



LEVERAGING COPQ TO ENHANCE COMPETITIVENESS OF INDIAN APPAREL INDUSTRY A HIDDEN OPPORTUNITY

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ABSTRACT

Apparel industry is one of the fastest growing industries which have helped improve the nation's economy and provide employment to millions of people. Although the apparel exports have steadily grown, growth rate of Indian apparel exports is not at par with countries like China, Bangladesh.

SWOT analysis of the Indian apparel industry revealed clearly there is a need to reduce the manufacturing cost, improve quality and reduce turnaround time. Further in-depth study of the costing module revealed significant manpower was being used to process monitoring and process corrections. The key factor identified was "not being right the first time".

The concept of Quality costs was brought in and effort was made to capture the Cost of Poor quality or COPQ. COPQ was captured under 4 subgroups, External failure, internal failure, appraisal and prevention costs. A case study of 1200 machines factory was taken up and results were startling, 39.76% of the conversion cost was being contributed by cost of poor quality or COPQ and an annual loss of 17.17 crores. Hence the reducing the COPQ there is a direct impact on bottom line and provides a competitive advantage for Indian apparel exports.

KEYWORDS: Fastest Growing Industries, COPQ, Product Diversity, Flexibility

INTRODUCTION ON INDIAN APPAREL INDUSTRY - CURRENT SCENARIO

Indian Apparel Exports Performance

In India the textiles and apparel industry contribute to 14% of industrial production and provides employment to 45 million people, textiles and apparel accounts to 11% of exports in terms of value. Indian apparel exports have grown from 0.7 Billion USD in 1980 to 13.8 Billion USD in 2012. With the end of Multi Fiber agreement (MFA) in 2005, the Indian Apparel Export has seen many highs and lows. During the year 2005 it recorded peak 26% growth, during 2009-10 (global recession) there was 6% negative growth and again peaked to 31% in 2011 but slumped to 6% dip during year 2012.

Indian Apparel Exports Performance Compared to Other Export Nations

China tops global apparel export at 37.3% share, EU- 27 at 28.2%, Bangladesh at 4.8%, India at 3.5%. Despite huge potential, export share of India is much lower than China, EU and Bangladesh. During 2005 to 2011 export share of India rose marginally from 3.14% to 3.27%, while Bangladesh and China have shown drastic increase in apparel share 2.48% to 4.72% and 26.68% to 37.8% respectively. After MFA was phased out, global growth rate was 48% between 2005 to 2011. India has done marginally better by registering 64% growth while tremendous improvements prevailed in Bangladesh at 189%, Vietnam at 181%, China at 107%, Malaysia at 84% and Cambodia at 83% as shown below:

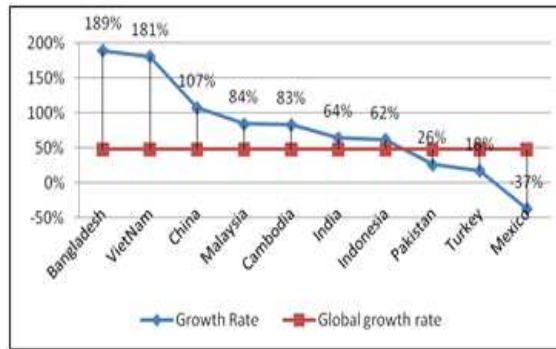


Figure 1: Apparel Market Growth Rate

Brief SWOT Analysis of Indian Apparel Industry

Strengths and Weaknesses

Strengths of Indian apparel industry are product diversity, flexibility and turnaround time due to presence of total supply chain. These strengths are reflected in the growth of Indian apparel exports by 64% after MFA between 2005 and 2011.

Weakness of Indian apparel industry is low productivity and efficiency, skill shortage, high manufacturing cost, inconsistent absenteeism, high attrition and absence of structured and uniform processes in manufacturing, small scale set-up's etc.,

Opportunities and Threats

Opportunities to Indian Apparel industry are raising wages in China and deliberate movement of Chinese industry towards other manufacturing industries like hardware, polymers etc., Political instability, growing labor unrest, severe compliance issues in Bangladesh. Both these scenarios at China and Bangladesh are presenting an opportunity for Indian apparel industry to garner larger market share. Very large young population, huge unemployment, large untapped work force and new export promotion measures by government will help fuel growth in Indian apparel exports.

Threats to Indian apparel industry are chances of currency volatility, lack of non-cotton raw-material base, longer transit times to Europe and US, poor logistics, rising energy costs, non-optimal small size manufacturing units, lack of scalability, absence of organized & large players in apparel manufacturing.



Figure 2: SWOT Analysis

SWOT Inference: SWOT is Summarized below Brings out that Clearly There is a Need to Reduce the Manufacturing Cost, Improve Quality and Reduce Turnaround Time

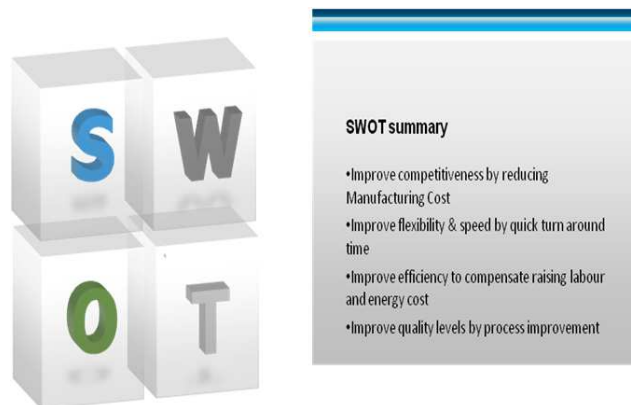


Figure 3

Typical Costing Module of Garment in Indian Scenario

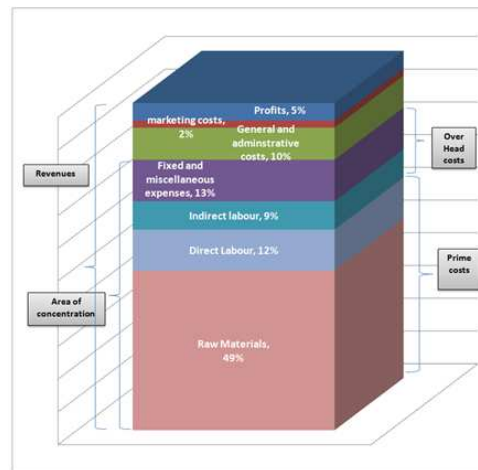


Figure 4

Raw Materials Cost which is mainly contributed by Fabric & trims is 49%, direct labor through which the value addition happens is 12%, **indirect labor** contribute to 9%. **Fixed and miscellaneous expenses** which include power and fuel, depreciation, testing charges, consumables contribute to 13%.

Prime Costs are raw materials, direct labor which is 48%, while **overhead costs** include, indirect labor and fixed and miscellaneous expenses which is 25%.

Total Cost of Goods Produced is sum of Prime costs and Overhead costs which is 83%. This is area of concentration of quality cost program.

Total Revenues is sum of **Cost of goods produced (81%) + General and administrative costs (10%), Marketing costs (2%) + Profit (5%)**.

Below Figure shows that there is a significant manpower cost being spent on process monitoring and correction. This aspect of non-value added component (processes as well manpower deployed) needs to be worked upon and reduced

to bring about process improvement and reduce manufacturing cost. A continual reduction in quality costs and being right first time will enable apparel industry to gain customer satisfaction as well as competitive cost structure to retain and improve the market share.

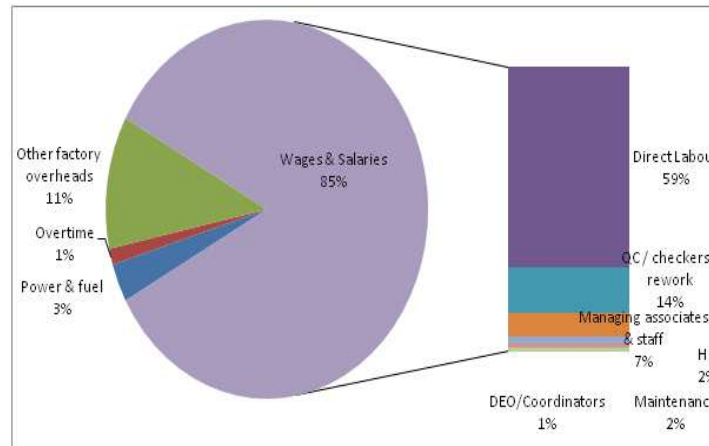


Figure 5: Conversion Cost & Distribution Analysis

INTRODUCTION TO COST OF POOR QUALITY (COPQ)

Quality Costs

Quality costs are commonly referred as “poor quality cost” or “the cost of poor quality” represent “the difference between the actual cost of the product or a service and what the reduced cost would be if there was no possibility of sub standard service, failure of products or defects in their manufacture” (Campanella, principles of quality costs)

More specifically, quality costs are the total of the cost incurred by

- Investing in the prevention of non-conformances to requirements
- Appraising a product or service for conformance to requirements and
- Failing to meet the requirements

The quality costs are classified into **Controllable poor quality costs (Prevention Costs, Appraisal Costs)** and **Resultant poor quality costs (Internal and External Failures)**.

Controllable Poor Quality Costs

- **Prevention Costs**

The cost of all activities specifically designed to prevent poor quality in products or services. Examples are costs of new product review, quality planning, quality improvement projects, quality education etc.,

- **Appraisal Costs**

The costs associated with measuring, evaluating or auditing products or services to assure conformance to quality standards and performance requirements. Examples are the costs of incoming and source inspection/test of purchased material, in-process and final inspection/test of product and processes, calibration of measuring and testing equipment etc.,

Resultant Poor Quality Costs

The costs resulting from products or services not conforming to requirements or customer/user needs is categorized under Failure costs are divided into internal and external failure cost categories.

- **Internal Failure Costs**

Failure costs occurring prior to delivery or shipment of the product, or the furnishing of a service, to the customer. Examples are the costs of scrap, rework, re-inspection, re-testing, material review and down grading.

- **External Failure Costs**

Failure costs occurring after delivery or shipment of the product, and during or after furnishing of a service to the customer. Examples are the customer returns, warranty claims, product recalls etc.,

IMPACT OF COPQ ON APPAREL MANUFACTURING – A GUIDE LINE

Identify and Standardize COPQ Measurement Metrics in Garmenting

In this step quality costs are captured comprehensively and organization wide metrics of COPQ are arrived along the value stream. This step is very important, in order get a reasonable picture of current state and establish the need for improvement projects. All quality costs were monetized and integrated into the financial MIS system. As soon as the quality costs form part of financial MIS, they get measured periodically and get management buy in.

COPQ is captured under four categories of Prevention cost, Appraisal cost, Internal and external failure costs. While prevention and Appraisal cost fall under controllable poor quality costs, Internal and external failure fall under resultant poor quality costs.

External Failure Costs: These are costs which are incurred after the products were shipped to the external customer. Claims, discounts, loss of sales are captured under this category.

Internal Failure Costs: These are costs incurred prior to shipment of product. Costs involved in re-work, re-inspection, rejection and scrap fall under this category. Re-work expenses across processes like cutting, sewing, printing, embroidery are part of these costs. Scrap costs like rejected piece goods, rejections at various stages of production, finished garments left over due to poor quality, any materials being extra ordered due to process failures, revised freight charges due to poor quality, all fall under internal failure costs.

Appraisal Costs: These include costs spent on wages, salaries, overtime payments of staff and associates meant for monitoring quality throughout the value stream. Costs incurred for in-coming materials and outgoing goods inspections are part of appraisal costs.

Prevention Costs: These include costs spent on research and development, training for skill up gradation of associates, industrial engineering and investments made on equipments for quality improvement.

COPQ is summarized while Prevention and Appraisal costs fall under **controllable poor quality costs**. Internal and external failure costs fall under **resultant poor quality costs**. Both are captured as percentage of conversion cost.

RESULTS: COPQ – CASE STUDY – A TYPICAL 1200 MACHINE FACTORY PRODUCING 6,00,000 UNITS/ MONTH

Identify and Institutionalize Appropriate Organizational Metrics: Before collecting the COPQ there was huge challenges faced

- Opinion were as many as people were there
- Data insufficient, incomplete, unavailable
- Who will collect data?
- Who will report to whom, when?

In order to overcome the above hurdles, lot of effort was spent in training people to understand the importance of COPQ and the elements involved in it. Teams were formed for various processes who worked together to capture the COPQ. Initial team meeting were having lot of conflicts in terms of understanding the concepts, views and who will collect the data.

Finally the approach to collect COQ on a monthly basis was discussed, debated and standardized. Clarity was obtained for - what, who, when and how. Data collection plan was made in consensus with the team, check sheets were designed, data collection was done and COPQ was consolidated. An overview of the COPQ that was measured is given below.

Table 1

Cost of quality - 1200 machines					
Resultant COPQ					
External Failure Cost	Source	Cost driver	Cost per piece	% OF Conversion cost	COQ annualized in lacs
Claims in INR	Financial accounts		1.40	2.33%	100.44
Discounts in INR	Financial accounts	-	0.36	0.60%	25.92
Total External Failure Cost			1.76	2.93%	126.36
Internal Failure Cost					
Cost per piece					
Cutting Rework Cost & Panel rejection due to poor quality	Cutting quality reports	Cut FPQ	0.67	1.11%	48.06
Sewing Rework Cost	Sewing quality reports	Sew FPQ	1.88	3.13%	135.00
Finishing Rework Cost	Finishing quality reports		0.66	1.10%	47.52
Stain removal charges	Spot wash section	Stains %	0.94	1.56%	67.50
Damages & contamination – Darning	Darning section	Damages %	0.34	0.56%	24.30
Fabric rejection due to poor quality & extra fabric ordered due to poor quality	Cutting/Fabric stores	Fabric OCR %	1.79	2.98%	128.52
Garment leftover due to poor quality	Sewing / Fin section	Garment OCR%	4.13	6.88%	297.00
Air shipments due to quality failure	Planning/ Execution	Air ship %	0.50	0.83%	35.64
Total Internal Failure Cost			10.88	18.14%	783.54
Controllable COPQ					
Appraisal Cost			Cost per Piece		
Salaries - Quality	HR records	Man-machine ratio	1.97	3.28%	141.48
Wages – Quality	HR records	Man-machine ratio	6.83	7.58%	327.6
Testing charges	LAB		1.44	2.40%	103.68
Over time - Quality	HR records	OT %	0.20	0.33%	14.04
Total Appraisal Costs			10.425	13.58%	586.8
Prevention Cost			Cost per Piece		
Research & Development	R & D	R & D initiatives	0.15	0.25%	10.8
Training	HR/CI team records	Training initiatives	0.39	0.65%	28.08
CI improvement teams	HR records	Improvement teams	0.255	0.43%	18.36
Total Prevention Costs			0.795	1.33%	57.24
External Failure Cost			1.76	2.93%	126.36
Internal Failure Cost			10.88	18.14%	783.54
Appraisal Costs			10.43	13.58%	586.8
Prevention costs			0.80	1.33%	57.24
Total Quality Costs / piece			23.86	35.97%	1553.94
Average Cost of Manufacturing (total conversion cost)			60		4320
Cost of Poor Quality as % of total conversion cost			39.76%		35.97%

External Failure was measured and contributed to 3% of the conversion cost with an annual loss of 1.26 crores. This was majorly contributed by claims & discounts on Packing failures, workman ship failures, stains, damages. Discounts on delay in shipments due to rescreens are also accounted under external failures.

Internal Failure contributed to 18.14% accounting to nearly 7.84 crores annual loss. Major contribution is due to Sewing rework, garment left over due to poor quality, fabric rejections due to poor quality, air shipments due to quality failures. Below Pie represents the distribution of internal failure cost.

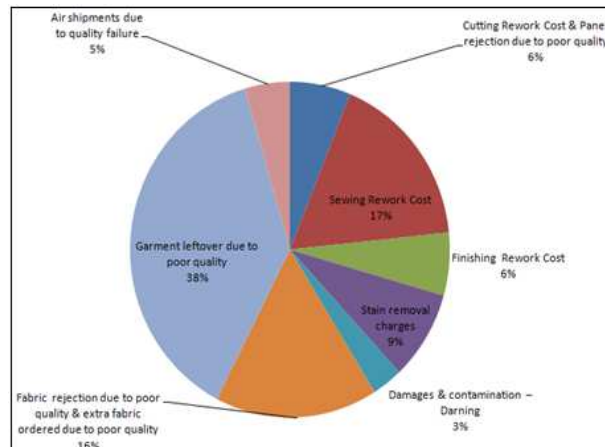


Figure 6: Internal Failure Break up

Appraisal Costs contribute to 13.58% of the Conversion cost, which accounts to 5.86 crores annually. The distribution of appraisal cost is as shown below; major contribution is from Wages and Salaries of Quality staff and associates.

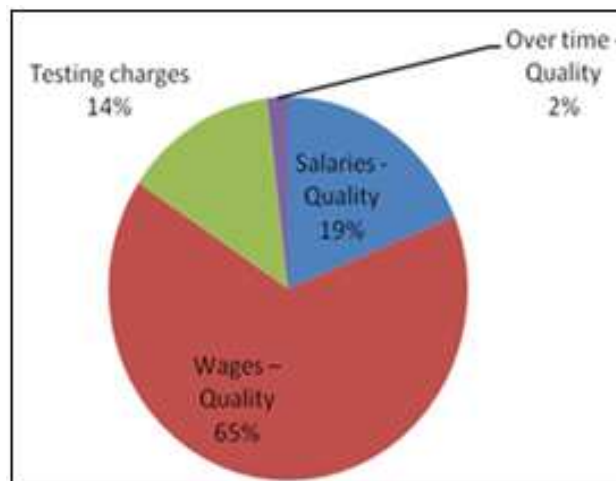


Figure 7: Appraisal Cost Distribution

Prevention Cost: In the overall COPQ, Investment of Prevention cost is very minimal, little efforts are being put in Research and Development, Training and Improvement initiatives.

Overall COPQ: As per the below COPQ is contributing to 35.97% of Conversion cost and an annual loss of 15.53 Crores.

CONCLUSIONS

Below illustration is used to understand the impact of COPQ in an organization. A defect which is found by the customer is a very costly defect to the organization and reflected in the external failure. Defects that are found and rectified internally are costly defects which are reflected in Internal and appraisal cost. This is classic case of continuous inspection in all processes, rework in cutting, sewing, finishing, embroidery etc., and rejection and scrap in each stage. Building quality in the process by having an effective Quality management system, investing in R&D help organization to prevent defect at source, with very less investment.



Figure 8

COPQ is having a major impact on the apparel industry, which is contributing to 40% of conversion cost. Poor first pass quality across the throughput is the primary cause for high COPQ. An in-depth study of the COPQ within the organization will help apparel manufacturers to identify areas where money is lost due to Process inefficiencies and “not doing right the first time”.

By reducing the COPQ the manufacturing costs can be drastically brought down. In the above illustration 50% reduction in COPQ, which is achieved by improving first pass quality will lead to an annual savings of 7.7 crores which directly adds to the bottom line of the company. This will provide a competitive advantage to Indian apparel exports, which currently has a huge growth potential.

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