

**REDUCTION IN SHIPMENT DELINQUENCIES
AND PRODUCT LEAD TIME ON
ENHANCING CUSTOMER SERVICE:A CASE STUDY**

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Abstract

Customer service plays an important role in an organization's ability to generate income and revenue. From this perspective, customer service should be included as part of an overall approach to systematic improvement. A customer service experience can change the entire perception a customer has of the organization. The present paper identifies the current weaknesses of an electronic company in terms of shipment delinquencies and long product lead-times and to propose recommendations to the company to overcome the issues towards enhancing customer service. The paper investigates the organizations' internal and external environment factors towards establishing strengths and opportunities and further analyzing the various problems faced in order to establish the root-cause components. A list of recommendations are proposed through which the company may be able to enhance its level of customer service, increase its market share and sustain in the industry as a serious and viable contender.

Keyword: Shipment; Lead-Time; Product Inventory; Customer Service

Introduction

SmartCap is an electronic component manufacturing company which employs over 1200 employees and are specialized in the manufacturing of electronic passive components namely capacitors. Capacitors are components that are used to store an electrical charge and are used to regulate current in a circuit. There are various types of components however the focus of this paper will be on multi-layered ceramic capacitors (MLCC). According to industry experts, the Global MLCC market is expected to continue to increase with steady growth over the period 2013–2015. SmartCap receives orders from its sales offices strategically located all over the world via EDI (electronic data

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interchange). Over the past several years, SmartCap has managed to extend superior service to its customers. However, since November 2012, there was a drastic decline in service which was due to a high number of delinquent shipments and extended product lead-time. Upon analysis of the annual customer satisfaction survey and plant key performance indicators, the issues are centered around the Chip Fabrication (front-end) process where product cycle-time has increased sharply due to several factors including resignations of technicians, capacity bottlenecks in operations, limitations to the order processing system, poor communication resulting in badly planned inventories of materials, supplies and machine spares. Due to the severity of the issue, as an interim action, management has decided to implement certain containment actions in order to reduce the impact to the customers with immediate effect. However, the root-causes must be identified and proper corrective actions must be implemented fast to avoid such recurrence.

Industry Profile

Rising demand for MLCCs is driven by the proliferation of multifunction devices that need high-speed, low-power ICs, compact modules and numerous interfaces. Mobile phones, laptops, flat-screen LCD televisions and video game consoles are currently the key applications for the line, which is leaning toward miniaturization in reflection of trends in consumer electronics. Ceramic capacitors, with their ability to support the power supply needed for semiconductor devices, have emerged as an integral component of the semiconductor devices. Hampered by the economic turmoil, the global ceramic capacitors market experienced weakening demand starting from the year 2009 until late 2010. However, the market recovered significantly in the year 2011, and is forecast to grow at a faster rate compared to the other segments, primarily due to their usage in almost all electronic devices. In addition, the development of new designs of MLCCs, with higher capacitances, improved bypassing, filtering and decoupling capabilities, is expected to expand their application in a broader range of end use markets. Prospects for ceramic capacitors therefore remain upbeat through the forecast period. Technological advancements and the emergence of new end use markets constitute the key growth drivers in the ceramic capacitors market. In addition, the increasing investments of manufacturers and suppliers to improve capacitance, making it useful in a broad array of applications, would spur market growth through the foreseeable future. According to industry experts, the Global Multilayer Ceramic Capacitor (MLCC) market is expected to continue to increase with steady growth over the period 2013–2015. The manufactures are expected to know whether the customers are price or lead time sensitive based on the simultaneous dependence of price and demand on delivery time before selecting a time-based competitive strategy (Saibal&Jewkes, 2004). However, due to stiff competition in the

marketplace, there is an increasing demand for lower prices and shorter deliveries.

Issues Faced

Over the past several years, SmartCap has managed to extend superior service to its customers. However, since November 2012, there was a drastic decline in service which was due to a high number of delinquent shipments and extended product lead-time.

The negative trend coupled with the poor financial results obtained in the last quarter of 2012 was alarming. Following a detailed analysis of the feedback received, the company arrived to the following 3 conclusions:

- Frequent shipment misses (either shipments are late or quantity shipped does not meet the requirement of the customer). On time deliveries dropping far below the industry benchmark of 95%.
- Increased product lead-time which is higher than that of most competitors. Benchmark is 25 days upon receipt of order.
- Shorter product delivery lead-time expectation due to reduced inventory levels maintained by distributors. Pan and Yang (2002) have constructed integrated inventory model with controllable lead time.
- A further analysis indicated that the major impact to the poor service is coming from the front-end operation which is the Chip-Fabrication.

Containment Actions Implemented

In order to contain the problem as well as to ensure minimum disruption to the service level to the customers, the management decided to put in place several actions on a temporary basis until the issue is eradicated completely. The following were the actions implemented which were put in place with immediate effect:

- Increased machine capacity by releasing additional machines to production. These machines were shut-off earlier as a cost-reduction plan in lieu of the weak sales forecast received from Sales and Marketing.
- Pulled over a few quality inspectors from other product lines to MLCC to attend to the high number of parts on hold for rework to shorten the waiting time.
- Pulled over a few technicians from other product lines to MLCC to address the high down-time issue.
- Redeployed operators who were being cross-trained to MLCC.
- Removed the over-time restriction on MLCC line.

- Authorized material control to expedite and bring in raw materials immediately to support operations.

These containment actions are costly but management agreed that in the interim the most critical point is to gain back the confidence from their customers with the hope that orders continue to come in at the normal rate.

Research Methodology

In October '2012, the plant received the final quarter forecast and immediately realised about 20% drop in orders. In order to reduce the impact to the bottom line performance, management decided to take certain actions as a cost-reduction effort in line with the weaker booking rate. Hayya et al., (2011) have studied the impact of stochastic lead time reduction on inventory cost under order crossover.

The following actions were implemented:

- No overtime (the previous quarter the plant was running with 12% overtime)
- Reduce number of machines in production by 20% with the intent of aligning capacity to forecast number.
- Cut down overhead expenses by 20%.
- Reduced the purchase of supplies and materials by 20%. Cancel orders/postpone deliveries.
- Redeploy operators and technicians to other lines and arrange for cross-training in the Training Department.

However, when the On-Time Delivery indicator dropped sharply in November '2012 and continued on a declining trend till February '2013; management was pressed to look for answers immediately. Matters became worse when the Customer Satisfaction Index for the year 2012 was published. Due to shipment misses and longer lead-times, customers started to cancel orders.

The situation forced management to immediately take containment actions discussed above to reduce the impact to the customers. Meanwhile, in parallel, urgent attention is required to determine the root-cause and implement corrective actions accordingly in order to avoid such recurrence. Factors that contributed to the poor service are all discussed in detail here.

Preventive Maintenance Schedule

It is a process and mandatory quality requirement that a comprehensive preventive maintenance schedule need to be drawn up for all critical machines in production. These machines need to be released to the Engineering group to carry out calibration and preventive maintenance at least twice per year. However, there was a loop-hole in the system. Production personnel did not release these machines to Engineering on a timely basis due to fear of loss of

capacity. Thus became a non-conformance which resulted in a high volume of products held up for secondary quality buy off which thus increased the cycle time.

Technicians Turn-Over

Another issue that contributed to the higher down-time of machines was the resignation of several experienced technicians in the front-end process in September 2012. After careful analysis, it was identified that these technicians despite their seniority in the line, they are paid about the same wages earned by a newly hired diploma-certified technician. Most of these experienced technicians rose from rank and file and do not possess the required paper qualifications to move up the scale. This created dissatisfaction amongst them.

Availability of Spares / Machine-Parts

Spares and machine parts were maintained in the warehouse. Ordering of parts and establishment of safety level of spares were based strictly on usage history and sales forecast. However, due to the ad-hoc and unplanned release of machines to Engineering for preventive maintenance and calibration work, the purchasing personnel were unable to track correctly the usage as they were not given the right information in a timely manner. Purchasing personnel were not being made aware of the preventive maintenance schedule and the critical parts that were required for this process. Also, the frequent change in the preventive maintenance schedule made it more difficult for them to plan for these spare-parts.

Availability of Raw Material

Raw materials were maintained in the warehouse. Material controllers order raw materials and establish their safety level based on historical consumption patterns and monthly order forecast received from Sales & Marketing. Due to incorrect or unreliable forecast received from Sales & Marketing, the material controllers will have to plan for pull-ins or push-outs accordingly. This has the tendency to lead to material stock-out which eventually brings down production machines resulting in delays and a loss of capacity.

Capacity Bottlenecks in Production

Another factor that contributed to longer cycle-time in production was specific product-mix related bottlenecks in production. For certain product mix, production had to change the set-up of the machine before running them. Machine set-up and changeover takes time and results in loss of capacity. Dedicating a specific machine for these products was not cost-effective as they may tend to run idle at times. Changing the set-up parameters of the machines frequently also results in loss of capacity; thus creating a longer cycle-time due to products being held up. All the issues discussed above directly impacts

the production cycle-time which eventually led to shipment delays and longer product lead-time resulting in poor customer service performance.

Method of Analysis

In the above sections, various issues that could lead to the current poor customer service levels were reviewed. Before going into the details and identifying the root-causes, it will be good to carry out an in-depth internal and external environment assessment of the organization. This is needed to understand clearly the internal strengths and weaknesses of the organization versus the external opportunities and threats faced by the organization. For this purpose, I will use the Internal Factor Evaluation (IFE) matrix and External Factor Evaluation (EFE) matrix. From here, the TOWS analysis will be used to formulate appropriate strategies. A further matrix called the Competitive Profile Matrix (CPM) is used to identify the organization's position in the market with respect to major competitors. Finally, as this case revolves around the plant's internal operations, the Cause-and-Effect diagram (also referred to commonly as Ishikawa diagram or fishbone diagram) will be used to identify the root causes to the problem.

Internal Assessment

The objective of the Internal Assessment is to identify the key strengths and weaknesses of the business unit and the organization at large. The major strengths of the organization are detailed below:

- *Good Product Quality* – Products of SmartCap are renowned for its product quality and are mostly superior to competitor's products. This is a result of high quality raw materials which are used in the process.
- *Wide Product Range* – SmartCap has a diversified range of ceramic capacitors and offer products ranging from low capacitance to ultra-high capacitance.
- *Competitive Pricing* – Prices of the ceramic capacitors from SmartCap are very competitive. In order to achieve this, the plant carries out a 6-monthly cost-reduction drive.
- *Strong Sales & Marketing Team* – SmartCap has Sales and Marketing personnel stationed at all the major hubs in Asia, Europe and US. Offices are set up in high density commercial areas.
- *Wide Distribution Network* – Various warehouses and distribution centres are located at major business hubs around the world in order to provide more efficient and effective deliveries.

- *Strong Product Knowledge* – The plant has been in the business for more than 20 years. There has also been a substantial technology transfer from the US and Europe plants.
- *Participative Management Style* – Management is actively involved in day-to-day business issues. All managers are hands on and have received proper and adequate training.
- *Strong Asset Position* – The plant is in a strong financial position and has carried out some significant strategic alliance formation in Europe and US. Cash flow is healthy.

On the other hand, there were also several weaknesses identified:

- *Long Product Lead Time* – Due to the stringent cost-reduction exercise carried out, Operations were under immense pressure to deliver products efficiently. This caused an increase in the cycle-time as major emphasis were put in meeting the numbers which resulted in lack on emphasis on product quality. According to Richard et al., (1995), the traditional long lead times and high inventory levels are more costly endeavours that may not even achieve product parity.
- *High Shipment Delinquency* – The pressure to deliver products on-time in accordance to industry lead-time resulted in Operations being unable to meet the volume in a timely manner. The change in product mix plus the inflexible machine changeover led to the violation of the FIFO (First-In, First-Out) rule which resulted in delinquencies.
- *Long Operations Cycle Time* – Frequent machine down-time and accumulation of lots at the quality control gate as a result of using non-qualified machines on the line created a huge impact to the cycle-time at the Chip Fabrication process. Ouyang et al., (2007) studied an integrated vendor-buyer inventory model with quality improvements and lead time reduction.
- *Poor Internal Communications* – Changes in periodic maintenance schedule and re-scheduling of orders were not communicated well to the Purchasing department which ended up with inaccurate purchases of supplies, spare-parts and raw materials.
- *High Turnover Rate* – Experienced and senior technicians were not compensated accordingly and felt that they were treated unfairly as new hires with proper paper qualifications were paid better.
- *Rigid Inventory Policies* – Despite many calls from the planners to plan inventories accordingly, corporate were unwilling to do so for fear that these inventories would end up being ‘dead stock’.

Marketing were unable to provide a clear and accurate forecasts as well.

- *Capacity Constraints* – The plant had limited capacity for certain product mix and this created a bottleneck in Operations. Tools to carry out these changeovers were limited and Operations prefer to group these products to be processed at once to minimize changeovers.
- *Limitation in Computerised Systems* – The existing Order-Processing system did not have the capability to manage production capacity by product mix and this often resulted in over-commitment of customer order that led to service failures.

Table 1 below identifies the plant's key strengths and its weaknesses. The overall score achieved by the plant is 2.30 which indicates a below average achievement.

Table 1: Internal Factor Evaluation (IFE) Matrix

KEY INTERNAL FACTORS		Weight	Rating	Weighted Score
STRENGTHS				
1	Good Product Quality	0.12	4	0.48
2	Wide Product Range	0.08	4	0.32
3	Competitive Pricing	0.08	3	0.24
4	Strong Sales/Marketing Team	0.02	3	0.06
5	Wide Distribution Network	0.02	3	0.06
6	Strong Product Knowledge	0.05	4	0.20
7	Participative Management Style	0.02	3	0.06
8	Strong Asset Position	0.02	3	0.06
WEAKNESSES				
1	Long Product Lead-Time	0.12	1	0.12
2	High Shipment Delinquency	0.12	1	0.12
3	Long Operations Cycle-Time	0.12	1	0.12
4	Poor Internal Communications	0.05	2	0.10
5	High Turnover Rate	0.05	2	0.10
6	Rigid Inventory Policies	0.08	2	0.16
7	Capacity Constraints	0.03	2	0.06
8	Limitation in Computerised Systems	0.02	2	0.04
		1.00		2.30

External Assessment

The objective of the External Assessment is to identify the key opportunities that could benefit the plant and threats that should be avoided. This will enable the plant to respond offensively or defensively to the factors by formulating strategies that take advantage of external opportunities or that minimize the impact of potential threats. The major opportunities are presented below:

- *Growing Asian Market* – Due to rapid globalization, increased economic power and higher population growth, Asian countries have become a massive consumer of electronic equipments. The

increase in purchasing power for electronic devices and mobile phones, have had a direct impact to the demand for ceramic capacitors.

- *Customers Value Quality & Design* – Despite the price war due to mushrooming competitors, customers still prefer high quality components with flexible designs.
- *Increased Demand from New Applications* – The growth of the electronic sector particularly in mobile devices such as smart-phones, modems, tablet computers and Global Positioning Devices have had a direct impact as well to the demand of ceramic capacitors.
- *Strategic Location* – The plant and its sales and marketing teams are strategically located to offer customers personalized efficient service. The possibility to react faster and adapting to changing demands faster gives the plant an advantage.
- *Resource Availability* – With its massive population and strong growth, resources (in terms of labour, equipment and supplies) are easily available for rapid expansion exercises.
- *Forming Strategic Alliance* – SmartCap should take advantage of the market in Asia by forming strategic alliances with major competitors. Its strength in quality and product knowledge would make it a suitable partner for many new players in the field (particularly in China) who has huge capacities and vast resources.
- *Local Source of Raw Materials* – Due to the rapid increase in electronic manufacturing plants in Asia, the plant can take advantage of local suppliers to replace the overseas suppliers. This automatically reduces the level of inventories the plant has to hold due to shorter raw material lead-times. Suppliers will also be more flexible to adapt to demand changes faster.
- *Contractual Agreements with Major Customers* – The plant can take the initiative to set up contractual agreements with major customers and work with them closely to identify demands for niche products. Setting a Customer Relationship Management (CRM) strategy with core customers will also help in identifying potential changes in demand thus making room for more accurate forecasts.

However, apart from opportunities there are also potential threats that the plant should avoid:

- *Strong Competition* – The increased demand for ceramic capacitors has attracted many new players in the market (particularly in China). These competitors are also being funded by the

Government. Their objective is match and lower prices in the market irrespective of their cost structure. Losses are being absorbed by the Government and their long-term strategy is to wipe out competitors thus resulting in enjoying larger market share.

- *Increased Raw Material Costs* – Prices of raw materials especially precious materials such as Nickel, Tin, Zinc, Copper and Palladium are increasing due to the higher demands from the Chinese manufacturers.
- *Reduced Market Share* – Despite competitive prices and superior product quality, the plant is at risk of losing its market share due its poor service, longer lead-time and frequent shipment delinquencies.
- *Industry Mergers & Acquisitions* – Most of the players in the market are getting into mergers and acquisition in order to have a larger capacity and more diversified product offering.
- *Shorter Industry Lead-Time* – Competitors are willing to hold stock for customers thus improving the availability of capacitors. This gives them a superior advantage over competition in terms of lead-time.
- *Potential Substitute Products* – The huge popularity of ceramic capacitors have also gone un-noticed by other passive components makers. Film capacitor and tantalum capacitor makers are also rapidly increasing their product availability and lowering their prices in order to get into this market.
- *Lack of Customer Loyalty* – In the capacitor business, it is often very difficult to engage customer loyalty. Loyalties are only formed when the manufacturer can constantly deliver superior quality products in a timely manner at the right cost. There are ample choices in the market for customers to choose from.
- *One-Stop Purchases* – Most electronic applications needs a range of passive electronic components in order to build a complete module. This involves resistors, capacitors, inductors as well as other components. The trend in the industry is moving rapidly to one-stop purchases whereby a supplier who can provide the entire combination of passive components would definitely have an edge over its competitors.

Table 2 below illustrates the plant's position with respect to external opportunities and threats. The plant achieves an average score of 2.55.

Table 2: External Factor Evaluation (EFE) Matrix

KEY EXTERNAL FACTORS		Weight	Rating	Weighted Score
OPPORTUNITIES				
1	Growing Asian Market	0.12	4	0.48
2	Customers Value Quality & Design	0.12	4	0.48
3	Increased Demand - New Applications	0.08	3	0.24
4	Strategic Location	0.02	3	0.06
5	Resource Availability	0.05	3	0.15
6	Forming Strategic Alliances	0.04	3	0.12
7	Local Source of Raw Materials	0.04	4	0.16
8	Contractual Agreements - Major Customers	0.02	3	0.06
THREATS				
1	Strong Competition - Increased Capacity	0.12	1	0.12
2	Increased Raw Material Costs	0.05	2	0.10
3	Reduced Market Share - Poor Service	0.12	2	0.24
4	Industry Mergers & Acquisitions	0.06	1	0.06
5	Shorter Industry Lead-Time	0.08	2	0.16
6	Potential Substitute Product - Film Capacitors	0.04	2	0.08
7	Lack of Customer Loyalty	0.02	1	0.02
8	One-Stop Purchase - Electronic Components	0.02	1	0.02

Market Positioning

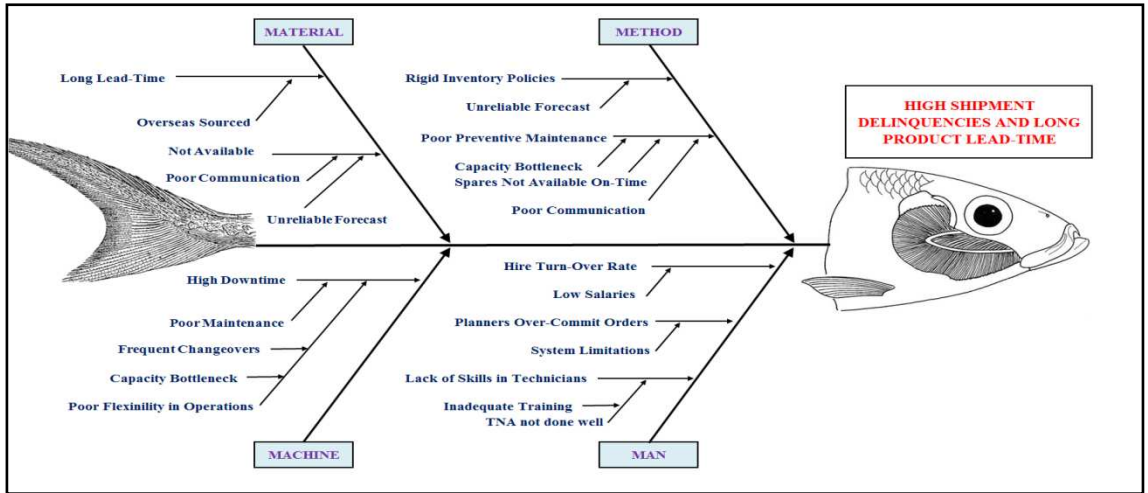
Table 3 below illustrates the competitive positioning of the plant with respect of two major competitors; Tamura (Japan) and Danyun (Taiwan). The overall score of the plant (3.06) despite being above average is still lower than both competitors and the major reason for this is its poor service performance as indicated by its score in On-Time Deliveries and Availability/Lead-Time.

Table 3: Competitive Profile Matrix (CPM)

CRITICAL SUCCESS FACTORS		Weight	SMARTCAP		TAMURA, JPN		DANYUN, TWN	
			Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score
1	Market Share	0.12	3	0.36	4	0.48	4	0.48
2	Product Quality	0.14	4	0.56	3	0.42	3	0.42
3	Price Competitiveness	0.10	4	0.40	4	0.40	4	0.40
4	Customer Loyalty	0.08	3	0.24	3	0.24	3	0.24
5	On-Time Deliveries	0.15	2	0.30	4	0.60	3	0.45
6	Availability / Lead-Time	0.15	2	0.30	4	0.60	3	0.45
7	Distribution Network	0.06	4	0.24	4	0.24	4	0.24
8	Product Offering (Scope)	0.08	3	0.24	4	0.32	4	0.32
9	Management Experience	0.06	4	0.24	4	0.24	3	0.18
10	Financial Position	0.06	3	0.18	4	0.24	4	0.24
		1.00		3.06		3.78		3.42

Recommendations

Based on the internal and external analysis carried out and following the identification of several issues that has an impact to customer service in terms of lead-time and shipment delinquency, a thorough analysis of the possible causes are analysed to identify the potential root-cause to the problem. This will be carried out with the aid of a Cause-and-Effect Diagram that helps identify, sort, and display possible causes to the specified problem. Figure 1 below illustrates the possible causes and effects.



weaknesses and identifying the opportunities and threats through the external evaluation, a major step towards strategy formulation is to match the key internal and external factors. TOWS matrix provides a framework that helps the organization to focus on its strengths while minimizing weaknesses and to take the greatest possible advantage of opportunities while avoiding the threats. Figure 2 below illustrates the 4 types of strategies (SO – Strengths versus Opportunities, WO – Weaknesses versus Opportunities, ST – Strengths versus Threats and WT – Weaknesses versus Threats) that should be used by SmartCap.

TOWS MATRIX		STRENGTHS		WEAKNESSES	
		1 Good Product Quality 2 Wide Product Range 3 Competitive Pricing 4 Strong Sales/Marketing Team 5 Wide Distribution Network 6 Strong Product Knowledge 7 Participative Management Style 8 Strong Asset Position	1 Long Product Lead-Time 2 High Shipment Delinquency 3 Long Operations Cycle-Time 4 Poor Internal Communications 5 High Turnover Rate 6 Rigid Inventory Policies 7 Capacity Constraints 8 Limitation in Computerised Systems		
OPPORTUNITIES		SO STRATEGIES		WO STRATEGIES	
1 Growing Asian Market 2 Customers Value Quality & Design 3 Increased Demand - New Applications 4 Strategic Location 5 Resource Availability 5 Resource Availability 6 Forming Strategic Alliances 7 Local Source of Raw Materials 8 Contractual Agreements - Major Customers	1 Expand aggressively into Asian market (S4,S5,O1). 2 Allocate additional resources to R&D department (S6,S8,O3). 3 Source aggressively for local based suppliers of Raw Materials. (S6,O5,O7)	1 Review compensation package. (W5,W4,O5) 2 Enhance order processing system. (W8,O4,O6) 3 Redefine organization structure to enhance communication & efficiency (W4,O4,O5)			
THREATS		ST STRATEGIES		WT STRATEGIES	
1 Strong Competition - Increased Capacity 2 Increased Raw Material Costs 3 Reduced Market Share - Poor Service 4 Industry Mergers & Acquisitions 5 Shorter Industry Lead-Time 6 Potential Substitute Product - Film Capacitors 6 Potential Substitute Product - Film Capacitors 7 Lack of Customer Loyalty 8 One-Stop Purchase - Electronic Components	1 Form Strategic Alliances with major competitors in Asia. (S6,S8,T4) 2 Extend product range beyond ceramic capacitors (S6,T6,T8) 3 Review alternate materials. (S6,T2)	1 Review Inventory Policy to provide MTO or ATO features. (W1,W2,W3,T5) 2 Implement CRM with major and potential customers (W2,T7). 3 Review policy for on-hold products. (W4,T5)			

In order to sustain in this competitive environment, various strategies have been identified resulting from in-depth analysis of the case above. The major issue is directed towards improving the efficiency and effectiveness of the plant towards achieving higher levels in customer satisfaction. These strategies can be classified into two categories; short-term strategies and long-term strategies.

Short-Term Strategies

This is the main focus of this paper. The objective is to eradicate shipment delinquencies and reduce product lead-times to enhance customer service. The strategies recommended for this purpose are explained below.

• **Review Organization Structure**

From the analysis above, several occurrences of poor communications have been identified. This is largely related to the form of organization structure in place which is very functional. Taking this as well as potential extension of product range into consideration, the need to emphasize focus and control is essential for sustainability. For this reason, it is proposed that the plant may adapt a Strategic Business Unit (SBU) organization structure as depicted in Figure 3. The advantages of an SBU structure includes improved communications, clear allocation of resources and narrowed as well as focussed objectives are established.

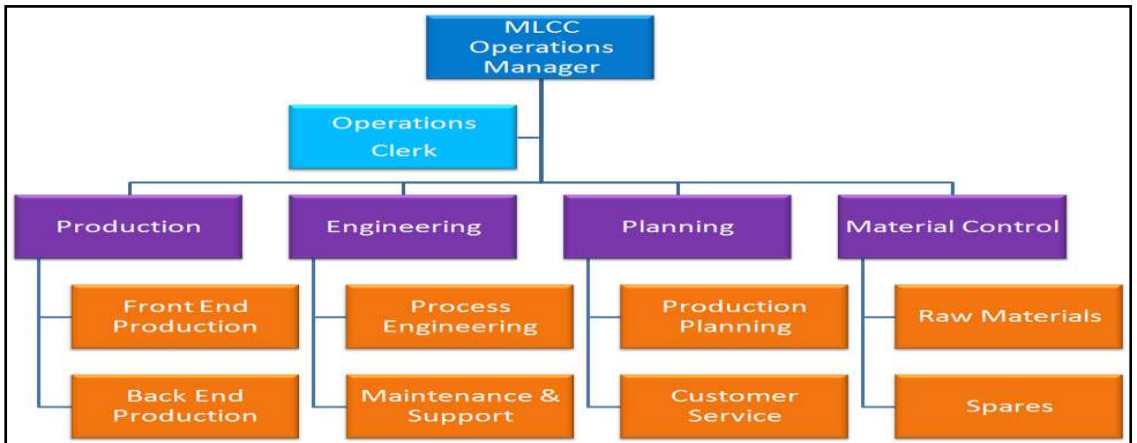


Figure 3: Strategic Business Unit organization structure

The MLCC operations manager will have total control over the maintenance, planning and material control activities. It provides an avenue for enhanced communication and control within the department. Process engineering will be tasked to review process improvement projects as well as to monitor in process quality indicators which will prevent the use of non qualified machines in operations thus reducing the need for a second quality buy-off for non-conforming products which eventually leads to reduced level of oh-hold lots resulting in improved cycle-time. On the other hand, there will be closed follow-up and tracking of materials and spares on the line with the involvement of the planning and material control group. There will also be closer working relationships established between the production and maintenance group to avoid reschedules of preventive maintenance activities as well as to achieve a quicker turn-around time to bring up machines which directly relates to increased capacity.

• **Review Inventory Policy**

In order to be able to serve the customers better, sales and marketing should work with the plant to build products to stock (MTS).

The plant should not be made accountable for this stock. It should be the primary responsibility of the Sales and Marketing team to define the safety level as well as to ensure these products are eventually sold to customers. This safety stock will also act as a buffer to operations in the event of some unforeseen circumstances whereby customer expectations are still being met despite longer cycle-times in production. It also helps the plant to secure orders requiring shorter delivery dates. On the other hand, to further improve the situation, the plant should plan as well for ATO (assemble to order) on certain products. These are semi-finish products maintained in inventory and the responsibility to keep this inventory in check should fall squarely on the shoulders of the MLCC Operations Manager. The flexibility it provides is because one semi-finish product can be linked to several finished products and the production planners should carefully monitor and manage these products by linking them to products required by customers; thus shortening the lead-time for shipment. The proposed organization and management of plant inventories are illustrated in Figure 4. A periodic 6 monthly audit should be carried out by management to review these inventories.

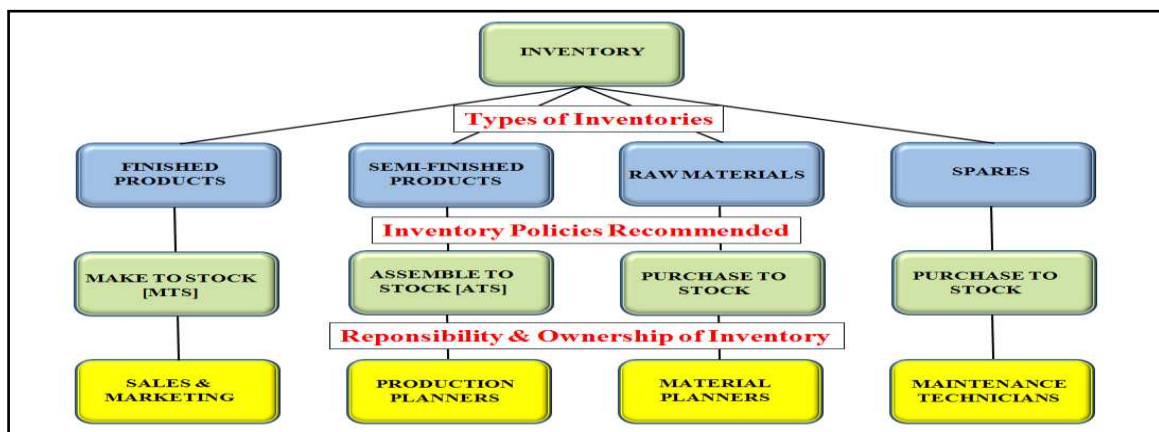


Figure 4: Flow of Inventory Management

- **Address Issues Related to Employee Development and Compensation**

The issue related to the resignation of several experienced technicians in the Front-End Process of the MLCC Operations line is an issue of great concern to management. Currently, the HR policy identifies only 1 path for career growth and employee development. For each position, several job grades are identified based on employee qualifications and experience. In each job grade, a salary scale is defined (from Minimum to maximum range). For an employee to move from one job grade to the next one, he should possess all the requirements defined in that job grade, failing which he will not have

the chance to move up the ladder. This creates room for resentment and dissatisfaction among employees. To overcome this, it is proposed that management considers a dual path career growth (one along the management path and the other along the technical path). For employees who rose from rank-and-file who possess great amount of tacit knowledge of the operations but do not have the necessary paper qualifications, they can still move up the ladder on the technical path and position themselves on the same job grade as someone who lacks in experience but has the required paper qualification. On the other hand, the management path provides staffs with an opportunity to be in the management team. In addition, a plant wide Training Needs Analysis (TNA) exercise also needs to be carried out across the plant with immediate and urgent focus on technician's capability and skill levels.

- **Enhance Order Processing System**

The missing link in the current order processing system is the capability to manage capacity and bottleneck by various types of products. This feature is very critical for production planners and customer service personnel to provide accurate lead-times to the customer as well as to refrain from over-committing orders on a particular product. Management must seriously consider this issue and take appropriate steps to overcome this shortcoming. This strategy should be noted as a short to medium term strategy for the plant.

- **Qualifying Local or Alternate Sources for Raw Materials**

In order to cut-down the lead-time involved in purchasing raw materials especially for those that are overseas sourced, management need to establish a project team comprising of process engineers, material controllers, quality engineers and the purchasing team to localize these materials. This can be done in stages starting with most critical items first. Apart from shortening the lead-time, there are other benefits that can be derived with localizing purchases of materials which includes lower price and lower inventories as well more frequent deliveries can be arranged.

Long-Term Strategies

Though this does not directly influence the scope of this project, it is important to mention the strategies that should be considered here by the plant to achieve sustainability. All the strategies mentioned above have been reviewed with this respect before being proposed for implementation. Strategies involved here involves the plant's expansion plans via the formation of strategic alliances with key competitors as well as expanding the plant's product range beyond ceramic products as a means to offer a one stop solution to customers. In lieu of that, it is also proposed for the plant to implement a Customer Relationship Management system to establish formal relationships with core customers that will help the plant in identifying the current and future

needs of these customers. Reducing shipment delinquencies and product lead-times towards enhancing customer service should be considered on a wider scale and should be forward-looking.

Downsides Management

The biggest downside to the strategies recommended above is the resistance to change following the alteration of the existing organization structure. Despite the fact that no individual or organization can escape change, it however raises anxieties because people fear economic loss, inconvenience, uncertainty and a break in normal social patterns. Resistance to change is a great threat to successful strategy implementation and it can take the form of sabotaging, absenteeism, unwillingness to cooperate and filing unfounded grievances. People often resist because they do not understand what is happening or why the changes are taking place. Successful strategy implementation hinges upon top managements' ability to develop an organization climate which is conducive to change. Change must be viewed as an opportunity rather than as a threat. Since change involves everyone in the organization as well as all levels of the management team; from lower level managers to senior managers, therefore it is essential to involve them as much as possible from the initial stages. Clear, concise and regular communications are also important to ensure that employees understand the reasons leading to the changes and what is expected of them. It is also important to convince employees that this change is to their personal advantage.

Strategy Implementation

In order to overcome this resistance, the following additional actions are necessary to ensure smooth implementation.

- ***Establishing annual objectives***

Establishing annual objectives is a decentralized activity that involves all managers. Active participation in establishing annual objectives can lead to acceptance and commitment. This is essential as it represents the basis for resource allocation. Establishing annual objectives in the form of a Balanced Score Card (BSC) is also a primary mechanism for evaluating managers. It is a major instrument for monitoring progress and finally it helps to establish organization and business unit priorities. It is also a basis for linking rewards and incentives to performance and achievement. The proposed Balanced Score Card required for this project is presented in Figure 5 below.

OBJECTIVES	MEASURE or TARGET	PRIMARY RESPONSIBILITY
CUSTOMER		
1. Ensure On Time Delivery	95%	Operations
2. Decrease MLCC Product Lead-Time	25 Days	Operations, Sales & Marketing
MANAGERS/EMPLOYEES		
1. Change Organization Structure	Implement New Structure	All
2. Review Career Path and Compensation Package.	Implement New Package	Human Resource
3. Conduct Plant Wide TNA Exercise	Training Calendar	Training
4. Review & Define Inventory Policy	Inventory Policy	Operations, Sales & Marketing
OPERATIONS/PROCESSES		
1. Reduce MLCC Product Cycle-Time	25 Days	Operations
2. Expand product line	5 New Products	R&D and Operations
3. Enhance Order Processing System	Include Capacity by Product Type	MIS and Operations
COMMUNITY/SOCIAL RESPONSIBILITY		
BUSINESS ETHICS/NATURAL ENVIRONMENT		
FINANCIAL		
1. Increase Sales Revenue	15%	Sales/Marketing
2. Reduce Cost of Goods Sold - Localize/Alternate Materials	20%	Operations

Figure 5: Balanced Score Card

- **Formation of Policies**

Policies are required to make a strategy work. They set boundaries, constraints, and limits on the kinds of administrative actions taken. They clearly let both employees and managers know what is expected of them. They also provide a basis for management control, allow coordination across business units and reduce the amount of time spent by managers on decision making.

- **Allocation of Resources**

Resources should be allocated in accordance with organization priorities indicated by the annual objectives. There are 4 types of resources which are financial resources, physical resources, human resources and technological resources. The real value of resource allocation lies in the resulting accomplishment of organization objectives.

- **Managing Conflict**

Establishing annual objectives and structural changes in the organization tend to lead to conflicts due to different expectations and

perception amongst employees. Conflict is unavoidable in organizations, so it is important that conflict be managed and resolved before it affects performance.

Conclusions

The present research article includes a detailed analysis of the issues faced by SmartCap, an electronic component manufacturing company, with respect to customer service. Following the analysis, several strategic recommendations were provided with well defined implementation strategies. The customer satisfaction is addressed today as a strategic business development tool and is crucial to the sustainability of any business. In the current context of globalization which gives room to intense competition especially in the electronics industry, measuring customer satisfaction must be done continuously, consistently, timely, accurately and through a reliable process. Customer satisfaction does have a positive effect on an organization's profitability, satisfied customers form the foundation of any successful business as customer satisfaction leads to repeat purchase, brand loyalty, and positive word of mouth. Organizations must take extreme measures to ensure continued customer satisfaction. In formulating customer satisfaction strategies for SmartCap, an in-depth assessment of the organization's strengths and weaknesses with respect to external opportunities and threats were carried out. Prior to the implementation of these strategies, potential downsides were carefully studied and actions were identified on how to overcome these potential downsides. Never the less, strategy implementation involves changes in the organization and for successful implementation, a complete 'buy-in' need to be in place through effective communication and total employee involvement.

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