CHAPTER 7
CONCLUSIONS

7.1 INTRODUCTION

The work taken up on studies on cost Engineering and Quality aspects during New Product Development (NPD) with a specific reference to Target Costing process has yielded certain significant contributions to the New Product Development process. The major conclusions based on this research study have been compiled under the following classifications and explained in the subsequent sections in this chapter.

- Conclusions specific to the Research questions framed
- General Conclusions
- Limitations of the Work
- Scope for Further Research

7.2 CONCLUSIONS SPECIFIC TO THE RESEARCH QUESTIONS FRAMED

The primary objective of the Research study was to study the Cost Engineering and Quality aspects during NPD with specific reference to Target Costing process. The study concentrated towards the role of supporting tools in a Target Costing process and the ways and means to link these tools with a Target Costing process. The objective was dissected into six major Research questions. The conclusions specific to these Research questions are detailed below.

7.2.1 Research Question: 1

Can Customer requirements along with Target Cost be incorporated into the Target costing model? If so, what will be the role of tools like Quality Function Deployment in a target costing process?

The Research study right form the beginning has strongly relied on the statement “Target Costing focuses less on Cost than on Customer requirements” which has been agreed by most of the past researchers. To incorporate customer needs, wants and demands into the product, Quality Function Deployment (QFD) has been used as a primary tool. A novel Cost – QFD (C-QFD) model was developed which incorporated customer requirements and cost aspects in a single QFD matrix.
To further ensure that Function and Quality are the most important aspects, the model incorporated Taguchi’s Design of Experiments (DoE) for parameter selection. The developed C-QFD model was also validated using a case study from an automotive industry. The results of the case indicate that the role of QFD in a Target Costing process is not only desirable but also inevitable to ensure that all customer needs are taken care by the product. The conclusion specific to this Research question is that, QFD rather being used in a stand alone way, when used in connection with Cost Engineering, Taguchi’s DoE, appears to contribute significantly to a Target Costing process.

7.2.2 Research Question: 2

Once the Target Cost has been set, what are the techniques the firm can adopt to achieve the set cost? Can cost reduction needs be addressed using techniques like Value Engineering?

Value Engineering (VE), primarily has been used as a powerful cost reduction technique right from the days of the founder L.D Miles. Linkage of VE with the Target Costing process provides a better platform for cost reduction as a cost reduction without target is tougher than one with a target. With functionality being one of the axes of Survival triplet of a product, VE appears to be the best tool for cost reduction in a Target Costing process as it adopts a functional approach. In this research study, role played by VE in a Target Costing process has been clearly proven vide case studies from automotive industries. The conclusion specific to this Research question is that, VE plays a significant role in a Target Costing process involving a product where the cost contribution by material is high. The technique is also robust in the sense that, customer needs, wants and demands are never neglected and unwanted functions are identified for sure during function analysis. For products where significant contribution to cost is by material, VE appears to give a near complete solution for cost reduction pressures during a Target Costing process.

7.2.3 Research Question: 3

How is uncertainty handled in a Target Costing process? Can Fuzzy Logic be helpful in the model?

Researchers like Professor Cooper who have made significant contributions to Target Costing have formulated a Cardinal rule for Target Costing that “Target Cost
should never be exceeded for the interests of the organization as well as customer”. Uncertainty in cost estimation can easily lead to the violation of this cardinal rule by sudden escalation in costs. Incorporation of a Fuzzy Cost model in the Target Costing process appears to greatly reduce this uncertainty. Cost estimates with a fair degree of accuracy can be obtained by developing a Fuzzy Cost model. This has been proved vide the case study conducted at an auto component manufacturer. The conclusion specific to this Research question is that, uncertainty in the form of input cost increase, foreign exchange fluctuations, order quantity, etc. can be modeled using fuzzy logic and incorporated in a Target Costing model. Fuzzy logic as a tool contributes significantly to a Target Costing process in handling uncertainty.

7.2.4 Research Question: 4

For lean manufacturers where bulk of the parts is supplied by suppliers, what role can Supply Chain Management (SCM) play in the Target Costing process?

Supplier involvement in a Target Costing process has been debated in the past and most of the Researchers have agreed that participation of the Supply chain early in the NPD process is beneficial. The study in this area during the research has identified that combining Supply Chain Management (SCM) and QFD has produced synergic benefits for a Target Costing process. Target Cost cannot be achieved by the manufacturer alone where bulk of the parts is supplier – supplied (purchased). A portion of the Target Cost has to be deployed to the supplier through the backward supply chain. While doing so, the customer needs as well has to be deployed. This has been accomplished vide the usage of a novel Supply chain – QFD (S-QFD) model. This model integrates QFD, SCM and a supplier selection process. Supplier selection methods like Quality survey method and Fuzzy analytical Hierarchy Process (FAHP) method add further benefits to the model by aiding selection of the right supplier. SCM, when combined with QFD appears to contribute significantly to a Target Costing process.

In essence, QFD being a centre tool, other tools like SCM, DoE, VE and Fuzzy Logic fit like a jigsaw puzzle with QFD to provide significant support to a Target Costing process during New Product Development.
7.2.5 Research Question: 5

After all efforts, if Target Cost is still not met, how is the drifting cost reduced?

A situation of drifting cost arises when the estimated cost exceeds the Target Cost. After VE activity and S-QFD initiative, if the Target Cost is not met, the drifting cost remains a permanent cost reduction challenge to the organization. This drifting cost requires long term cost reduction initiatives like Process Re-Engineering to eliminate the non-value adding processes. Also productivity improvement and DFM tools help in reducing the drifting costs.

7.2.6 Research Question: 6

Once the Target Cost is met, how is it maintained in the long run? Can Kaizen Costing play a role in such situation?

During the research study, it has been identified that, once the Target Cost has been met, two situations often arise during the start of production.

a. Target Cost Maintenance needs arising during the regular production when a sudden increase in input costs, escalates the product cost substantially
b. An inevitable cost reduction sought by the Customer (Either Original Equipment Manufacturer / Market Forces) due to his own prevailing market conditions

Kaizen Costing (Continuous Cost improvement) plays a significant role in addressing these issues. It has been proven vide case study during the research study that kaizen initiatives like Vendor – Vendor localization, improvement in packaging and Design change can help an organization to continuously improve the Cost.

It can be concluded that Target Costing together with QFD, VE, DFM, SCM and Fuzzy Logic helps the organization to compete in the market and remain profitable while Kaizen Costing helps maintaining the competitive position and overall profitability.

7.3 GENERAL CONCLUSIONS

Based on the Research study and answers to the specific research questions, the following general conclusions are made.
• A comprehensive Target Costing model has been developed addressing issues of Quality and Cost Engineering aspects during a New Product Development process

• The developed model is a constitution of two sub models, C-QFD and S-QFD. Having QFD as the primary tool, it has been ensured and proven again that Target Costing focuses less on Cost than on Customer requirements.

• Target Costing cannot be seen as a stand-alone process during NPD, as it relies on tools like Quality Function Deployment (QFD), Value Engineering (VE), Supply Chain Management (SCM) for effective implementation

• Target Costing serves as an Economic umbrella while QFD primarily takes care of the binding Customer needs

• Integration of Cost, QFD, DoE and VE offers a synergic benefit towards achieving the Target Cost

• Integration of SCM with QFD facilitates the Target Costing process by deploying Target Cost needs through the backward Supply chain

• Kaizen Activities are needed in the post Target Costing process, to maintain the achieved Target Cost

• Failure Modes & Effects Analysis (FMEA) plays a vital role in ensuring Reliability considerations during a TC process

7.4 LIMITATIONS OF THE WORK

The limitations of the Research work are listed below.

• The Proposed model works well for an industrial product where the major Cost driver is Material. (Thereby using VE as a predominant tool for Cost reduction). However, for a Consumer product, say FMCG, where the other costs drivers such as sales promotion expenses and distribution channel expenses are high, the model validity has to be verified.

• Here again, it is perceived that the model can be used with a change that tools like Logistics management in the forward Supply chain will play a major role instead of VE.

• Cost details are likely to vary time-to-time. These dynamic considerations of cost variations are not accounted.
7.5 SCOPE FOR FUTURE RESEARCH

The scope for further research in this area is detailed below.

- This model can be modified to suit to the Service sector like Banks, Insurance companies and Hospitals
- Tools like Service Quality can be linked with QFD, Cost reduction tools to achieve a comprehensive Target Costing model for the service sector.