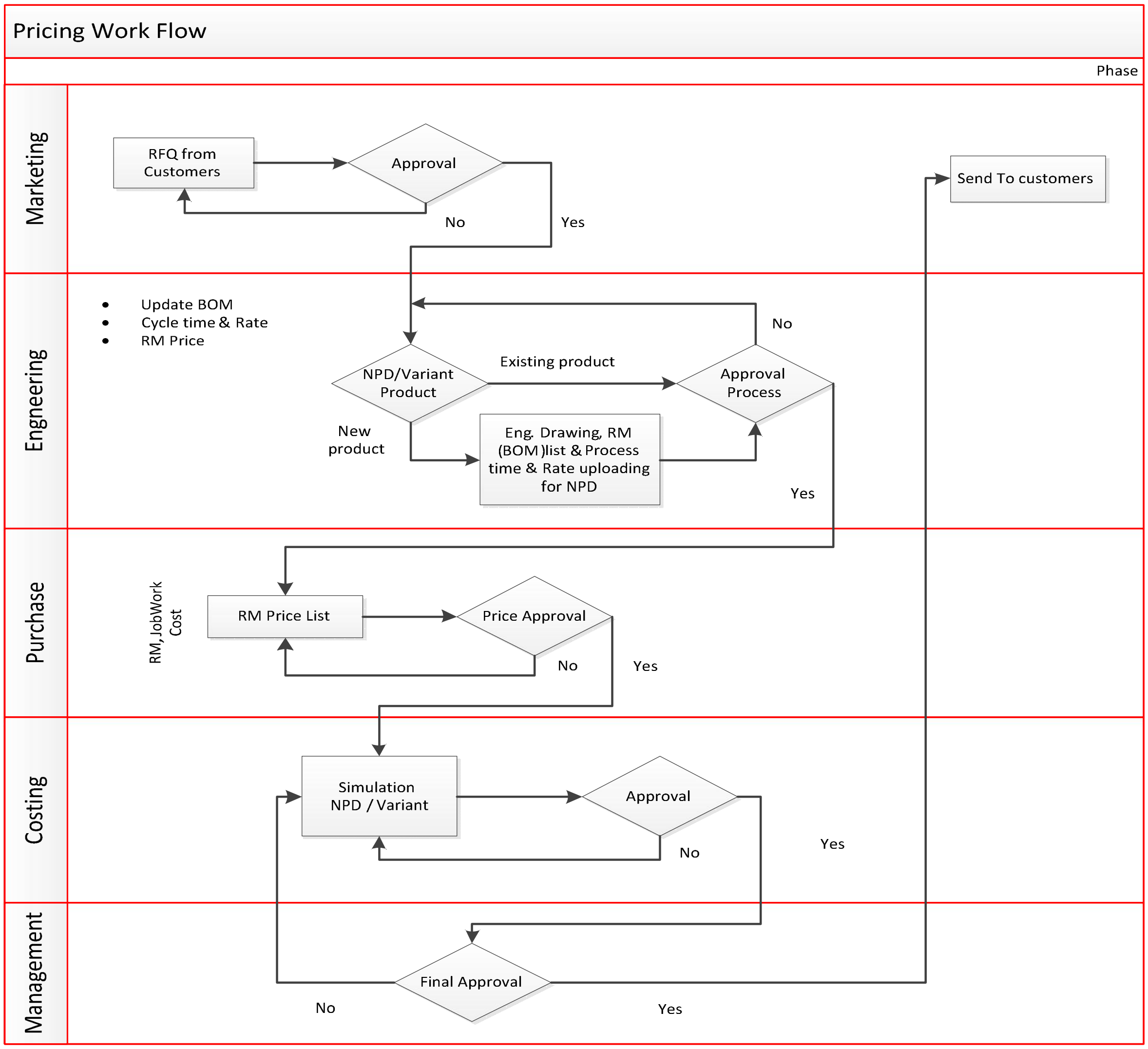
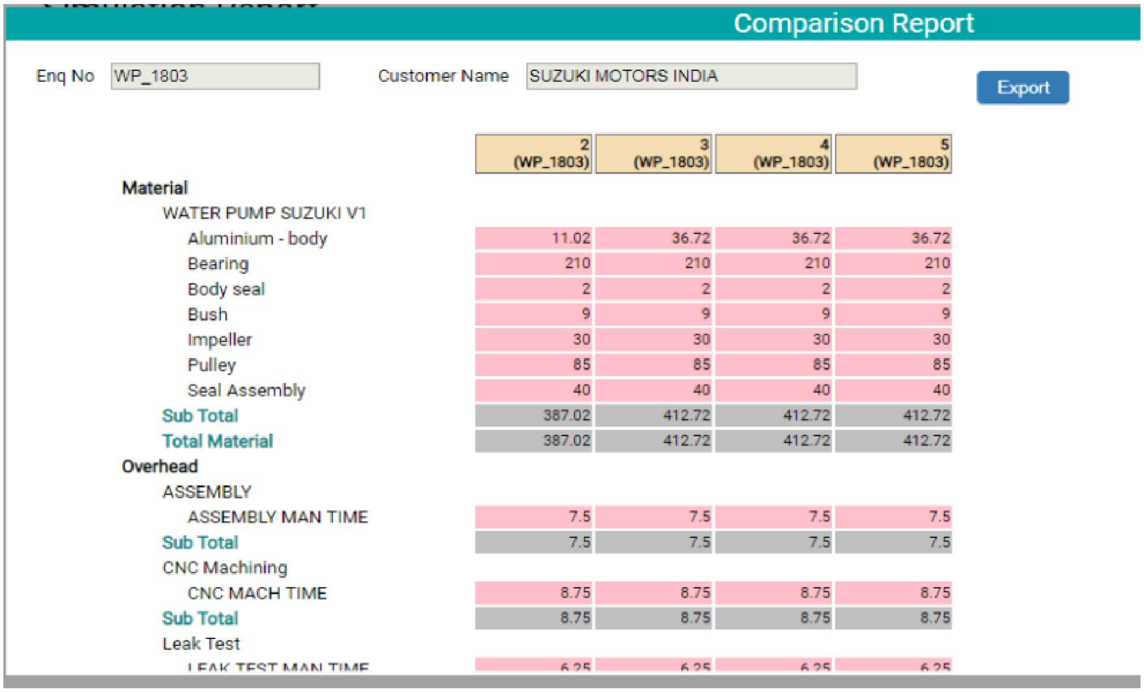
4.8 Work Flow Diagram



V. EXECUTIVE SUMMARY - EXPERIMENTAL RESULTS & COMPARISON

Pricing Pro is a quoting tool specifically designed for manufacturing companies. The typical pricing flow starts with an RFQ (Request for Quotation) from the customer or a manufacturer. The marketing team forwards this RFQ to the Engineering and Purchase teams for their inputs. Costing team uses inputs from these teams and its own inputs for other administrative costs to work out a selling price (simulation). The cycle finally ends when this selling price is submitted to the customer. Depending up on customer's approval or rejection of this particular price, this cycle could go on for a number of iterations. This paper will manage the above process steps with history of changes made during the preparation. There is a Provision to compare the different versions of the quotes,



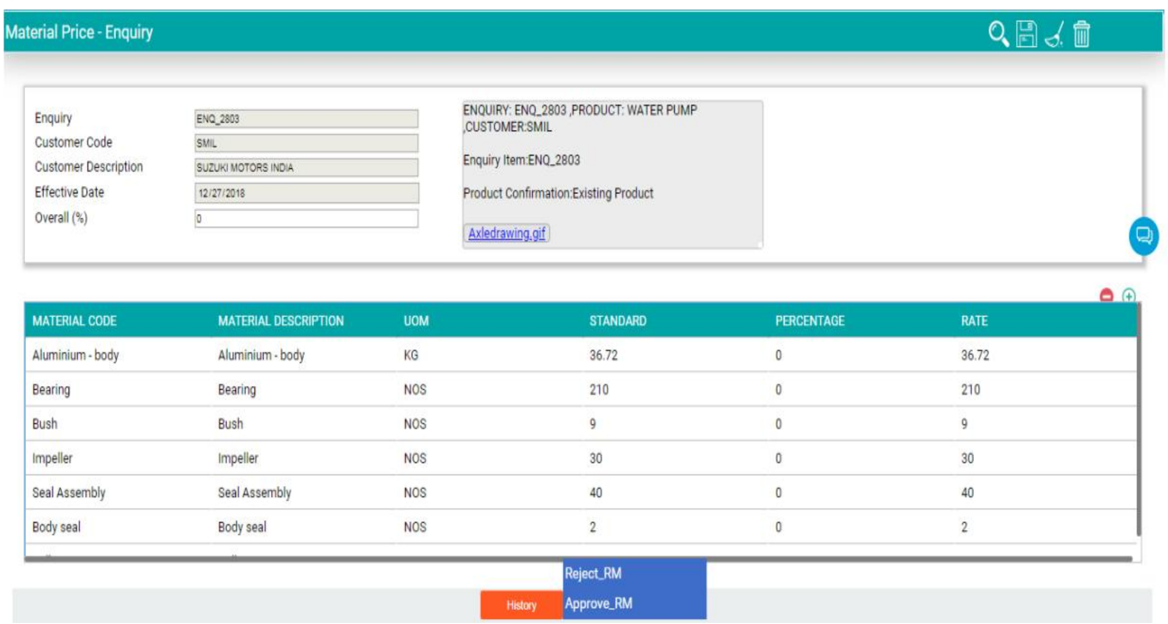
Comparison Report

Enq No WP_1803 Customer Name SUZUKI MOTORS INDIA Export

	2 (WP_1803)	3 (WP_1803)	4 (WP_1803)	5 (WP_1803)
Material				
WATER PUMP SUZUKI V1				
Aluminium - body	11.02	36.72	36.72	36.72
Bearing	210	210	210	210
Body seal	2	2	2	2
Bush	9	9	9	9
Impeller	30	30	30	30
Pulley	85	85	85	85
Seal Assembly	40	40	40	40
Sub Total	387.02	412.72	412.72	412.72
Total Material	387.02	412.72	412.72	412.72
Overhead				
ASSEMBLY				
ASSEMBLY MAN TIME	7.5	7.5	7.5	7.5
Sub Total	7.5	7.5	7.5	7.5
CNC Machining				
CNC MACH TIME	8.75	8.75	8.75	8.75
Sub Total	8.75	8.75	8.75	8.75
Leak Test				
LEAK TEST MAN TIME	6.25	6.25	6.25	6.25

Sample Data with simulation output

RFQ – Entry Screen – This interface screen will get all the inputs necessary for that particular RFQ given by the Customer.



Material Price - Enquiry

Enquiry: ENQ_2803
Customer Code: SMIL
Customer Description: SUZUKI MOTORS INDIA
Effective Date: 12/27/2018
Overall (%): 0

ENQUIRY: ENQ_2803 ,PRODUCT: WATER PUMP ,CUSTOMER:SMIL
Enquiry Item:ENQ_2803
Product Confirmation:Existing Product
Axledrawing.gif

MATERIAL CODE	MATERIAL DESCRIPTION	UOM	STANDARD	PERCENTAGE	RATE
Aluminium - body	Aluminium - body	KG	36.72	0	36.72
Bearing	Bearing	NOS	210	0	210
Bush	Bush	NOS	9	0	9
Impeller	Impeller	NOS	30	0	30
Seal Assembly	Seal Assembly	NOS	40	0	40
Body seal	Body seal	NOS	2	0	2

History Reject_RM Approve_RM

RFQ – Simulation Screen – This interface screen will process all the inputs given by the departments and additionally we can simulate the output based on different input parameters based on various "What-If" conditions – like – What is my Final Price – "If the Raw material Copper Rate is 1000 Rs. Higher than the present cost and so on.

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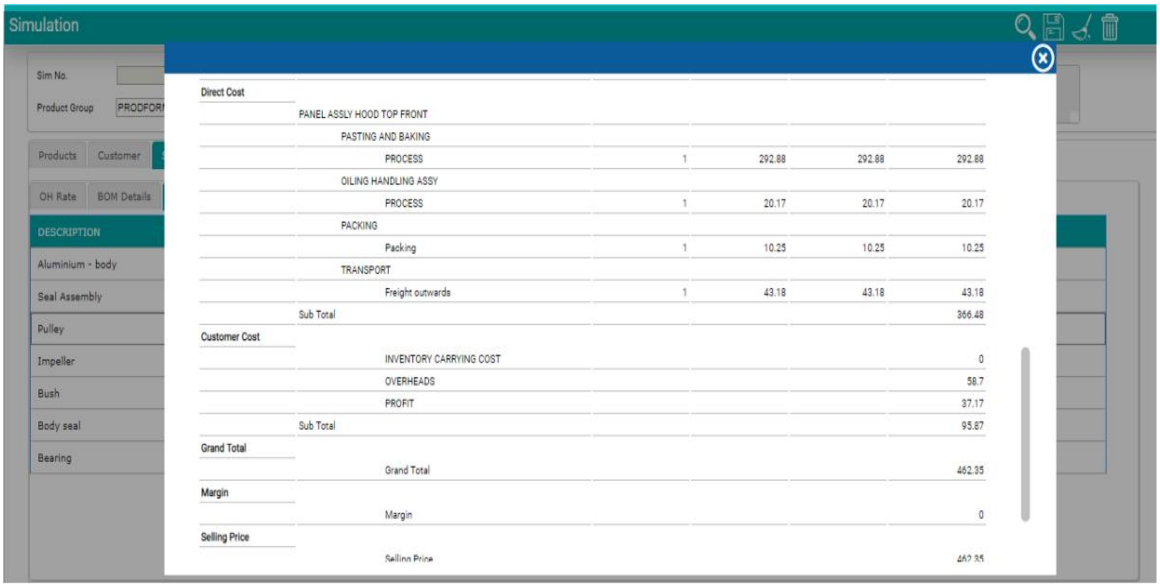
In another scenario, the sub-assembly required in that product would be costlier if it is produced in-house, the team can decide to bought the assembly from another third party. The price controller can simulate the dataset in two different ways by declaring the assembly product as In-house production or by considering that as bought-out and compare the overall pricing and the effects of the above scenarios



VI. CONCLUSION

The manual processing of the RFQ will lead to uncertainty and financial loss. The reputation of the Company depends on the quality products/ services within the cost specified and agreed. The Pricing~Pro will help the entire team of executives, who are all working on a quotation to keep the track of each step in the RFQ progress. On top of it, the Users can review and compare the different versions of the pricing quotation. This will help the Marketing team to reduce the turn-around time to submit the reply to the Customer. The Marketing team is equipped with the comparison data and with the power of simulating the new scenario within a moment, they could easily win the deal in favour of the Company. Pricing~Pro prepares the best pricing for the benefit of both the Company and the Customer.

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