

# CUSTOMER SATISFACTION IN AN EMS COMPANY

by

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**DECLARATION**

I hereby declare that the project is based on my original work except for quotations and citation which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at USM or any other institutions.

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Date: June 12, 2015

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“The sacrifice which Knowledge pays is better than great gifts offered by wealth, since gifts’ worth, O my Prince!, lies in the mind which gives, the will that serves;”

From the “The Song Celestial”

A translation of the Bhagavad Gita by Sir Edwin Arnold, 1899

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## **Abstract**

Increasing competition in an increasingly globalized world drives the need of companies' to retain their customers. Ensuring Customer Satisfaction is a key strategic imperative for any company in this battle to retain customers.

The Electronics Manufacturing Services [EMS] industry is a large and growing but highly competitive industry. EMS Companies provide a variety of services to Original Equipment Manufacturers [OEMs]. Many OEMs today have completely outsourced their manufacturing operations to EMS Companies, retaining R&D and Marketing functions. Customer Satisfaction in the EMS industry is driven primarily by Cost, Quality and Delivery performance.

Enfer Electronics is a leading EMS Company and has in recent months experienced poor Customer Satisfaction performance at one of its sites in South Asia. This site's recent poor Delivery and Quality performance to a numbers of its customers has put at risk 30% of that site's annual Sales revenue due to the threat of loss of these customers.

This paper intends to identify the primary systemic root causes of the poor Customer Satisfaction performance at this site. Data collection is by cause and effect analyses and extensive interviews with senior leaders in the region. The analyses outcomes are cross referenced against each other to identify the ultimate systemic root causes of the poor performance. Performance information from a sister site in the same region is also obtained as Benchmarks of good performance.

This paper concludes with specific, short, medium and long term recommendations for the leadership of Enfer Electronics in the region to improve the Customer Satisfaction performance at the site in question.



## **Executive Summary**

Increasing competition in an increasingly globalized world drives the need of companies' to retain their customers. Ensuring Customer Satisfaction is a key strategic imperative for any company in this battle to retain customers.

The Electronics Manufacturing Services [EMS] industry is a large and growing but highly competitive industry. EMS Companies provide a variety of services to Original Equipment Manufacturers [OEMs]. Many OEMs today have completely outsourced their manufacturing operations to EMS Companies, retaining R&D and Marketing functions. Customer Satisfaction in the EMS industry is driven primarily by Cost, Quality and Delivery performance.

Enfer Electronics is a leading EMS Company and has in recent months experienced poor Customer Satisfaction performance at one of its sites in South Asia, the Southern Site. This site's recent poor Delivery and Quality performance to a numbers of its customers has put at risk 30% of that site's annual Sales revenue due to the threat of loss of these customers.

This paper intends to identify the primary systemic root causes of the poor Customer Satisfaction performance at this site. Data collection is accomplished by cause and effect analyses and extensive interviews with senior leaders in the region.

The Cause and Effect analyses from the viewpoint of four of the customers at the Southern Site revealed that the proximate root causes of the poor performance were the poor competency of the people supporting these customers as well as an

unbalanced focus on financial performance to the exclusion of all other considerations, including Delivery performance to the customers.

Interviews with senior leaders at the site and regional levels were intended to identify functional and other systemic root causes of the poor performance across all customers. Interviews were conducted with thirteen senior leaders and data was tabulated into Affinity Charts to group common themes and ideas together. Collated Affinity Chart data was translated to Pareto Diagrams to enable the identification of the most likely systemic roots causes. Relations Diagrams were also used to provide understanding of causal relationships in this complex situation.

The outcomes from the Ishikawa Diagrams and analyses of the interviews were cross referenced to establish triangulation of independent data sources. This revealed three primary systemic root causes, Leadership, Organization Structure and Unbalanced focus on Financial Performance.

Recommendations have been made to address these systemic root causes and include immediate containment actions, actions for the midterm [three to six months] and longer term actions [six to twelve months].

The recommended containment actions include the immediate assumption of control of the Southern Site by the Regional VP. Mr. Yong, displacing Mr. Raj, the current General Manager and the immediate restructuring of the Organization at the Southern Site to include Functional Leadership. The Functional Leadership positions are recommended to be filled with leaders from the Northern Site and Regional

teams in the short to medium term. This will allow time to assess the leadership behaviors [through skip level meetings and independent employee surveys] of the Northern Site and also to rebuild the functional competencies that are required.

Formalized Training and Succession plans are recommended to be put in place over the next six months. Finally, Benchmark information from the sister site in the region [the Northern Site] indicated that having a focused customer segment strategy provided an advantage in Customer Satisfaction performance. Thus, it is recommended that a Strategy Remap of the Southern Site be executed in the next six to twelve months to ascertain what the Competitive Advantage of the site could be and possibly define a desired customer portfolio.

## Definitions

**EMS:** Electronics Manufacturing Services. EMS companies provide electronics Manufacturing services to OEMs

**OEM:** Original Equipment Manufacturers. Refers to companies that design, develop and market their own products and services. OEMs traditionally also manufactured their products. Many contemporary OEMs, however, no longer manufacture their products, having outsourced the manufacturing [in part or in whole] to EMS companies.

**Customer:** In the context of the relationship between EMS and OEM companies in the EMS industry, the EMS companies' customer is the OEM companies that have contracted it [the EMS Company] to provide manufacturing services.

**End Customer:** In the context of the EMS industry, the OEM's customers is defined as the end customer, consuming the products that are fully or partially manufactured by the EMS company but which is designed, marketed and branded by the OEM.

**On Time Delivery:** Is a key Customer Satisfaction metric in an EMS company. It is a measure of the number of units of products that are delivered on time to the customer's [i.e. the OEM's] requested date of delivery over the number of products delivered over a designated period of time. It is expressed as a percentage [number of units delivered on time over the number of units delivered in a month, for instance]

**DPPM:** Defective Parts per Million is a key Customer Satisfaction metric in an EMS company. It is the measure of number of defective products delivered by the EMS Company to its customer [the OEM] over the number of products delivered over a stipulated period of time, multiplied by one million.

## **1. Introduction**

Globalization has increased competition across many industries, particularly those industries where technology cycles have been accelerating, as is seen in the electronics industry. One major consequence of this increased competition is the need to ensure a constant supply of sales growth for firms through the acquisition of new customers or new opportunities with existing customers.

It is also noted in some customer relationship management texts that the cost of acquiring a new customer can range from 3 to 13 times higher than the cost of retaining existing customers (Dyche, 2008). Thus retaining existing profitable customers becomes a key strategic imperative for any company. A key element in the effort to retain existing profitable customers is the ability to satisfy their needs; to provide customer satisfaction. Customer satisfaction, in turn, is the first step leading to Customer Loyalty, which is a customer who not only is a repeat purchaser of goods and services offered by the company but also is a Promoter of the company through positive word or mouth (Reichheld, 2003) thus indirectly contributing to the growth of the company.

This case study intends to identify factors that affect Customer Satisfaction in a company, [Enfer Electronics] in the Electronics Manufacturing Services [EMS] industry. Customer Satisfaction in this context is specifically defined to include objective performance data [Delivery and Quality metrics] and subjective evaluations [responsiveness, flexibility etc.] as well as event driven phenomenon. For example, excursions in performance that are the genesis of consequential action taken by the

customer to reduce their risk including dual sourcing previously single sourced products.

A unique confluence of events and circumstances has allowed a review of customer satisfaction results in one region of this company, Enfer Electronics, which is governed by the same regional leadership team and management reporting processes but with diametrically opposed Customer Satisfaction results demonstrated over a period of several months in two factories or sites. One site [referred from this point on as the Southern Site] has very poor Customer Satisfaction and is at risk of losing some of their customers while the other site [the Northern Site] has recently received awards from customers for outstanding performance and customer satisfaction and this site is the market share leader in its business segment.

The Southern Site serves nine different customers from a wide variety of market segments. In recent months, Customer Satisfaction in the area of Delivery and Quality performance has suffered significantly for four of these customers. Three of these four customers display poor Delivery performance over many months and this has resulted in threats of termination of the Manufacturing contract with the Southern Site [i.e. loss of these customers to competitors] in two cases [UltraSite and Industrial Electronics] and imposition of a Probationary Period for the third [General Instruments], effectively putting the Southern Site out of contention for new business opportunities with this customer. The fourth customer [Ocular Electronics] has experienced very poor Quality performance from the Southern Site to the extent of escalation of this poor performance to the CEO of Enfer Electronics. Ocular Electronics has also demanded and received significant extension of payment terms

to the Southern Site as mitigation against the Southern Site's poor quality performance. Collectively, these four customers contribute to 30% of the Southern Site's annual revenue. If performance does not improve, the Southern Site runs the risk of loss of all of these customers and this would represent a significant financial impact to site and Enfer Electronics as a whole.

This case study intends to understand the underlying differences between these two sites that contributed to the vastly different outcomes despite these two sites sharing management structures, processes and senior leadership team members. This is accomplished by collection of Customer Satisfaction data and feedback from both sites followed by a series of interviews with the senior leadership at both sites as well as the Region in an attempt to understand the key reasons for this dramatic difference in Customer Satisfaction results.

The case study begins with an overview of the EMS industry followed by an overview of the company that is the subject of this paper, with specific focus on the background of the two sites within the region of concern. The issues faced by the site with poor Customer Satisfaction results will be elaborated upon with the data and analysis from the other site [with strong Customer Satisfaction outcomes] used as a benchmark.

Data gathering, research methods [interviews with leadership team members] and analysis of the subsequent research data is then presented. Finally recommendations are made to the senior leadership of the region based on the outcomes of the analysis of the data from the interviews.

## **2. Industry Background**

The Electronics Manufacturing Services [EMS] industry began as Contract Manufacturing [CM] solution providers and has its roots in the need in the mid to late 1970's for Electronics Original Equipment Manufacturers [OEMs] to outsource electronics assembly work to third parties in times of increased demand [beyond normal or typical limits]. Contract Manufacturers were established to absorb this "excess" demand that flowed out of OEM factories to provide OEMs flexibility in capacity without having to invest in additional capital. Typically Contract Manufacturers would aggregate demand from multiple OEMs [referred to as "customers" from this point on] to plan their capacity requirements, thus providing economies of scale to OEMs that they would not, otherwise, have access to. Early contract manufacturers included Solectron [which has since been purchased by Flextronics Corporation; Solectron was purportedly the very first electronics Contract Manufacturer] and Sanmina, both located in Silicon Valley. Early solutions provided by Contract Manufacturers were limited to Printed Circuit Board Assembly [PCBA] and structural testing with consigned direct materials from the OEMs used in the assembly. Figure 2.1 illustrates this early engagement model between OEMs and CMs.



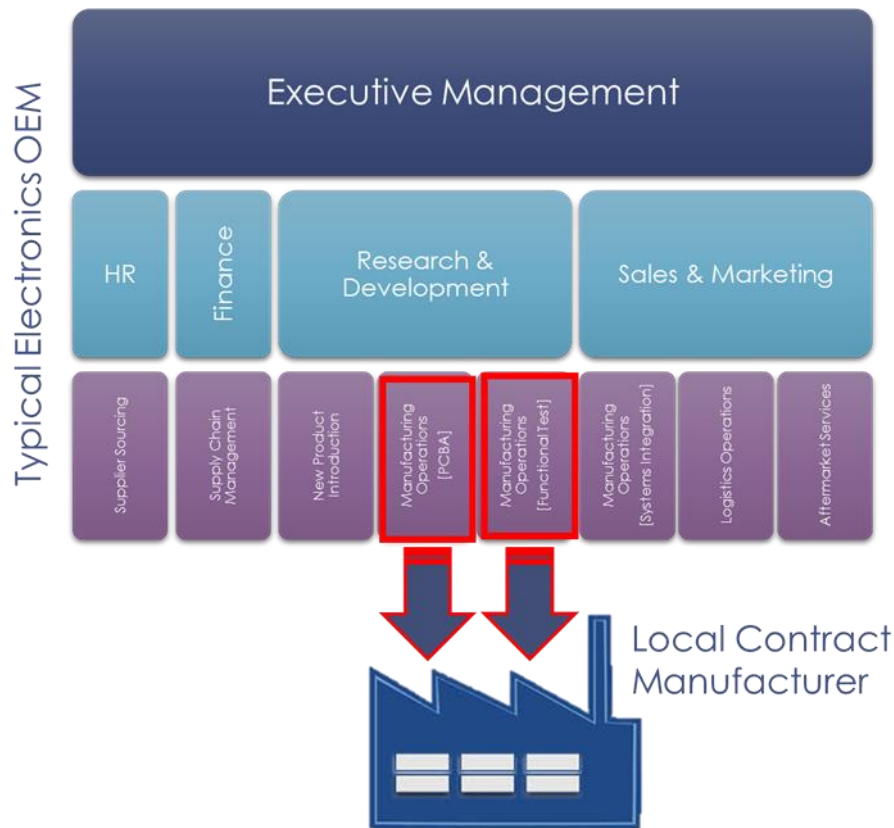


Figure 2.1 Early engagement model between OEMs and CMs in the 1970s

From these humble beginnings, Contract Manufacturers have developed to become full-fledged Electronics Manufacturing Services [EMS] solution providers with services that range from design to aftermarket sales repair services; providing end-to-end services to OEMs. This has resulted in many OEMs liquidating any and all in-house electronics manufacturing capabilities (Barnes, et al., 2000) . Figure 2.2 illustrates this new configuration of the EMS – OEM engagement prevalent today.

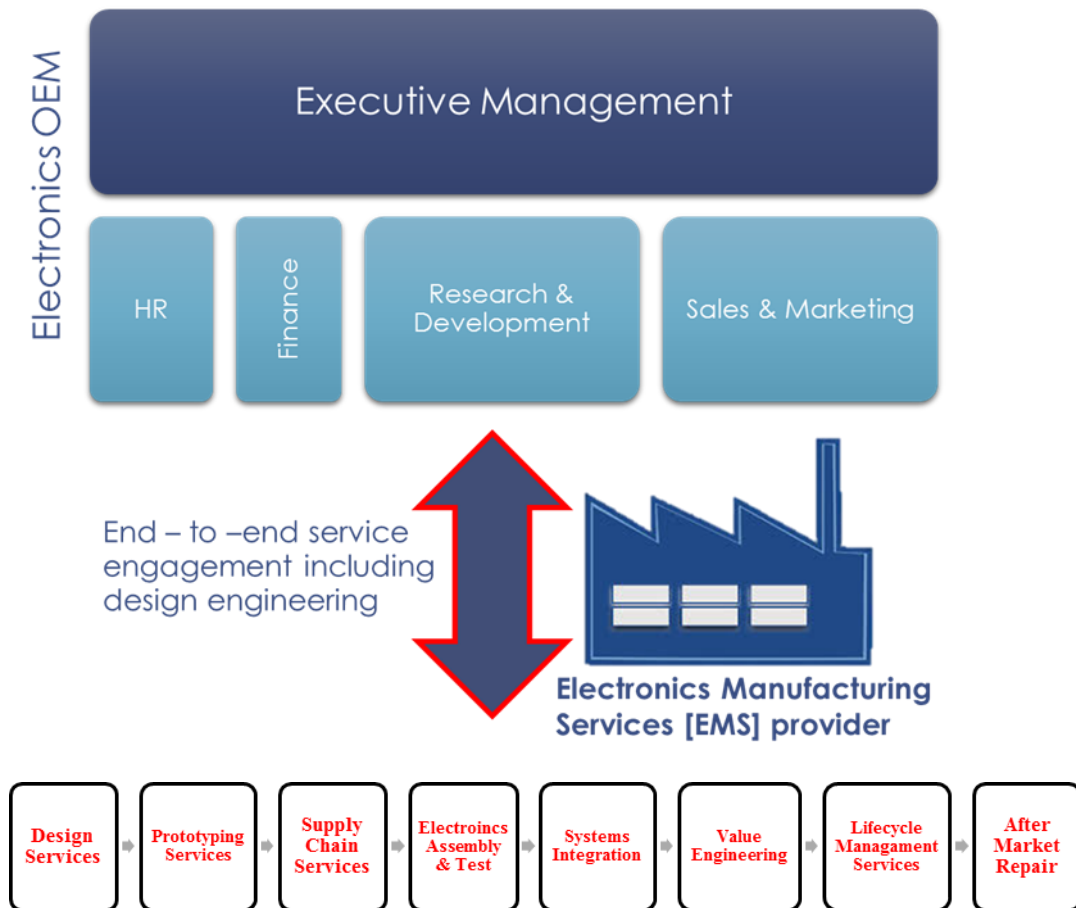


Figure 2.2 End-To-End Services Provided by EMS solution providers today. Note that the OEM is depicted as not having any Manufacturing capability

A typical engagement between and OEM and EMS could include many levels of interaction and engagement. Let us imagine an OEM which designs, markets and supplies electronics products in the Smart Phone market whose end customers are individual consumers across the world. Let us further imagine that this OEM engages an EMS company such that they provide the following services, viewed from a Product Life Cycle perspective:

- The EMS Company provides support to the OEM [i.e. the EMS Company's customer] in the early stages in the product life cycle of the Smart Phone that include Design Engineering services. This is typically characterized as a Joint Development & Manufacturing

[JDM] relationship where the EMS Company provides support in the design of the product but the Intellectual Property remains with the OEM. These services can include electronics design, mechanical design and industrial design services in the development of the Smart Phone. At this stage of the product life cycle, the EMS and OEM Design teams are closely engaged with the support of business teams on both sides that manage the commercial engagement.

- As the design reaches completion, the EMS Company can provide Prototyping or New Product Introduction Services to the OEM to launch the product into manufacturing. At this stage of the engagement, the EMS Company's manufacturing team engages with the OEMs team that oversees and manages the outsourced manufacturing.
- Also at this stage, the Supply Chain of component suppliers that are required to manufacture the Smart Phone is also established. The EMS Company provides Supply Chain Management services to OEM that can include identifying and sourcing the suppliers of components, negotiating terms and conditions with the suppliers followed by purchasing and managing the supply of components to enable the manufacture of the Smart Phone, in this example.
- As the product moves into volume production [after the completion of the Prototype stage], the EMS company now starts providing Printed Circuit Board [PCB] Assembly and Test services along with Systems Integration services to manufacture the Smart Phone . The EMS company, in this example, does all of the manufacturing of the Smart

Phone; the OEM has no part in the Manufacturing other than providing the requirements to build and monitoring the performance of the EMS company. At this stage, the EMS company has a cross functional team that includes but is not limited to Manufacturing, Engineering, Quality, Supply Chain Management & Program Management personnel that interact with the OEMs team that manages the outsourcing activities of the OEM. The OEM outsource management team would also include cross functional team members that include but is not limited to Buyers, Engineers and Quality personnel. There is typically also a centralized team that manages the commercial relationship between the two companies, at both companies.

- As the product now reaches maturity in the market, the EMS Company may also provide Value Engineering Services that reduce the cost of the product. These services include minor redesigns to improve the manufacturability of the product or to introduce lower cost components.
- The EMS Company may also provide After-Market Repair services of the Smart Phone. This service is the service that allows the OEM to have Smart Phones that are returned from the field [i.e. from the end customers] due to defects detected by the end customer to be repaired and returned to the field.

These services can be provided by the EMS Company to the OEM across multiple product lines and each product line could be at different stages of

engagement. A single EMS site or factory may be providing these services to multiple OEM customers and each customer may have product lines that are at various stages of the product life cycle. In summary, the relationship between and EMS Company and their OEM customers can be complex and goes beyond the traditional buyer – seller relationship and increasingly is seen more as a collaborative partnership across the value chain of the products being outsourced to the EMS Company. Figure 2.3 depicts these services relative to the typical view of product life cycle [Sales volume over time], indicating when during the product life cycle the EMS company engages with the OEM in the various types of services.

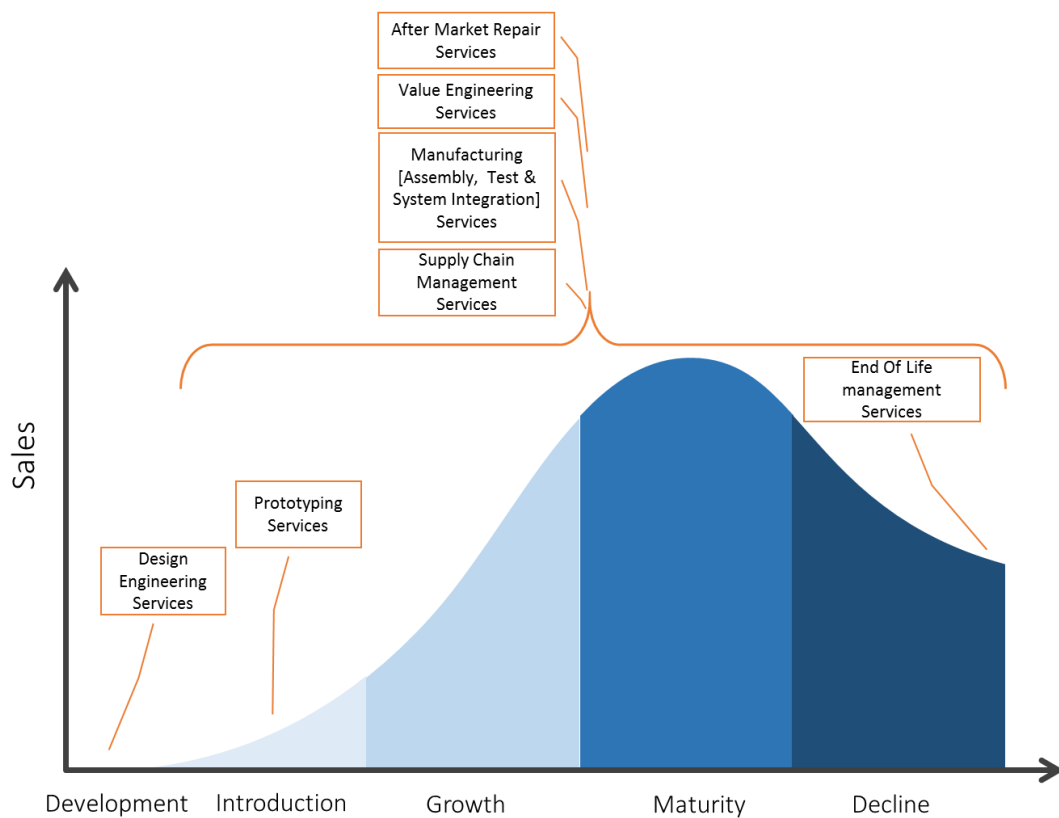


Figure 2.3 EMS Services provided to OEMs seen from a product life cycle perspective

The most visible and widely known contemporary example of this type of partnership is between Apple Incorporated [Apple], the largest company in the world

by Market Capitalization, and Foxconn Technology Group [Foxconn], the largest EMS provider in the world. Apple outsources all the manufacturing, supply chain management and lifecycle management of its electronics products primarily to Foxconn and some other smaller EMS providers; retaining Design and Marketing responsibilities for themselves.

The size of the EMS industry has grown steadily in the decades since its inception; breaching the USD50 Billion mark in the late 1990's and exceeding USD500 Billion in 2012 (Manufacturing Market Insider, 2015) with projections to exceed USD639 Billion in 2018 (PR Newswire, 2014). It is estimated that there are over 350 EMS providers in the world with 80% of the revenue concentrated in the top 8 to 10 suppliers (PR Newswire, 2014). A perusal of publicly available Financial reporting from the top suppliers indicate, however, that the industry operates at very slim margins, ranging from 1% to about 3.5% at the high end.

In summary, the EMS industry has large scale but also has a high degree of industry rivalry as evidenced by the existence of hundreds of suppliers. The big players control the lion's share of the market. The industry is characterized by commoditization due to the large number of capable suppliers and a seeming lack of any clear differentiation between the suppliers. This commoditization is reflected in the relatively low margins.

### **3. Company Background**

Enfer Electronics is a leading Electronics Manufacturing Services [EMS] provider. It has consistently ranked amongst the top 15 largest EMS providers in the world for the last few years as reported in the Manufacturing Market Insider [a

publication of New Venture Research] in their annual list of Top 50 EMS providers in the world.

Enfer Electronics is a multi-billion US Dollar multinational with a worldwide manufacturing services footprint with sites in North America, Europe and Asia. This includes factory sites in nineteen countries. Enfer employs tens of thousands of employees from diverse backgrounds at these sites. Like all large EMS providers, Enfer has invested in people, infrastructure and capabilities that allow them to provide end-to-end services that include Printed Circuit Board Assembly [PCBA] and Test, Systems Integration, Direct Fulfilment, New Product Introduction and Prototyping, Design & Value Engineering, Supply Chain Services, After Market repair services. It should be noted that the provision of these levels of services does not, in and of itself, differentiate Enfer from its rivals as all major EMS providers are similarly equipped.

Enfer's customers include market leading Original Equipment Manufacturer (OEM) companies in the following market segments:

- Communications segment, including network and switching equipment that provide the infrastructure backbone of the internet
- Enterprise segment, including servers and enterprise scale storage devices
- Aerospace and Defense segment, including Avionics and aircraft electronic control systems
- Industrial segment, including automation and control systems

- HealthTech segment, including critical lifesaving and monitoring electronic equipment
- Semiconductor Equipment segment
- Smart Energy segment

Enfer aggregates the Aerospace & Defense, Industrial, HealthTech, Semiconductor Equipment and Smart Energy segments under the rubric of Diversified Markets. Further, the specific market segments that Enfer has engaged in [coupled with specific segment that they have exited; namely consumer electronics] is the consequence of the deliberate and conscious strategy of the company that was developed in the last 6 years; which is to grow Diversified Markets to become the largest segment within the company within a couple of years [it currently accounts for about 30% of the company's revenue] while also maintaining a significant presence in the two, more traditional, market segments of Enterprise and Communications. This strategy is an attempt by the Enfer corporate leadership to fulfill the vision of the CEO to differentiate Enfer from its major competitors by becoming the pre-eminent EMS provider in the Diversified Markets segment.

This vision is driven by the attributes of the Diversified Market segment which are characterized by longer life cycles, lower overall volumes but higher product customization [i.e. higher mix of products], high quality and reliability requirements and in, some cases, highly regulated industries [Aerospace and Defense and HealthTech]. These attributes confer these market segments higher average margins for EMS providers than the Enterprise, Communications and certainly Consumer electronics segments. The relative complexity of supply chain and



operational management of these Low Volume, High Mix [LVHM], higher quality, reliability and regulated industries also mean that higher exit barriers exist for OEM customers, thus dampening somewhat the commoditization of these segments. However, this has seen to be changing as more and more tier one EMS providers have also invested in capabilities, infrastructure and talent in the Diversified Markets market segments.

Enfer's strategy is reflected in the organization structure of the company. A simplified view of this organization structure is show in Figure 4. The Market or Customer segment [also referred to as the Business Unit] side of the organization is led by two Executive Vice Presidents; one for Diversified Markets and another for Enterprise and Communications. The Business Unit side of the organization is responsible for the performance of the individual customer accounts and market segments and is also responsible for the growth of the business, engaging existing and new customers within their respective segments. The Operations side of the organization is responsible for operational performance by individual factory site, which is then aggregated into regional operations performance.

The subject sites of this case study are also shown in Figure 3.1 as sites that report into the VP of South Asia. The next level detail of the organization structure in the South Asia region is shown in Figure 3.2

Mr. Yong is the VP of Operations in South Asia and is supported by his regional team. His regional team leaders are shown in the organization chart in Figure 3.2 in light blue shaded boxes. The Southern and Northern Sites are led by a

General Manager [GM] each. Mr. Raj is the GM of the Southern Site and is

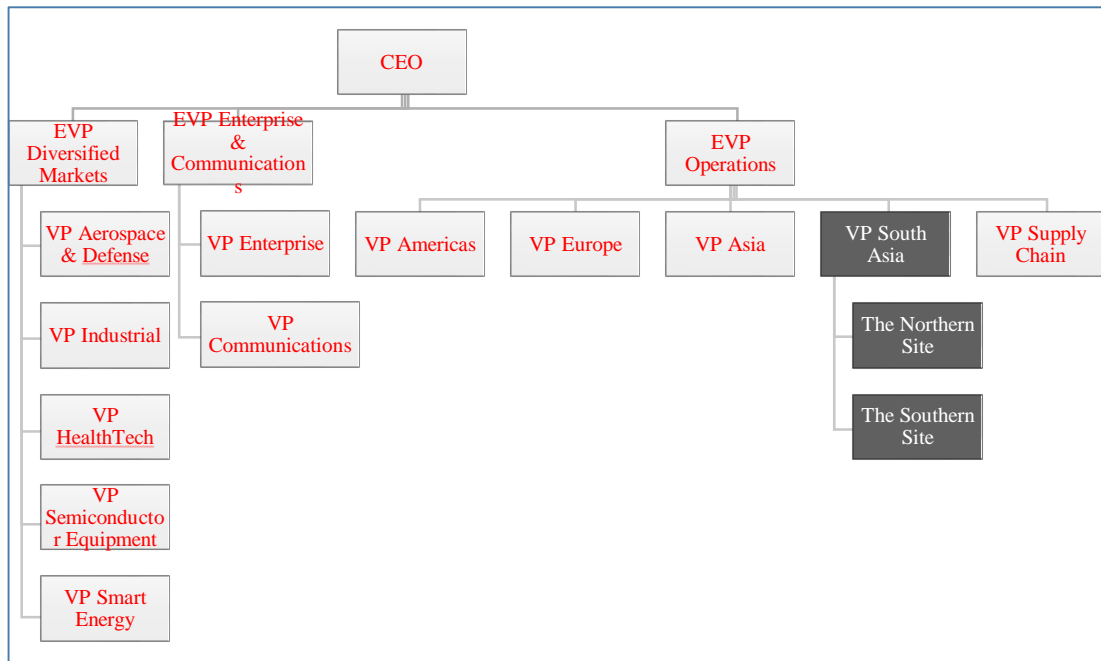


Figure 3.1 Simplified Organization Chart of Enfer Electronics

supported by leaders in various roles including Customer Focused Team leaders, Engineering, Supply Chain Management and various other support functions. The Southern Site leadership is shown in green shaded cells in Figure 3.2. Also shown [in simplified fashion] key leaders in the Northern Site [shown in gray shaded boxes].

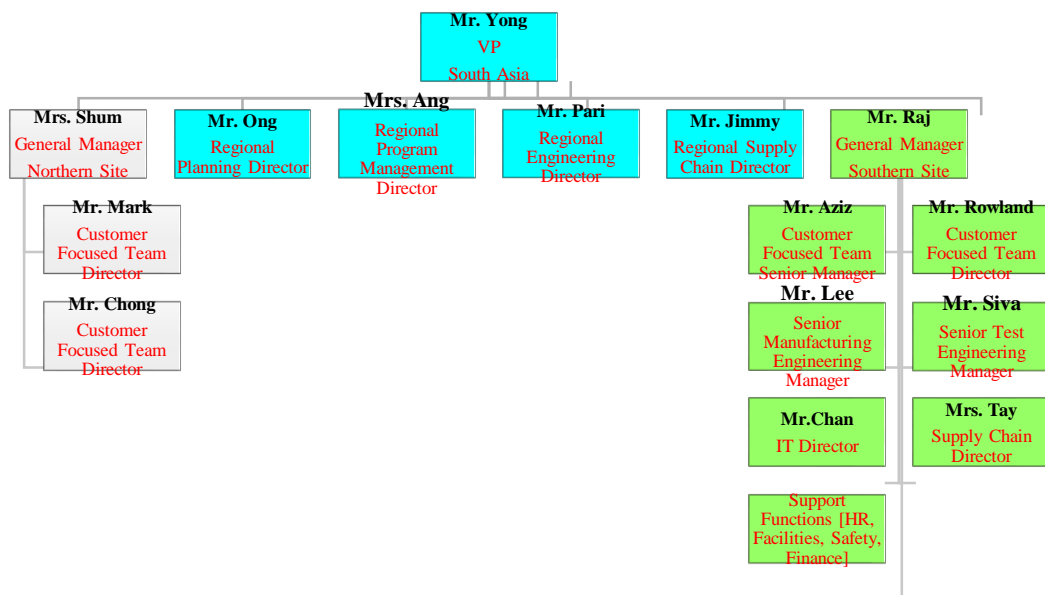


Figure 3.2 Organization Chart in the South Asia region showing detail of Southern Site organization structure

## **4. Case Issues**

### **4.1. Customer Satisfaction in an EMS Company**

Customer Satisfaction in an EMS company is typically reflected in three major objectively measured areas: Delivery Performance, Quality Performance and Costs as experienced by the OEM companies. Typically, metrics are defined to measure the performance in these areas. The performance metrics expectations are also sometimes included in the contract between the EMS Company and their OEM customers and may include penalty clauses or other remedies in the event the EMS Company does not achieve the performance expectations over a prolonged period of time. It is also possible that these metrics are tightened over time. As an example, the On Time Delivery [OTD] expectation of the OEM may start at a lower percentage at the beginning of the engagement and progressively increase over time to drive continuous improvements activities and efforts by the EMS Company.

Delivery Performance is typically measured by the On Time Delivery [OTD] metric or sometimes On Time Delivery to Request [OTD-R] metric. OTD is calculated as a percentage of products that the EMS Company delivered “on-time” [as measured against the required delivery dates stipulated by the OEM] over a designated period of time; which is typically a month. The higher the percentage, the better the Delivery Performance, to a maximum of one hundred percent. A simple example could be as follows:

- The EMS Company’s customer [the OEM] orders 1000 Units of products to be delivered in the month of January
- The EMS company is only able to deliver 950 units in January with the balance delivered the next month

- In this simplified example, the OTD-R for January is measured as  $950/1000 = 95\%$
- Let us assume that the contract between the EMS and OEM companies, in this example, stipulates that the expected delivery performance is 98%. As such, the EMS Company, in this example, is not performing to the expected Customer Satisfaction measurement. If the EMS Company persists in not performing to the expected OTD performance over an extended period, it may expose itself to penalties or other remedies, which could include termination of the manufacturing services contract by the OEM [i.e. loss of business for the EMS Company].

Quality performance is typically measured using the DPPM metric. Defective Parts Per Million [DPPM] is typically measured as the number of units of product delivered by the EMS company to the OEM that do not meet the quality requirements stipulated by the OEM over the number of units of products delivered within a period of time [typically a month] multiplied by one million. The lower the DPPM, the better the quality performance to a minimum of zero [no or zero defects]. A simple example could be:

- The EMS company delivers 1000 Units of product to the OEM in the month of January
- The OEM detects one unit of the product delivered that does not meet the stipulated quality requirements.
- Thus in this simplified example, the DPPM for January is measured as  $1/1000 * 1,000,000 = 1000$  DPPM

- Let us assume that the contract between the EMS and OEM companies, in this example, stipulates that the expected quality performance is 500 DPPM. As such, the EMS Company, in this example, is not performing to the expected Customer Satisfaction measurement [there are more defects than are expected in the month]. If the EMS Company persists in not performing to the expected Quality performance over an extended period, it may expose itself to penalties or other remedies, which could include termination of the manufacturing services contract by the OEM [i.e. loss of business for the EMS Company].

Costs, as experienced by the OEM, is typically a measure of the unit price of the products that are manufactured by the EMS Company. There are other costs that OEM experiences from the EMS Company, in the shape of various Not Recurring Expenses [NRE] or Purchase Price Variances [PPV] due to one-off events that drive additional costs above and beyond unit price of products that the EMS Company charges the OEM. Generally, there is an expectation that the costs for the OEM Company reduces over time and in some cases, these cost reductions [i.e. EMS price reductions] are stipulated in the contract for a given period of time.

Apart from these objective measurements of customer satisfaction, there are usually subjective elements that contribute to the overall Customer Satisfaction of an OEM relative to the performance of EMS companies. This may include responsiveness of the EMS Company's personnel to inquiries and requests for data or reporting, flexibility of EMS Company as reflected in their ability to respond to

changes in the requirements from the OEMs and general ease of doing business with the EMS Company. Generally, these elements are not measurable but is reflected in “escalations” from the OEM to senior management representatives of the EMS Company. Escalations usually involve communications of dissatisfaction via emails, phone calls, meetings or conversations between members of the OEM team to senior members of the EMS Company’s leadership team.

We begin the Case Issue description with a review of the Northern Site’s Customer Satisfaction performance to establish that the Northern Site can be used a benchmark for Customer Satisfaction Performance within the context of this EMS company, Enfer Electronics.

We then review similar data from the Southern Site to understand the Customer Satisfaction situation there and also to understand impacts to the company of the poor performance there.

#### **4.2. The Northern Site – a benchmark of Customer Satisfaction**

The Northern site was a Greenfield investment from Enfer and started operations in the 1999. In the first eight years of operations, the customer base for the Northern site reflected the prior undifferentiated strategy of Enfer with customers from a wide variety of market segments, including Storage, Enterprise, Communications and Industrial segments. An average of five to seven customers were present and serviced at the site during these first years.

However, in line with general industry trends, some of these customers started to be relocated to lower cost regions [whether to Enfer's own lower cost sites or losses to competitors], particularly from the Storage, Enterprise and Communications segments. This resulted in declining revenues for the site. At about the same time, early efforts at outsourcing to Asia from OEMs in the Aerospace segment began and the Northern Site gained an OEM customer with small initial annual sales [initial revenues from this customer was less than USD5 Million annually]. Aerospace customers, up to that point, had not significantly outsourced manufacturing to Asia probably due to concerns of quality and reliability of Asian EMS suppliers and given the highly regulated nature of Aerospace. However cost pressures eventually began to tell and the Aerospace segment eventually succumbed to the need for lower costs electronics manufacturing.

This confluence of circumstances lead Enfer to consider refocusing the Northern site's efforts to this newly emerging segment and so, in 2007, it was declared that the Northern site would make all efforts to put in place capabilities, infrastructure and talent to become a designated Aerospace Center of Excellence for Enfer in Asia. This began the journey of the Northern site over the next years in the Aerospace segment. At the moment, the site hosts four customers; all of whom are in the Aerospace segment.

The strategies and strategy implementation of the organization to become an Aerospace Center of Excellence culminated in the site's emergence as the world-wide leader in its market segment on the back of 12.8% Compound Annual Growth Rate [CAGR] in this segment from 2007 to 2014. Further, the Northern site was

awarded Supplier Gold Status by one of its four customers, United Electronics, in 2015. With this award, United Electronics provided formal acknowledgement that the site's performance is Best in Class in Quality, Delivery and overall Customer Satisfaction. The site has also emerged as the electronics manufacturing outsource Market Share leader for United Electronics. Sales to United Electronics represent 14% of the Northern Site's annual revenue.

A second customer of the Northern site, Minneapolis Regulator Company (MRC) conferred upon them the award of APAC Best Delivery of the year [2014]. This was a reflection of the outstanding performance in On Time Delivery to Request, a metric measured globally for all individual sites supplying to MRC. The site also emerged as the Market Share leader for MRC. Sales to MRC represent 58% of the Northern Site's annual revenue.

The site's overall Customer Satisfaction indices for the past fifteen months also reflects the high levels of performance in key Customer Satisfaction metrics of quality and delivery as shown in Table 1. Green shaded cells indicate performance that meets or exceeds the customer's targets for those metrics in the particular periods of time. Yellow shaded cells represent non achievement of targets but within acceptable limits while red cells represent unacceptable performance levels against targets. We observe from Table 1 the following:

- The Northern Site displays consistent Delivery Performance at or above the levels expected by their customers. This is seen across all four of the customers for many consecutive months. For three of the four customers, the Northern Site's delivery performance is very close



to the maximum possible or “perfect” performance of 100% for all of the fifteen months of data collected. For these customers, the straight average [average of all OTD percentages for all months] is 99.2%. For the fourth customer [IFS], the straight average for the fifteen months is 92.4%. Although significantly lower than the average for the three other customers, it is still better than the expected performance from the customer. The lower target is a reflection of the difference in business model of the IFS customer. IFS has a Configure-To-Order business [CTO] model where the final configuration of the product is not known until the very end of the process. This drives significant variability in the demand requirements that the Northern Site has to fulfill. This, in turn, results in a lower OTD performance requirement from the customer.

- The Northern site also displays consistent Quality Performance at or below the required DPPM levels for each customer across a sustained period of months. The quality levels [as reflected in the DPPM targets set by the customer] vary significantly, from 3500 DPPM to 500 DPPM, as a reflection of the different levels of complexity of the products across the portfolio of customers that the Northern site services.

Table 4.1 The Northern Site's OTD and DPPM Performance over the last 15 months

The Northern Site												
OTD-R	Minneapolis Regulator Company [MRC]			United Electronics [UE]			Miletus			IFS		
	Target	Actual	Status	Target	Actual	Status	Target	Actual	Status	Target	Actual	Status
Jan-14	98.0%	99.2%		97.0%	99.2%		98.0%	100.0%		90.0%	95%	
Feb-14	98.0%	99.0%		97.0%	99.0%		98.0%	100.0%		90.0%	79.0%	
Mar-14	98.0%	99.6%		97.0%	99.6%		98.0%	100.0%		90.0%	85.0%	
Apr-14	98.0%	99.5%		97.0%	99.5%		98.0%	98.0%		90.0%	93.0%	
May-14	98.0%	99.8%		97.0%	99.8%		98.0%	100.0%		90.0%	94.0%	
Jun-14	98.0%	99.6%		97.0%	99.6%		98.0%	100.0%		90.0%	100.0%	
Jul-14	98.0%	99.1%		97.0%	99.1%		98.0%	100.0%		90.0%	95.0%	
Aug-14	98.0%	98.9%		97.0%	98.9%		98.0%	100.0%		90.0%	94.0%	
Sep-14	98.0%	98.8%		97.0%	98.8%		98.0%	100.0%		90.0%	92.0%	
Oct-14	98.0%	98.7%		97.0%	98.7%		98.0%	100.0%		90.0%	90.0%	
Nov-14	98.0%	98.8%		97.0%	98.8%		98.0%	99.0%		90.0%	92.0%	
Dec-14	98.0%	99.5%		97.0%	99.5%		98.0%	100.0%		90.0%	90.0%	
Jan-15	98.5%	99.2%		97.0%	97.0%		99.0%	100.0%		92.0%	97.0%	
Feb-15	98.5%	98.7%		97.0%	97.0%		99.0%	100.0%		92.0%	94.0%	
Mar-15	98.5%	99.0%		97.0%	98.0%		99.0%	97.0%		92.0%	97.0%	

DPPM	Minneapolis Regulator Company [MRC]			United Electronics [UE]			Miletus			IFS		
	Target	Actual	Status	Target	Actual	Status	Target	Actual	Status	Target	Actual	Status
Jan-14	3500	1790		550	0		2500	6444		500	0	
Feb-14	3500	2503		550	712		2500	434		500	306	
Mar-14	3500	7483		550	279		2500	408		500	0	
Apr-14	3500	3424		550	0		2500	261		500	0	
May-14	3500	1524		550	547		2500	886		500	127	
Jun-14	3500	3182		550	0		2500	582		500	98	
Jul-14	3500	1448		550	0		2500	300		500	0	
Aug-14	3500	1095		550	0		2500	0		500	0	
Sep-14	3500	1998		550	275		2500	618		500	0	
Oct-14	3500	1868		550	0		2500	371		500	177	
Nov-14	3500	3096		550	0		2500	1559		500	155	
Dec-14	3500	3442		550	0		2500	352		500	0	
Jan-15	3000	2381		550	437		2000	0		500	162	
Feb-15	3000	1899		550	534		2000	0		500	130	
Mar-15	3000	2046		550	428		2000	0		500	0	

<ul style="list-style-type: none"> <li>- Awarded APAC Best Delivery of the year [2014].</li> <li>- Sales to MRC represent 58% of the Northern Site's annual revenue</li> <li>- Northern Site has largest share of MRC's outsourced business. MRC has 3 major EMS providers and multiple smaller providers</li> </ul>	<ul style="list-style-type: none"> <li>- Awarded Supplier Gold Status [Best in Class in Quality, Delivery and overall Customer Satisfaction]</li> <li>- Sales to UE represent 12.8% of the Northern Site's annual revenue</li> <li>- Northern Site has largest share of UE's outsourced business. UE has 2 major EMS providers and multiple smaller providers</li> </ul>	<ul style="list-style-type: none"> <li>- Sales to Miletus represent 6.2% of the Northern Site's annual revenue</li> <li>- Northern Site has largest share of Miletus's outsourced business. UE has 2 major EMS providers and multiple smaller providers</li> </ul>	<ul style="list-style-type: none"> <li>- Sales to IFS represent 23 % of the Northern Site's annual revenue</li> <li>- Northern Site has largest share of IFS's outsourced business. UE has 2 major EMS providers and multiple smaller providers</li> </ul>
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### 4.3. The Southern Site – poor Customer Satisfaction

In contrast to the Northern Site, the Southern site was part of an acquisition made by Enfer over ten years ago of a small, regional EMS company. This acquisition brought with it an existing portfolio of eight customers. These customers were from multiple segments and shared little in common; ranging from very high volume, low mix businesses with short product life cycles to low volume, high mix

businesses with longer life cycles. They were from different market segments, including Enterprise Storage, Industrial, Computing, HealthTech, Industrial Automation, Communications and Consumer electronics segments. The sizes of the customers also varied significantly; the largest being an order of magnitude larger than the smallest couple.

However, again in contrast with the Northern Site, the Southern Site did not experience any consolidation of the customer base and continues to host and service a wide variety of customers with significantly varying needs and competency, infrastructure and talent requirements.

Recent events highlight the challenges the Southern Site is facing relative to Customer Satisfaction. These events are as follows:

- Osmium [a Communications segment customer] has issued an official notice of discontinuance of services. This was communicated in late December, 2014  
  
This loss represents a 5% reduction of the Southern Site's annual revenue.
- Ultrasite [a HealthTech segment customer] issued an ultimatum in early January 2015. The site is required to recover delivery by March 2015 or face termination of contract. Referring to Table 3 for the OTD Metric, we observe that the Southern Site has performed very poorly in Delivery Performance in seven of the last fifteen months, recording OTD lows of 35%. As the Southern Site has not been able to meet the required delivery of products from Ultrasite, Ultrasite themselves

have not been able to fulfil their own delivery commitments to their end customers. This has resulted in loss of Sales revenue [which also impacts their profitability] to Ultrasite and potential loss of market share to their competitors.

Sales to Ultrasite represent approximately 8% of the Southern Site's revenue.

- Ocular Electronics [OE, another HealthTech segment customer] escalated poor quality performance to the CEO of Enfer in the final quarter of 2014. OE subsequently demanded and received significant extension of pay terms. OE argued that the Southern Site's poor delivered quality limited OE's ability to sell product to their customers, thus constraining their cash flow. Referring to Table 3, we observe extremely low Quality Performance [very high levels of DPPM or defects] in late 2014 and 2015 to OE. This has also impacted the Delivery Performance as the defective products had to be returned to the Southern Site for repairs and thus, could not be counted against the required quantity of product delivered on-time. Sales to OE represent approximately 6% of the Southern Site's annual revenue.
- General Instruments [GI, an Industrial segment customer] has put the Southern Site on a six month probationary period, beginning January 2015, pending evidence of performance improvements from the Southern Site. This puts the Southern Site out of contention on any and all new business opportunities GI has for their EMS partners. Referring to Table 2, we observe that the Southern Site's Delivery