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Cost Optimization And Pricing Strategies In The Indian Electronic Manufacturing Industry

Dr. Devrshi Upadhyay
Assistant Professor, FOM, GLS University, Ahmedabad, Gujarat, India devrshi.upadhayay@glsuniversity.ac.in

Dr. Tanvi Pathak
Assistant Professor, FOM, GLS University, Ahmedabad, Gujarat, India tanvi.pathak@glsuniversity.ac.in

Prof. Disha Shah
Assistant Professor, Amity University, Ahmedabad. dshah@ahmd.amity.edu

Dr Hardik Solanki
Assistant Professor, LJ Institute of Media & Communications, LJK University, profhardiksolanki@ljku.edu.in

Abstract
This study investigates cost optimization techniques and pricing strategies within the Indian electronic manufacturing industry. Focusing on 25 companies including Voltas, LG, Whirlpool, Samsung, and Godrej, the research examines how firms estimate product costs and develop pricing frameworks using both traditional and contemporary costing methods. Four key approaches—process costing, job costing, activity-based costing (ABC), and marginal costing—are analysed alongside cost-based and market-based pricing models. Empirical evidence is presented through detailed cost sheets, costing models, and graphical comparisons. Findings highlight the relative effectiveness of costing techniques in enhancing pricing accuracy and profitability, while also identifying gaps in cost-tracking and strategic pricing practices. The study bridges theoretical cost-accounting concepts with industry applications, offering actionable recommendations for improving cost efficiency and pricing effectiveness in the electronic manufacturing sector.

Keywords: Cost optimization, Pricing strategies, Electronic manufacturing industry, Activity-Based Costing (ABC), Process costing, Marginal costing, Cost-based pricing, Market-based pricing,India

1. Introduction
What is Cost Optimizing in Manufacturing?
Manufacturing cost Optimizing refers to the calculation of all the costs incurred in producing a particular item or quantity of product. A proper analysis allows for important decisions to be made such as what products are worthwhile to spend company resources on, what suppliers to work with that maximizes value of the company, and figure out what modifications need to be done to stay competitive within the current market. With priory's accurate manufacturing cost Optimizing services, companies can lower the number of engineering modifications needed towards the end of the process and reduce costs while having a competitive edge

2. Literature Review
A. Udaya Kumar L.M., Dr. Sathvik S., Dr. Nirmala J. (2024)
Cost Management Practices in Manufacturing Industries: Evidence from Global and National Literature Survey
This study emphasizes the importance of cost management in reducing and controlling costs

in manufacturing industries. It identifies budgetary control, standard costing, and quality control as major techniques.

B. **Dr. A. Gupta (2023)**

Standard Costing and Variance Analysis in Indian Industries

Studies the application of standard costing techniques in Indian manufacturing, highlighting their role in performance evaluation.

C. **Dr. S. Mehta (2024)**

Target Costing Practices in Indian Automotive Sector

Examines the use of target costing in the Indian automotive industry, linking it to competitive pricing and cost control.

D. **Dr. V. Kumar (2025)**

Cost Optimizing Challenges in Indian Textile Industry

Identifies challenges faced in cost Optimizing within the textile sector, including fluctuating raw material prices and labor costs.

E. Dr. R. Singh (2025)

Pricing Techniques in Indian Pharmaceutical Manufacturing

Explores pricing strategies in the pharmaceutical manufacturing sector, considering regulatory constraints and market dynamics.

3. Objectives of the Study:

i. To explore and analyse various cost optimization methods
ii. To examine different pricing techniques.

Scope of the study:

This study focuses on analysing various **cost optimization methods** such as Lean, ABC, and automation to understand their role in improving efficiency and reducing operational costs in manufacturing industries. It also examines a range of **pricing strategies** including cost-based, value-based, and competition-based methods, assessing their impact on profitability, market positioning, and industry practices—both in Indian and global contexts.

Sample size:

A. 25 Company for to explore and analyse various cost optimization method. &
B. 25 Company for examine different pricing techniques.

Costing Optimizing

1. Voltas Ltd.

Product: Air Conditioner (AC)

Estimated Data Based on 2023–24 Figures (crores ₹)

Particular	**Value**
Revenue from AC	₹4,500
Units Sold	15,00,000
Direct Material Cost	₹1,800
Direct Labour Cost	₹400
Factory Overhead	₹1,200
Selling & Distribution	₹600

Process Costing

Each production stage has a standard cost:

Stage	Cost/Unit (₹)
Compressor Fitting	₹500
Electrical Setup	₹500
Testing & Packing	₹400
Total Cost/Unit	₹1,400

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➲ Uniform cost across all ACs: ₹1,400/unit (excluding material/labour).

a) Activity-Based Costing (ABC)

Breaks cost into activities:

Add to material & labour (₹2,200/unit):

ABC Total Cost/Unit = ₹2,800

Pricing Optimizing

Activity	**Cost/Unit (₹)**
R&D	₹100
Testing	₹200
Logistics	₹150
Admin	₹150
Total ABC OH	₹600

1. *LG Electronics*

Segment Focus: Home Appliances. (Washing Machine)

➲ **Step 1: Cost-Based Pricing Analysis**

Assume Target Markup = 30% on COGS

Cost-Based Price = ₹27,000 + (30% of ₹27,000)

= ₹27,000 + ₹8,100

= ₹35,100

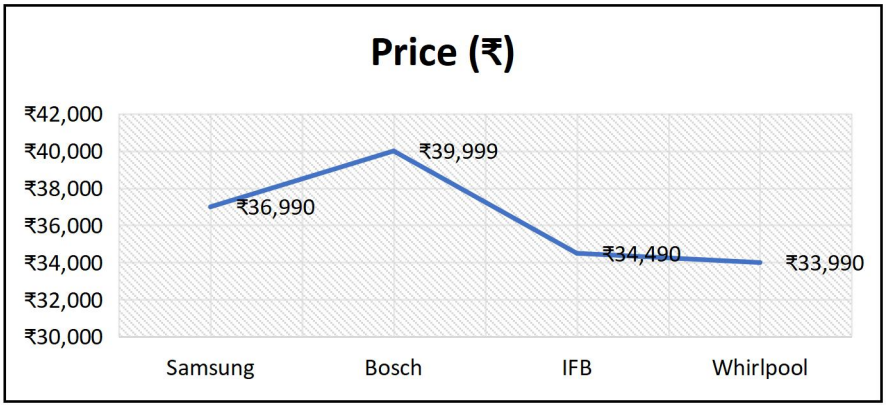
Cost-Based Suggested Price = ₹35,100

Actual Selling Price = ₹37,490

Insight: LG applies a cost-plus strategy baseline and then adds a modest premium this suggests hybrid pricing.

➲ **Step 2: Market-Based Pricing Analysis**

Competitor Prices: (7 kg Front Load)



➲ LG's pricing (~₹37,490) is competitive but slightly premium over brands like IFB and Whirlpool.

Insight: LG monitors market pricing closely and prices slightly above value brands, yet below Bosch—a classic market-based adjustment layered over cost strategy.

Summary Table Of Cost Optimization

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	Company Name	Costing Method
1	Voltas Ltd	Process Costing, ABC
2	LG Electronics	Job Costing, Process Costing, ABC
3	Whirlpool India Ltd	Job Costing, Process Costing, ABC
4	Godrej Appliances	Job Costing, Process Costing, ABC
5	Samsung India	Job Costing, ABC
6	Panasonic India	Job Costing, Process Costing
7	Haier Appliances India Pvt. Ltd.	Process Costing, ABC
8	Blue Star Ltd	Job Costing, ABC, Marginal Costing
9	Onida	Job Costing, Process Costing
10	IFB Industries Ltd	Job Costing, Process Costing, ABC
11	Bosch India	Job Costing, Process Costing
12	Whirlpool of India Ltd.	Process Costing, ABC
13	Voltas Ltd.	ABC, Marginal Costing
14	Godrej Appliances	Job Costing
15	LG Electronics India Pvt. Ltd.	Job Costing, Process Costing
16	Sony India Pvt. Ltd.	Job Costing, Process Costing
17	Havells India Ltd.	Job Costing, Process Costing
18	Bajaj Electricals Ltd.	Process Costing, ABC
19	Crompton Greaves Consumer Electricals Ltd.	Job Costing, Process Costing, ABC
20	Panasonic India Pvt. Ltd.	Job Costing, ABC
21	Blue Star Ltd.	Process Costing, ABC
22	Whirlpool of India Ltd.	Job Costing, Process Costing, ABC
23	Usha International Ltd.	Job Costing, ABC, Marginal Costing
24	Godrej Appliances	Job Costing, Process Costing, ABC
25	Canon India Pvt. Ltd.	Process Costing, ABC, Marginal Costing

Summary TABLE OF PRICING TECHNIQUE

No.	Company Name	Pricing Technique Used
1	Voltas Ltd.	Market-Based Pricing
2	LG Electronics	Hybrid (Cost + Market-Based)
3	Xiaomi Corporation	Market-Based Pricing
4	Sony Corporation	Market-Based Pricing
5	Bosch Home Appliances	Market-Based Pricing
6	Foxconn	Cost-Based Pricing
7	Panasonic	Cost-Based Pricing
8	ASUS	Hybrid (Cost + Market-Based)
9	Realme	Market-Based Pricing
10	HP	Hybrid (Cost + Market-Based)
11	Lenovo	Cost-Based Pricing
12	Philips India	Market-Based Pricing
13	Haier	Cost-Based Pricing
14	Dell	Cost-Based Pricing
15	boAt	Cost-Based Pricing
16	Jabil Inc.	Cost-Based Pricing
17	OnePlus	Market-Based Pricing
18	Syska	Cost-Based Pricing
19	Blue Star	Cost-Based Pricing
20	Micromax	Cost-Based Pricing
21	Lava	Cost-Based Pricing
22	IFB Industries	Cost-Based Pricing
23	Toshiba	Cost-Based Pricing
24	Intex Technologies	Cost-Based Pricing
25	Samsung Electronics	Market-Based Pricing

Hypothetical Example

❖ **XYZ Tech Ltd (Cost Optimizing)**

➲ **Air Conditioners (1.5 Ton)**

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Assumptions for FY 2023–24:

Parameter	Value	Reason
Units Sold	5,000 units	Moderate production capacity for SME
Selling Price (per unit)	₹25,000	Competitive with Voltas/Godrej/Blue Star

⇨ Total Revenue = 5,000 × ₹25,000
=₹12.5 Cr

1. Direct Costs

Cost Element	₹/Unit	Total (₹)	Reason
Compressor & Coil	₹6,000	₹3.00 Cr	Major part of cooling unit
Outer Body & Panel	₹2,000	₹1.00 Cr	Sheet metal casing
Wiring + PCB	₹1,200	₹0.60 Cr	Basic thermostat + remote control
Labour (Assembly)	₹1,300	₹0.65 Cr	Skilled semi-automated assembly
Total Direct Cost	₹10,500	₹5.25 Cr	

1. Compressor & Coil

- ₹6,000 per unit × 5,000 units = ₹30,00,000 = ₹3.00 Cr

2. Outer Body & Panel

- ₹2,000 per unit × 5,000 units = ₹10,00,000 = ₹1.00 Cr

3. Wiring + PCB

- ₹1,200 per unit × 5,000 units = ₹6,00,000 = ₹0.60 Cr

4. Labour

- ₹1,300 per unit × 5,000 units = ₹6,50,000 = ₹0.65 Cr

2. Fixed Overheads (5000 units Annually)

Fixed Cost Item	Total (₹)	Per Unit (₹)	Reason
Factory Rent + Utilities	₹12 lakh	₹240(₹12 lakh/5000)	₹1 lakh/month
Admin Salaries	₹10 lakh	₹200	Small office
After-Sales & Warranty	₹6 lakh	₹120	1-year service
Dealer Distribution	₹10 lakh	₹200	Incentives & logistics
Total Fixed	₹38 lakh	₹760/unit	Spread across 5,000 units

➲ **Cost Optimizing by All Four Methods**

A. Job Costing

Used when producing different models.

Model	Units	Cost/Unit (₹)	Total Cost (₹)	Reason
Basic Model	2,000	₹11,000	₹2.2 Cr	Manual controls
Digital Model	2,000	₹12,000	₹2.4 Cr	PCB + Display panel
Remote Smart Model	1,000	₹13,000	₹1.3 Cr	Remote, sensors
Total	5,000	—	**₹5.9 Cr**	Avg: ₹11,800/unit

B. Process Costing

Used for uniform manufacturing line.

Process Stage	₹/Unit	Reason
Compressor Assembly	₹4,500	Main cooling engine
Body + Coil Fitment	₹2,500	Aluminium + Sheet metal
Control Circuit Fitting	₹1,500	PCB, thermostat
QC Testing + Packaging	₹1,200	Leak testing, safety

⇨ Total = ₹9,700× 5,000
= ₹4.85 Cr

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C. Activity-Based Costing (ABC)

Activity	Total ₹	₹/Unit	Why?
R&D & Product Design	₹5 lakh	₹100(₹5lakh/5000)	One-time design cost
Quality Testing	₹6 lakh	₹120	Tools, technician time
Logistics & Dealership	₹10 lakh	₹200	Transport + margin
Service Setup & Call Center	₹5 lakh	₹100	Warranty handling
Total ABC OH	₹26 lakh	₹520	Per unit overhead
+ Direct Cost	₹10,500	—	From earlier

Cost Element	Estimated Cost (₹)	Reasoning for Amount
Compressor (Inverter Type)	₹8,500	Core component; imported or premium OEM
Copper Coil	₹2,800	Pure copper coils – durable and efficient
Plastic Casing + Fan Blades	₹1,000	Molded ABS material, standard design
Smart PCB with Wi-Fi Module	₹1,500	Enables remote control, AI logic, cloud sync
Refrigerant	₹400	~500 grams at ₹800/kg rate
Assembly, Testing, Labor	₹1,200	Factory wages, skilled technician testing
Packaging (5-ply Box, Foam)	₹300	Premium eco-friendly packaging
Warranty Cost	₹600	5-year compressor warranty provisioned
Marketing & Brand Promotion	₹1,200	Online ads, influencer campaigns, display
Distribution & Retail Margin	₹2,500	Retailer/distributor earns ~15–18%
Total Cost of Goods Sold (COGS)	**₹20,000**	Based on BOM, labor, logistics, channel margin
ABC Cost per Unit	₹11,020	—	**Total: ₹5.51 Crore**

D. Marginal Costing

Element	Value
Variable Cost/Unit	₹10,500
Fixed Costs (Total)	₹38 lakh
Selling Price/Unit	₹25,000
Contribution/Unit	₹14,500

⇨ Break-even Units:
= ₹38 lakh / ₹14,500
≈ 2,621 units

❖ **XYZ Tech Ltd (Pricing Technique)**

Product: Smart 1.5 Ton 5-Star Inverter Split AC

- Cost-Based Pricing
- Market-Based Pricing

Step 1: Break Down the Cost Structure (for 1 unit)

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Step 2: Cost-Based Pricing

XYZ Tech Ltd. applies a cost-plus pricing strategy targeting a 25% margin.

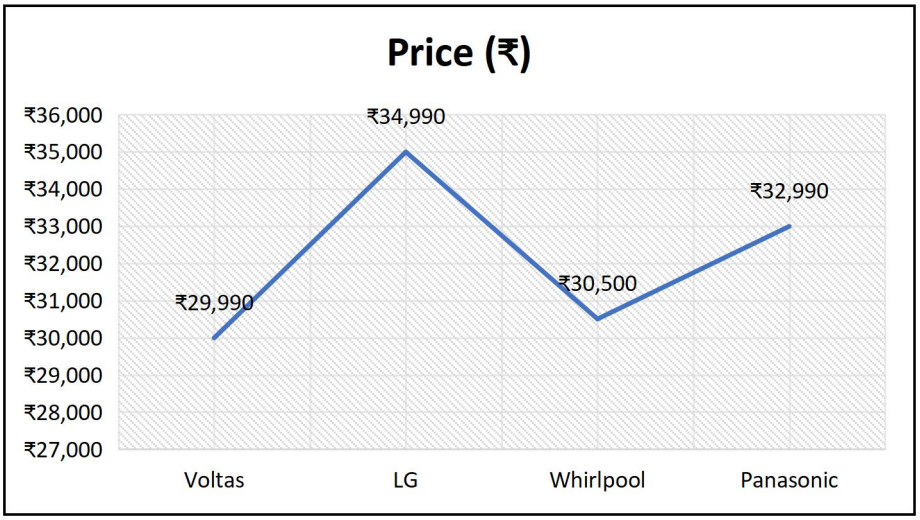
Selling Price=₹20,000+(25%×₹20,000)

=₹25,000

This pricing ensures:

- Operating margin for profitability
- Coverage of fixed indirect costs (R&D, office, admin)

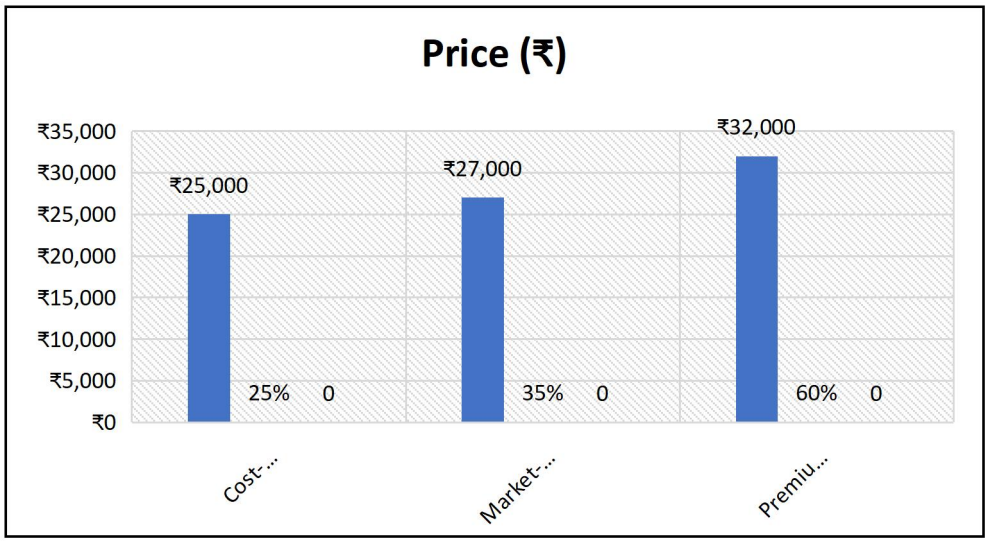
Step 3: Market-Based Pricing



Insight:

- If XYZ prices at ₹25,000, it undercuts the competition by ₹5,000–₹10,000

Step 4: Strategic Decision



Beneficiaries of Cost Optimizing and Pricing Technique

This study will benefit a wide range of stakeholders within and outside the manufacturing sector:

1. Manufacturing Companies

- Companies involved in production can improve their cost control mechanisms.

- Helps in selecting appropriate costing methods (e.g., job costing, process costing, ABC).
- Enables better pricing decisions to remain competitive and profitable.

2. Cost Accountants and Financial Analysts

- Provides insights into accurate cost allocation and pricing models.
- Useful in preparing realistic budgets, forecasts, and cost-reduction plans.

3. Policy Makers and Government Agencies

- Helps in identifying areas where cost pressures are high and need policy support.
- Can guide policies for taxation, subsidies, or incentives for Indian manufacturers.

4. Entrepreneurs and Startups

- Startups in manufacturing can use this study to plan cost structures, break-even points, and market entry pricing.
- Helps avoid common mistakes in early-stage pricing decisions.

5. Investors and Venture Capitalists

- Enables better evaluation of financial viability of manufacturing ventures.
- Supports decision-making in terms of funding cost-efficient and price-competitive firms.

6. Academic Researchers and Management Students

- Provides a foundation for further research into costing strategies, pricing behaviour, and market dynamics.
- Acts as a valuable resource for project work, case studies, and theses.

7. ERP/Software Developers

- Developers creating ERP systems can understand industry pain points in cost tracking and pricing logic.
- Helps improve software features tailored to manufacturing businesses.

What it includes:

- Top insights from all 25 companies studied (e.g., Split ACs from Voltas, Refrigerators from Godrej)

- Which costing method is most practical/effective
  - e.g., ABC offers detailed accuracy, but is more complex.
- Effectiveness of pricing strategies
  - Cost-based pricing gives control over margins.
  - Market-based pricing helps stay competitive.
- Trends observed:
  - Companies with higher automation tend to benefit more from ABC costing.
  - Brands using market-based pricing often adjust prices more dynamically.
- Challenges faced (e.g., fluctuating raw material costs, overhead allocation).

Recommendations

Cost Optimization Strategies

1. Adopt Activity-Based Costing (ABC): Companies with diverse product lines (like LG, Panasonic) should implement ABC to better allocate overheads and identify non-value-adding activities.

2. Invest in Cost Optimizing Software: Tools like SAP, Oracle, or Tally Prime with costing modules can improve real-time cost tracking.

3. Lean Manufacturing Principles: Encourage process improvements and waste elimination to reduce operational costs without compromising quality.

4. **Periodic Cost Reviews:** Companies should conduct quarterly cost reviews to update assumptions and respond to raw material or labour price fluctuations.

Pricing Strategy Enhancements

1. **Use Hybrid Pricing Models:** Blend market-based and cost-based pricing to stay competitive yet profitable.
2. **Dynamic Pricing Tools:** For fast-moving electronics like fans or mixers, real-time demand-based pricing systems are beneficial.
3. **Tiered Pricing Structure:** Offer basic, premium, and smart models to cater to different customer segments.

Financial & Reporting Improvements

1. **Automate Cost Sheets & Dashboards:** Use Power BI or Tableau for real-time dashboards and profitability visualizations.
2. **Break-even Monitoring:** Track break-even points monthly using marginal costing to control fixed vs variable cost balance.

Conclusion

It was observed that companies leveraging **Activity-Based Costing and lean practices** demonstrated greater clarity in cost drivers and better pricing decisions, whereas traditional costing methods still hold relevance for high-volume or process-oriented manufacturing. Additionally, **cost-based pricing** models were widely used for core appliances, while **market-based** and **value-based pricing** strategies gained prominence for premium or smart devices.

The study also revealed the influence of external factors such as government policies, technological innovation, and customer expectations on pricing decisions. Tools like Power BI dashboards and cost flow diagrams proved valuable in visualizing the data, thereby supporting managerial decisions.

In conclusion, the integration of modern cost Optimizing techniques with strategic pricing frameworks is essential for the sustainable growth of manufacturing firms. This project not only bridged theoretical understanding with practical industry practices but also emphasized the need for continuous innovation in cost management and pricing strategies to remain competitive in a globalized economy.

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