TCI LEADERS IN LOGISTICS

Logistics Focus

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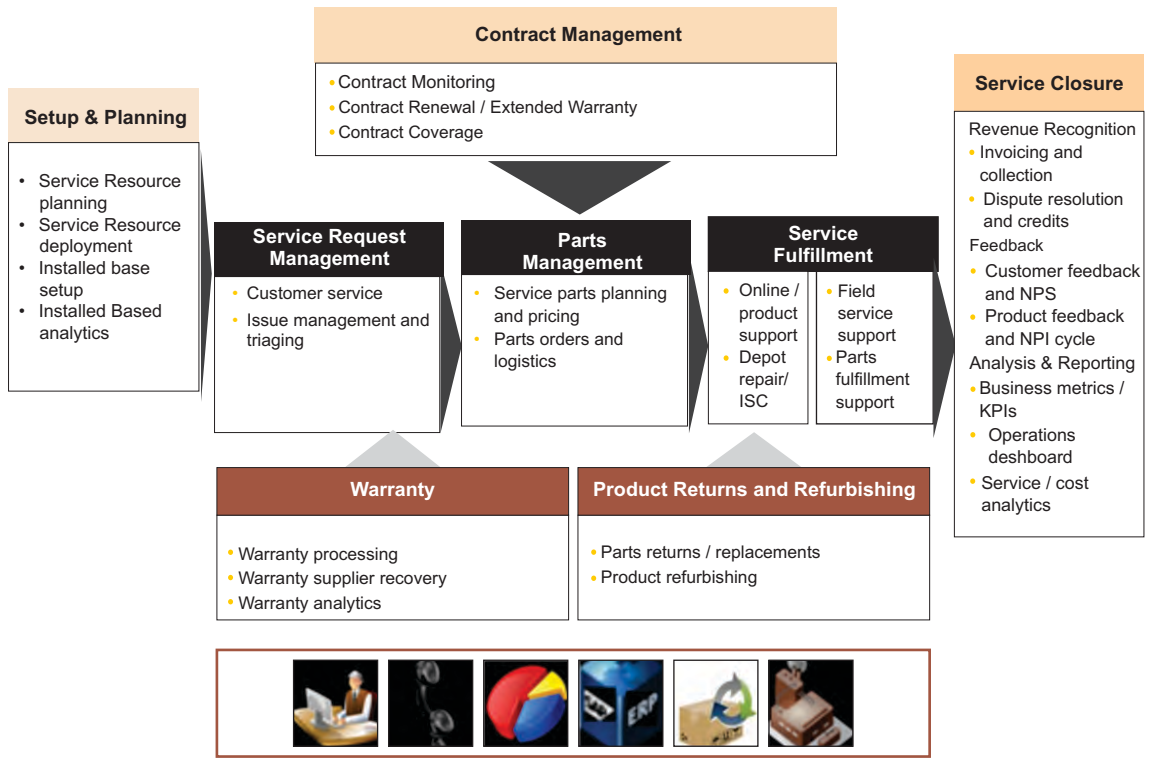
AFTER MARKET SERVICES

Foreword

The criticality of 'After Market Services' in manufacturing and service operations cannot be understated. Given factors like demand unpredictability, part alternates, parts indigenization, fakes and tight control on spare parts inventory coupled with high service levels (wherein Customer is the King!!!), the imperative to accurately forecast spare parts and services requirements, and to optimize on inventory requires significant decision support & capable software. Performing on objectives such as these helps improve profitability and achieve strategic goals such as customer loyalty and lock-in. This issue looks at the various facets of spares and service management from primarily an Aftermarket Services (AMS)perspective. AMS space brings in the complexity of managing customer requests, field services, and parts logistics in a cohesive manner. The issue also examines the space from a People, Process and Technology approach.

Overall "After Market Services' can be best depicted by the model below:



Mr. Gopalakrishnan V K
Vice President and Global Practice Leader - Genpact

GENPACT
INTELLIGENT ENTERPRISES POWERED BY PROCESS

Editorial

One of the world's emerging markets with the greatest aftermarket potential is India — the second most populous country with more than 1.2 billion people, which supports 40 million vehicles and has achieved $145 billion in vehicle sales. Despite its market potential, India's vast geography presents limitations to maintaining business efficiency. Aftermarket services are an important part of any supply chain. A strategic aftermarket service not only improves customer service levels but also reduces the burden on other elements of the supply chain.

The criticality of spare parts management in manufacturing and service operations cannot be understated. Manufacturers rely on their service and aftermarket parts business to deliver 20-30% of their total revenues and nearly 40% of profits – some estimates go even higher. Spare parts, returns, repair items and products for Maintenance, Repair and Operations (MRO) can provide a stable cash flow.

The aftermarkets logistics in India has been receiving greater attention in the last few years . However the challenges to optimizing aftermarket logistics in India and to bring it up to global standards are varied and indicative of those of developing countries.

A special thanks to Mr. Gopalakrishnan V K of GENPACT who is the Key Author of this issue & has Immensely contributed on the (overall) theme.

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about TCI

TCI group with a revenue of INR 22 Billion (Approx. $ 440 Million USD) is India's leading Multimodal Integrated Supply Chain Solutions Provider with a Global presence.

With expertise developed over five decades, customer centric approach and world class resources, TCI is equipped with an extensive set up of 1000 plus branch offices, a large workforce, huge fleet of customized vehicles and managed warehouse space of 9.50 million sq ft.

Leveraging on its extensive infrastructure, TCI offers seamless multi-modal logistics solutions and moves 2.5% of India's GDP by value and has a well performing script in premier stock exchanges like Bombay Stock Exchange and National Stock Exchange.

TCI is also a part of World Economic Forum's Community of Global Growth Companies (GGC). GGC is a platform to engage dynamic high growth companies with the potential to be tomorrow's leader and become a driving force of economic and social change. TCI's membership at GCC is a reflection of its consistent growth, its potential and its initiative to build global business and exemplary executive leadership.

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General Overview of Aftermarket Services

Spare parts inventory management shares many traits with standard inventory management, but requires an extra layer of cost consideration.

Whether a maintenance and repair organization (AMS) is internal to a larger business, or providing maintenance services to an external customer, efficient spare parts inventory management plays a critical role in reducing costs and maximizing customer service.

For this example, we will look at an internal AMS to a production facility. These five steps collect the information you need for executing effective spare parts inventory management.

Step #1: Understanding existing (or projected) consumption

Because repairs happen due to system failures, rather than as part of a production plan, many logistics professionals overlook consumption predictions.

Depending on the age of the AMS, spare parts consumption can be based on either actual historic consumption, or projected based on equipment manufacturer preventative maintenance recommendations and fleet records of other system owners.

Step #2: Calculating system failure costs

In-stock levels and the size of your on-site inventory should be directly linked to costs of system failure or “down time”. Every machine in a production facility plays a role.

Some have redundancy, like the multiple forklifts in a warehouse, while others act as a single point of failure for the whole building, such as an automated full-building outbound sorter.

Step #3: Estimate soft cost impact of out-of-stocks

It is a picture familiar to many industry professionals: parts hoarded in toolboxes, a spare motor under a desk in the maintenance supervisor’s office, or the "secret stash" closet with thousands of dollars worth of parts.

Reducing inventory dollars on the books as part of spare parts inventory management can lead to an off-books rise in inventory costs. You are guaranteed these behaviors will start when your out-of-stock rate in your frequently requested spare parts inventory reaches 4-5%.

Step #4: Work with vendors for cost-reduction and in-stock improvement

In many instances, leveraging vendor relationships will allow you to reduce your overall inventory dollars and keep better in-stocks.

Rather than using your own time and resources to monitor spare parts usage, establish reorder points, and project parts required for preventative maintenance, the

manufacturer can often provide you a starting point for your stocking levels.

In the best cases, you can find vendors willing to provide spare parts inventory management on a consignment bases: you pay only for parts consumed.

Step #5: Calculate costs (hard and soft) of expedited orders

It is sometimes impossible to maintain a spare parts inventory for every contingency. The key is to establish an expedited spare parts ordering process and understand the costs involved. This allows subordinate managers and maintenance person to make good decisions on what to expedite and what to order on standard orders.

Step #6: Managing the process to optimize costs

When you look at the process dimension, multiple activities and sub-activities are measured by Key Performance Indicators (KPIs) at various stages in the operating process. All these link to optimizing costs depending on the effectiveness and efficiency of the process. For instance, Insights from market data indicate that measuring Field Response TAT or Parts TAT individually are not adequate. Metrics like "% Reduction of Service Request on hold for parts" are vital in measuring the "effectiveness" of the process.

There is a thus a need to look at processes scientifically and execute them effectively

These six steps are just the beginning to achieving optimum spare parts inventory management. From these basics, you can measure, evaluate and further stream line your spare parts inventory control processes.

Cost reduction, increased system availability, and improved moral because workers have the tools they need to do their jobs are just some of the benefits you can experience.

About the Author

Atul Endlay has over 10 years of experience in the Warehousing industry. Atul is a North India head of warehousing operation at TCI. He has been closely working with many large clients with a global footprint for their warehouse site selection and disposition requirements throughout India.

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Global Aftermarket – The New Paradigm in Service & Logistics

Whatever we buy we expect to work, and if it breaks under warranty, we expect the manufacturer to fix it—quickly, efficiently, and cheerfully. When that happens, customers cannot praise the company's aftermarket services highly enough; when it doesn't, the whole brand suffers. Studies have shown that superior AMS produces up to 30% of net revenues for businesses smart enough to make field service a competitive differentiator. These companies have managed to convert a complicated cost center to a profit center—but how?

When we think of logistics, usually we think of warehouses, trucks and capacity—the hard infrastructure. Or perhaps it is outcomes that concern us: time to deliver, costs, etc. Yet these things are inextricably linked, so how do you make one positively impact the other?

Linking services to logistics opens up huge opportunities to drive productivity and lower costs from end to end of the supply chain. By building a "soft" framework of skilled people, smarter processes and integrated technology around the "hard" physical infrastructure, supported by a measurement system to identify and link key performance indicators (KPIs) to business objectives, we can measure processes and operations to understand

gaps and drive significant improvement. To demonstrate how this works, let us look at this approach as applied to aftermarket services (AMS), an area of increasing importance within the logistics sphere.

The Increasing Challenges of AMS

Whatever we buy we expect to work, and if it breaks under warranty, we expect the manufacturer to fix it—quickly, efficiently, and cheerfully. When that happens, customers cannot praise the company's aftermarket services highly enough; when it doesn't, the whole brand suffers. Studies have shown that superior AMS produces up to 30% of net revenues for businesses smart enough to make field service a competitive differentiator. These companies have managed to convert a complicated cost center to a profit center—but how?

The global AMS picture is growing more complex daily as supply chains try to source parts advantageously for fulfillment in established and emerging markets around the world. Shipping parts from China to a regional warehouse in the U.S. for installation in any of hundreds of locations means managing a widespread service network of transportation, local service centers, warehouses, and third party service providers. At any step along the way communication can break down, leaving your field engineer without the proper part at the specified time, confronting an unhappy customer with a broken machine.

To overcome this scenario, the field service operation must be tightly integrated with logistics and administration, producing a seamless linkage between customer contact and service fulfillment. According to a Blumberg study, service requests requiring parts to complete the transaction range from 28-73%, making effective inventory management an imperative. Likewise, managing product returns is an increasing cost for many companies, while new regulations are driving tighter requirements for managing warranties. Many businesses struggle to connect front-end customer contact with back-end service fulfillment in ways that meet customer expectations. Others have no insight into their overall cost to serve. The lack of a single integrated technology solution which would provide a "magic bullet" for managing the end-to-end AMS supply chain can make the whole operation seem too complex to tame.

Fortunately, that is not the case.

Integrating "Front" and "Back"

Many field service operations are local, with dispatch, parts ordering and customer service managed from hundreds of locations. This often results in huge

inventories of unnecessary or obsolete parts, duplication of effort, poor allocation of personnel resources, high costs, and slow turnaround and response times.

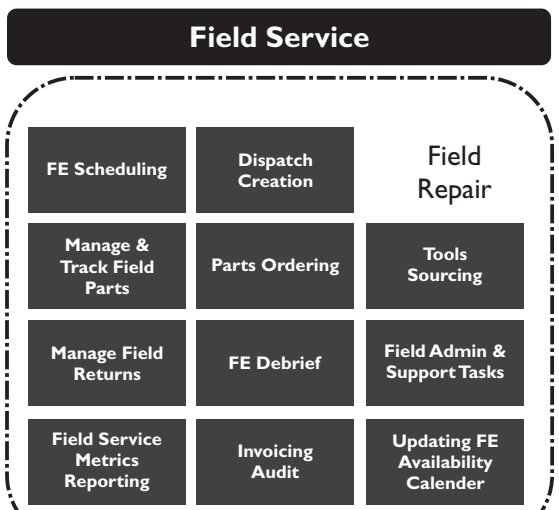
A truly effective AMS operation looks at ways to integrate the front-end service operation with back-end administration. Many companies are finding that partnering with a service provider can help them maximize the effectiveness of their existing personnel and service infrastructure. Rather than outsource the AMS operation, which many companies resist, these enterprises tap the provider's global delivery capabilities to quickly attain a stronger mix of talent, smarter end-to-end processes, and technologies that integrate logistics, service fulfillment and customer relationship management into a single platform.

Field service and logistics are often treated as separate entities, each with their own management, information, and reporting system. Integrating these "building blocks" creates a system that speeds up parts fulfillment at lower cost, while freeing field service personnel to focus on actual repairs rather than administrative tasks.

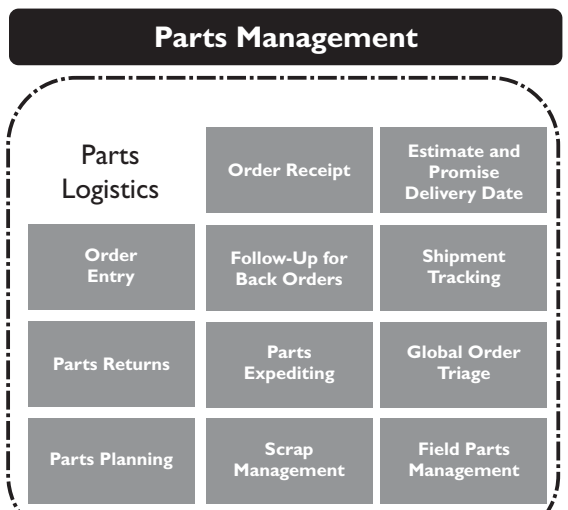
The Foundations of Superior AMS

Better AMS rests on three equally important factors: the right processes, used by the right people, built on the right technologies.

PROCESS : More effective service is built on more effective processes, from customer contact to parts management to field service dispatch. Better processes are in turn driven by analytics that measure and benchmark performance against best in class. Key performance indicators such as the percentage of service requests filled on time or on hold for parts, the percentage of reduction in service costs, and first time resolution, drive performance and higher customer satisfaction. Good metrics allow AMS organizations to provide more targeted service delivery with better management of parts inventories and personnel time. Service need-based segmentation of customer data profiles

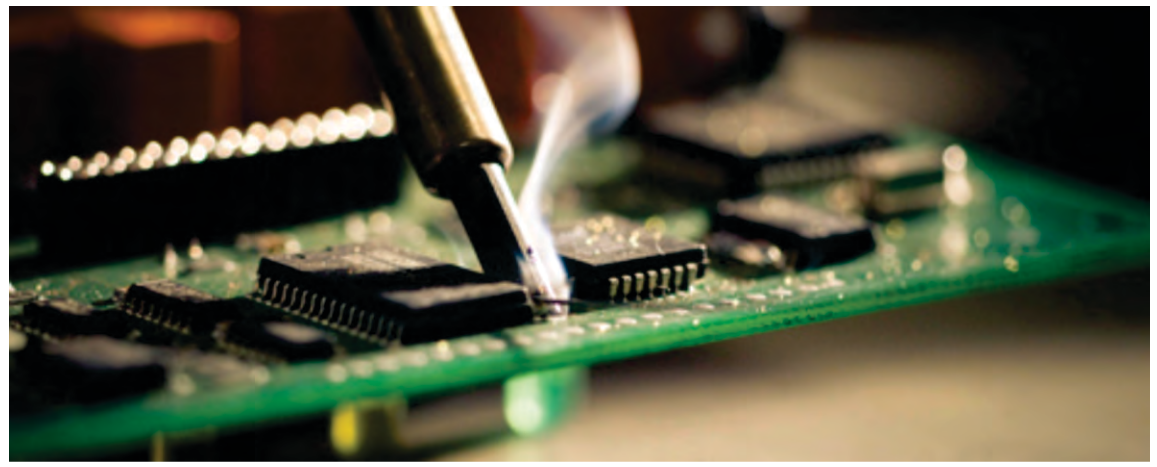


Field admin time vs. wrench time



Parts velocity vs. fulfillment support costs

Such an arrangement, particularly when created in partnership with a service provider already versed in AMS operations, quickly realigns the field service organization into a more effective integrated operation. Local execution of service is supported by a common central platform. Tighter processes and controls reduce revenue leakage and shorten cycle times. For one global energy services company, redesigning the parts management and shipment process reduced its working capital requirements by $23MM per year and shortened its pick to pack cycle from 48 hours to 8.



actual customer requirements against service types. This allows the service organization to predict service needs, eliminate unnecessary work, and optimize costs, resulting in a balance between customer satisfaction and cost to serve.

PEOPLE : Shifting tasks such as customer service, scheduling, and parts order management to administrative personnel frees highly trained local field engineers from routine administrative tasks to more actual “wrench time.” A service provider can help you quickly revise or expand the service operation by tapping a deep pool of personnel already trained on the optimal processes, or help to manage third-party service providers in emerging markets where the provider already has a presence.

TECHNOLOGY : Because there is no single integrated technology solution for AMS, it is necessary to understand the nature of the individual business and its needs in order to attain the right mix of tools that will support a consolidated platform. The technologies chosen support rather than drive the processes, providing seamless, end-to-end access to information so that there is clear visibility for all parties into the status of any order at any stage of fulfillment.

Aftermarket services built on these foundations utilize a seamless flow of information from the first customer contact to order close. By improving its end-to-end process for ordering and tracking parts, one healthcare major that provides support to an installed base of equipment reduced its field inventory of critical repairable parts by 70%.

Driving Growth Through AMS

Forward-looking companies view superior field service as a powerful differentiator, cementing customer loyalty around their brand. They are crafting and implementing strategies for linking logistics and field services in ways that produce high customer satisfaction, efficient management of spare parts and personnel, and a lower overall cost to serve. In this era of tight margins and increasing competition, every manufacturer should be taking a close look at reshaping its AMS operations in ways that produce long-term, sustainable profits.

About the Author

Mr. Gopalakrishnan V K (Gopal) is Vice President and Global Practice Leader for Genpact, a global leader in business process and technology management, where he is responsible for strategy, growth, and P&L for the After Market Services business.

In a career spanning 17 years, Gopal has played key roles within manufacturing and automotive industries, as well as IT and outsourcing and as a consultant, specializing in supply chain/logistics and aftermarket services. He has created and led new businesses and engagements in multiple geographies, including the U.S., Asia Pacific, South Africa and India. He has held key leadership positions in the manufacturing and automotive industries, managing business P&Ls. In his industry roles he drove multiple initiatives, including the Deming Prize, new product development and logistics optimization for global majors. Gopal worked with Deloitte as a management consultant, and has implemented process and cost management programs across multiple industry segments. As an entrepreneur he also created a technology IP company that led to global commercialization for patents developed.

He is a recognized thought leader and speaker in the supply chain and aftermarket services space, serving as a member on leading forums in India and abroad. Gopal sits on the Board of Advisors at Arizona State University's Center for Services Leadership, is a member of the National Logistics Advisory Council of CII (Confederation of Indian Industry), and Vice President of the Delhi Roundtable for Council of Supply Chain Management Professionals (CSCMP). A Mechanical Engineer, he also holds a masters' degree in Business Administration. Gopal lives in Gurgaon, India

3 Auto Supply Chain & Management: Outbound in After Market SCM

Trends & Challenges

The service business is completely different from the factory. Both of them encompass Supply Chain Management, but with a huge difference. Both are complex. But there is a difference. Just to bring out the difference; In terms of the demand, there are certain factors that contribute to it in the factory and there are certain things you can do in making supply possible. As far as the factory is concerned it is largely make or buy. Coming to the aftermarket, there is a whole bunch of reasons why you need the parts and there is a whole bunch of ways in which you can make those parts available. This is one major reason why we believe that the aftermarket supply chain is completely different form the factory supply chain.

The drivers for the business for the aftermarket and the factory again are completely different. Looking at all the dimensions listed here, the approach to manufacturing is just in time (JIT), whereas the approach to service is just in case (JIC). Now let us look at volumes which is about, we have products and we have parts in the factory whereas, in the aftermarket we have products and parts in different locations so what is important is how much of a part or how much of a product do you have in a particular location? So the

volumes and the factors for the volumes are different.

Moving onto Inventory Flow, the Inventory Flow in the factory is one way, while in the aftermarket is two ways. We all know there is reverse logistics. The next one is part chaining. This is probably one area where the aftermarket is significantly different. The aftermarket manager has to worry about all the different versions of the products that have been built till date, because those need to be serviced, whereas, the factory manager need only to worry about the ones currently being produced. If a part has got replaced, it is history. There is no reason to be worrying about the part any more. So these are some the dimensions, factors that affect Supply Chain Management strategies in the aftermarket.

Let us take globalization, the things that they do in order to face the challenges in its wake – attempting to build systems and build more and more visibility; ability to scale and visibility in the market. Systems that can scale because a company that can market, one that used to be in one market is now in five markets and is also aggressively looking to move into more markets. One should be able to scale up very quickly and should have the visibility. These are the things that companies are trying to build into their systems today.

How does mass customization impact the trends? Mass customization is something, which affects not just the markets, but production itself. It is important for companies to understand what are the trends and to be able to identify the leading indicators. This is possible using information technology. One of the ongoing challenges is consolidation, which means that there would be opportunities to integrate more tightly in terms of information systems. There is going to be lesser data points, meaning that the quality of that data point is it is going to be more and more important. One need to share more information with the dealers and sharing it more often. We see companies rising to the standards of producing greener vehicles by having more and more electronics in the vehicles to meet the Green Standards. It is not the same thing as storing a crankshaft and storing an electronic item in the warehouse. More things need to be done for stocking electronic items. Moreover, electronic items are not built by the auto company, but brought out, meaning that some of these parts are the same across companies. Pricing these in the after market is becoming a challenge since the end customer can actually buy it from the person who makes it.

There are companies, which are coming out with strategic pricing solutions using presently available information technologies. The ability to change prices dynamically, for spare parts almost on a daily basis, based on what is happening; say for example the grey market is a possibility today. There are companies that have eliminated the grey market just by implementing strategic pricing solutions. We are referring about the US here.

The last point is how do you face the challenge of proliferation of information, the consumers are becoming smarter, they know more now and have access to more information. So how does one tackle this? Go back to the basics. Focus on Cost, Quality and Timelines of your service. There are information technology solutions that can help you provide timely service of the right quality in the right price.

Let us look at some of the challenges. We have seen we have been talking with India Auto Majors for Information Technology solutions, especially in the parts and spare parts planning area. This is an area where we find the problem today. Part chaining is available mostly in bits and pieces. There is no systematic way of logging part chaining or part substitution information and since all the companies have this drive towards greener vehicles, there is a lot of part chaining and substitution happening. But that information is not being communicated to the aftermarket department, with the result when the car or the vehicle comes back for servicing, there are delays.

The planning methodology used for planning your spare parts network today is largely based on Excel. Excel is probably the best technology that is being used today and of course a lot of tribal knowledge of the person undertaking the planning. This is changing and we see companies showing interest in enterprise planning solutions. Nevertheless, it remains a challenge for large auto companies in India. Planners are doing mostly expediting, rather than analysis and planning. This needs to change as well. All of those listed above, result in higher inventory, lower service rates, and obviously very poor process. Another important aspect is that the grey market is more pronounced in India, compared to the Developed World. These are some of the challenges that we see in the Auto Industry in India, in addition to the global challenges already mentioned.

There are two areas where strategic partners of LSP, have been able to directly contribute in terms of impact - Spare Parts Planning and Warranty Analytics. By implementing parts planning solutions, they have been able to see 5-30% increase in parts availability, upto 50% reduction in inventory, reduced repairs and ordering costs and increasing visibility and productivity. This is what they have been able to see across all the Auto Companies we have been dealing with. Another area they have been able to impact is the area of warranty analytics. The ability to design your warranty programme in such a way that the customer feels happy about it and

the company still remain profitable. There are certain things, which have been written there which are part of the information solutions they have been able to offer. There are a couple of examples of auto companies which they have been able to contribute in terms of parts planning solutions for their designs and dealers and part pricing; a leading automobile company for the trucks. A Construction Equipment Manufacturer, have helped again with the entire Supply Chain from suppliers to dealers. For Forklifts, they have carried out dealer inventory management. For they have done DC Phase II. Drainage Channel Company and Agricultural Equipment Manufacturer, they have done global parts, price management as well as parts panning, For a leading automobile and motorcycles company, in India they are doing parts planning and both at the DCs as well as the dealer level.

Let us look at an example of an automobile company and give some more detail about what they did; Parts Management for the distribution centre, they have been able to increase the fill rate by 20% and bring down inventory by 50%. The parts Management for the dealer, dealer turns have increased to greater than II, there is reduced buy back and returns, they have eliminated grey market completely, and has increased sales and profits, by upto 15% and the dealer relationships have got stronger now. In terms of pricing management solution that they have done, they have reduced complaints from the dealers about the price. Their annual parts revenue has increased by 15 million US $. This is one case study where they have implanted solutions.

One more case for an automobile and motorcycles company, in India, where they are doing parts planning. This is something being implemented right now. They have not really seen the benefits yet, but to share the objective to achieve. They have the four wheeler business, the two wheeler business and the Power Products business. All these business, the aftermarket is handled by one entity, which is implementing the solution. There are six different host systems. Because these are talking to the four wheeler companies, talking to the two wheeler company, they are talking to the parts planning, they are talking to the Power Products Division, there is need to integrate with six core systems, to increase their service levels, to minimize back orders, to optimize inventory in their national parts centres, in their regional parts centres and the dealers in terms of costs and in terms of time. They want to have part wise, location wise forecast for each part. They want to have a system that can give them a reliable, expected time to deliver and eventually when the CST Regime is in place, they want to move to one National Parts Centre, so they transition into it smoothly in the year 2010.

Differentiate between Supply Chain for manufacturing as well as after sales.

When we talk of the Supply Chain we talk of the whole, including service and return management. So how you are trying to differentiate between these two things? So when you are talking about the Supply Chain we are talking of the whole including after market, return management everything. So how are you saying, what are the micro-things you are trying to address?

Take for example inventory control in both the aftermarket as well as in the factory. Inventory control talks about how much are you going to consume, how much you are going to have in order to be able to consume. There is a minimum quantity, a maximum quantity, and there is safety stock. All these terms are the same in both cases. But the demand for parts in the After Market is completely probabilistic, whereas, the demand for parts in the factory, is deterministic. Say for example you know you are going to make 500 cars. But, you do not know there are two cars that are going to come in for repair today, since you have no idea. Maybe suddenly 10 cars will come in a day, may be on a particular day there will not be anything. The inputs to your planning are different and one has to use different tools for planning. The same tools cannot be used for planning. This is just one aspect of the difference. There are a whole bunch of differences like that.

But the point is when you come to a purchase like inbound Supply Chain, it is different. Talking about Inventory, Warehousing, Supply Chain requirements are different. You are talking about micro Supply Chains inside a Supply Chain. That is usually different for every function. When you are Inbound Materials, the Supply Chain strategies are different. When you compare the same points in the inventory, like the points put forth by you, it is different for every function. When one talks about Supply Chain, the after market Supply Chain is also considered. If one talks only about manufacturing and aftermarket, naturally they are different. If one speaks about buying and manufacturing, those are different.

Role of Technology for improving the efficiency of a warehouse Manager

We are to ensure that all resources in the warehouse in getting utilized efficiently. Today, the Warehouse Manager spends most of his time is spent in a room and very little time in the floor. This is not a good scenario. Instead, the warehouse manager requires to stand in a warehouse floor and use the data available in his desktop. Such a scenario is possible today using technology. This slide shows familiar warehouse operations. What are the pain points of

undertaking those operations manually? It is now possible to automate this process. The operations person in the warehouse needs a rugged mobile computer having scan facility, to be able to scan the location and the item. The computer that he has got will be able scan items in the long range, located in the far end of the wall, and should scan as well. Movement of items anywhere may be required. Hence rugged mobile computer with scan capability is a need, which should help the operator in the warehouse to be able to print labels and place address of the customer. Hence a cordless Bluetooth printer is required. The operator can hang up the printer and have a mobile computer that can do most of the job. He would also need a wireless LAN Network in the warehouse, that is connected to the back end system. Such an arrangement would enable to see data on the desktop and on his mobile computer. Update of the database is immediate and instantaneous recording pickups or scanning. If the warehouse operator receives an item, he reaches his scan, which immediately updates the inventory. Such a rapid process makes operations more efficient. These computers play a role in the receiving and put away areas. The rugged mobile computer with a scanner can be used to automate all the manual jobs.

The next aspect is put away pallet picking and cross docking. A typical put away location looks like this, where they go on a forklift and keep placing items on different shelves. When they do that they do need to instantaneously enter as they place the items. There are mobile computers that can be docked to the forklift, which can have push to talk facility, where they can talk to other operators or the manager. It can have a scan facility, where one can scan right as the items are being placed in the shelves. The wireless link gets the data updated in the system. The system becomes completely perfect in terms of data entry and all operations. This can be used in the shipping area as well as in the put away area. One can use this wherever there is forklift and other heavy equipment; one can enter information while carrying out the activity and use these facilities to automate the warehouse. Typical Managers Desk is filled with papers and computer desktop, spending very little time on the floor. One wants him to be on the floor, with the EDA kind of device, having all kinds of applications in the desktop. It has email, it has messaging, and the person will be able to make low cost VOIP calls using the wireless LAN Network, to the shop floor operators, thus making it more efficient. Sorting and picking will be made without a carry any list, getting instruction and acting like a robot. This is possible today and the person acts like a robot, updating the database. There are several wearable devices available, which can scan the item and updating the database for picking and sorting activity. The information can also be printed in certain cases.

Such devices can be used in the Sorting Area and Picking Space. Assets in the warehouse can also be managed using such equipment. Any warehouse contains a lot of assets in terms of Forklift, Trolley, all the assets. If all these assets are tagged with an RIFID Tag, RIFID readers can be installed and the assets always monitored including the location in which it is lying. This will ensure that assets in the warehouse are effectively utilized, and will reduce the firm ordering for more and more assets.

Technology solves all problems in the warehouse using this equipment. Wireless LAN Solution synchronizes all databases, all information on mobile devices, capturing all the information. Every warehouse function today is automatable and there is not need for pen and paper inside a warehouse. That is the trend. Not many warehouses in India have gone to this stage of automation, but there are warehouses that are moving towards this direction in the western world, say for example in the US, who are moving to complete paperless warehouses using these devices.

OE Spare Part vs. Market Replacement

Another question which the consumer always faces' is regarding the use of original equipment (OE) parts or spare part. There are generally two drawbacks which pull back the customer to use. One is the high cost of the genuine part and other thing is that low availability in the open market.

If you take OE parts, the specifications, the metal composition plays a vital role here. Any component manufacturer, fitting a vehicle, also takes care of the safety aspect of the passengers. So when you compare that with ancillary part any other non-genuine product, there will be huge specification variation in the metal also. There will certainly be price value added advantage in the OU product, with regard to availability. This is where the Commercial Vehicle Manufacturer was able to succeed in the their Project. Earlier what was happening is that they used to sell products but were not aware where it was getting consumed and why it was getting consumed. So with the project what they did was tracked exactly where the materials were moving and how they were being consumed. That really helped them to redesign the forecasting methodology. If you are able to make you material available, at the right place at the night rime, your customer will not suffer and should be able to get an OVA (original value added) product.

Metrics for Spare Parts

As mentioned, in the year 2003-04, prior to launch of the project, their turnover replacement was about Rs. 103 crores, which is about 17% of the market share.

has now gone up to 37% in the year 2007-08. In the earlier days they used to have volumes but they were not exactly aware where it will be reaching or where it will be moving. It was a blind calculation. Today, in the project they have a parameter, they have metrics, where they measure the length, breadth, width, what they do is try to map the total channel available, geographically, so how much parts have gone from where, secondly the range, number of items sold compared to the range, number of items sold compared to the earlier days. In that company they market each and every part which getting fit into the vehicle bumper to bumper, baring a few items like batteries and tyres. The volume they were drawing was with minimum number of parts. Today, they are trying to cover the entire range of parts being marketed by the Commercial Vehicle Manufacturer, and that is again comparable to the past and similarly the volume growth is being tracked. So in conclusion, there are variables but they have with metrics and visible!!

About the Author

To address the need of sharpening India Inc's competitive edge through better Logistics and Supply Chain practices, CII Institute of Logistics (CIL) was established in 2004 by the Confederation of Indian Industry as a Center of Excellence in Logistics and Supply Chain.

At CII Institute of Logistics we create a platform for the Industry to gain more insights into the emerging trends, industry specific problems of national importance and global best practices in logistics & supply chain management. We enable the industry to cut down the transaction cost, increase efficiency, and enhance profitability and enable to sensitize and bring solutions to macro level issues.

With a relentless aspiration to enhance logistics competitiveness in the industry, CIL provides a complete range of services such as:

- Events
- Education
- Training
- Advisory Services
- Research& Publication

4

Interplay: People, Process & Technology

A significant portion of service revenue comes from the provision of basic maintenance and repair services including replacement (spare) parts.

However, most customers require more services than just basis maintenance and repair such as training, configuration management, technical support, remote maintenance, advanced exchange, spare parts, etc. These activities are called value-added services. Faster turnaround time, guaranteed uptime, or longer service hours of coverage are also examples of value added services.

In laymen's terms, operating a Aftermarket Service operation is a little like driving a car in a cross country race. While it is important to keep an eye on the road (the market), sponsors (customers), and other drivers (competitors), it is also just as important to look under the hood to make sure the engine gets us where we need to go.

Just as the company needs to work diligently and effectively in building a customer base to generate revenue, it must continuously find ways to drive productivity and efficiency through its service delivery infrastructure. Benchmark measurements such as Turnaround Time, FSE Utilization Rates, and Number of Faults Found provide an assessment the productivity and efficiency of internal service management systems while Customer Satisfaction measures the external perspective on the service performance.

These measurements should be viewed in parallel to determine if the internal infrastructure (e.g., Reverse Logistics, Field Service, Depot Repair) is capable of fulfilling the marketing promise and vice versa to determine if the marketing promise is capable of being delivered through the internal infrastructure.

In order to operate as a Aftermarket Service as a profit center, a company must be able to generate income. This requires that a service company identify their target market and identify sources of revenue. In essence, we need to define the serviceable installed base. To this, we must be able to answer the following questions:

1. What equipment are we going to service?
2. Where is it located? Who owns it?
3. How many units are in the population?
4. Who is the customer for our service? How many customers are there? Where are they located?
5. How many customers will buy our service? How many units will that represent?

Market data obtained from primary or secondary market research will provide the answers to this information.

A significant portion of service revenue comes from the provision of basic maintenance and repair services including replacement (spare) parts.

However, most customers require more services than just basis maintenance and repair such as training, configuration management, technical support, remote maintenance, advanced exchange, spare parts, etc. These activities are called value-added services. Faster turnaround time, guaranteed uptime, or longer service hours of coverage are also examples of value added services.

With this background we look at 3 key elements of the whole network, namely – People, process and technology.

People : They form backbone of anything in service and following are the key contributions:

- Understand installed base and obsolescence.
- Planning based on inputs such as ageing, MTBF of critical components etc.
- Use of technology for quicker response
- Complaint call registration,
- Subsequent communication while reaching the customer
- Diagnostic skills, customer training
- Ability to understand requirement in terms of time required, spare parts required, handling of defectives either for repairs or replacement

Process: Without robust processes we cannot achieve operational efficiency even if people give their best. Key elements to be considered would be:

- Updated information on maintenance contracts, service calls and route plan, spares availability and status of jobs in repairs
- Spare parts planning, ordering and logistics
- Stocking points and stock levels
- Obsolescence planning for parts and equipments
- Pricing, installation manuals
- Repair centers and its support systems

Technology: Clearly the way we do things changes every day. Use of appropriate technology is a must to deliver results in more economic fashion consistently. Major aspects of this in aftermarket service are :

- Effective data transfer thro' mobiles
- Access to database on stocks, specification sheets for quicker resolutions and decisions
- Remote monitoring
- Predictive maintenance
- Effective use of Barcode scanners, RFID, GPS etc. in warehouse and distribution network.
- Real time analysis of the problem or progress of work
- Optimum utilization of work force

There are many examples we can see of successful integration of people, process and technology that we can see around today:

- Various customer training programs for global /key accounts is part of the contract in most long life equipments
- Use of mobile for variety of data transfers has been very common.
- Paperless transactions right from service calls to payments giving great speed has become way of life
- Collaboration with key suppliers is part of

the service strategy in ensuring continued customer support and has been part of the contracts in most cases

- On the other hand use of various web sites by dissatisfied customers is also popular way to build pressure on manufacturer

With clearly defined objectives, customer base, we can work on the key elements of people, process and technology to set up network which is both optimum and capable of operating as independent profit centre.

About the Author

He has 3 decades in supply chain and was associated with many industries including covering HVAC, Retail, Elevators, Chemical and Auto. Have been associated with many developmental projects during this period and have handled wide variety of products and services.

Presently he is Heading Supply Chain (Products business) with Blue Star Limited. The present job responsibilities include planning, sourcing, procurement, Warehousing & distribution for products business.

His earlier assignments included short stint with Reliance Retail and also many other leading manufactures such as Otis Elevators, Cable Corporation Limited and Automobile products etc.

5

Building Strong Spare Parts Supply Chain: Impact of GST

Looking Ahead – The Big Opportunity for Network Design - GST Introduction in India

Executive Summary:

The supply chain network of a company is seldom optimal. Reasons for the same can often be associated with the major changes happening in internal and external environments such as demand pattern, tax policies, introduction of new products, suppliers and competitors actions, etc. which are inherently dynamic in nature. When one or more of these factors change, the network is often rendered sub-optimal. Since re-designing the network involves significant effort and cost for the company, it cannot be done for every small change which occurs. But it is imperative to carry out this activity when a major change occurs in any of the factors.

One such change is the proposed introduction of Goods and Services Tax (GST) in India which would rationalize the current, complex tax structure. Though a final agreement on GST is yet to be reached, two aspects of GST hold special significance

from supply chain perspective:

1. Elimination of Central Sales Tax (CST) for interstate movement of goods

2. Uniform taxes in most parts of the country

In this paper we present ITC Infotech's understanding of the changes that will happen once GST is implemented in India and its impact on the supply chain. Further, we analyse the emergent scenarios and provide an insight on potential action points for a company in a post-GST scenario. The paper also provides a suggested methodology for optimizing your supply chain network, post the implementation of GST in India.

Post GST – Need for Network Design

The proposed implementation of GST will be one of the biggest tax reforms happening in India since independence. The current tax structure is very complex and differs from state to state. The evolution of GST can be seen as a gradual transformation of a disparate, complex and cascading tax structure into a largely unified value added system of taxation.

The current tax structure can be classified into three categories:

- Central indirect tax: Custom duty,
- Central excise duty, Central service tax etc
- State indirect tax: Value added tax (VAT), entry tax, luxury tax, entertainment tax etc
- Local tax: Octroi and other entry tax

Highlights of the proposed GST tax structure are:

- Dual GST for centre and states, Integrated GST (IGST) on interstate transactions
- Free credit flow-No cross credit for Central GST (CGST) & State GST (SGST)
- Refund of unutilized accumulated ITC (income tax credit)
- Between 12% to 20% in year 1, 12% to 18% in year 2, 16% in third year

The impact of current fiscal policies has been such that most companies had to give priority to tax benefits over operational efficiency. As an example, many companies have established warehouses in all states where they have a significant market size and transact on **"stock transfer"** as a way to nullify CST which is paid during interstate sales. Post GST the very existence of many of these facilities will come into question. We provide an illustration to better understand the impact of GST on your supply chain:

Illustration:

Assumptions:

- Excise rate 10%, VAT 12.5%, CST 2%, GST 16%
- Some sort of manufacturing at Vendor, Manufacturing location and Warehouses
- Stock movements from manufacturing location to warehouses is treated as a stock transfer (ownership doesn't change)

Ú From warehouses to WDs (wholesale dealer) ownership changes

- Vendor is in Karnataka state, Manufacturing unit in Karnataka state, WD (wholesale dealer in Tamil Nadu state)
- There are two warehouses-one in Karnataka & one in Tamil Nadu
- Value wise margins for different echelons are kept same

Scenarios:

- Scenario 1-Pre GST & Interstate sale happens during ownership change
- Scenario 2-Pre GST & Interstate stock transfer and then sales happening
- Scenario 3-Post GST & Interstate sale happens during ownership change
- Scenario 4-Post GST & Interstate stock transfer and then sales happening

		Pre GST	Net tax	Post GST	Net Tax
Vendor	Cost of manufacturing	100		100	
	Excise	10	10		
	VAT	13.8	13.8		
	GST			16	16
	Final Price	123.8		116	
	Total Tax Paid		23.8		16
Manufacturing Unit	Value addition (Mfg Unit)	50		50	
	Basic Price	173.8		166	
	Excise				
	VAT				
	GST			26.6	10.6
	Final Price	173.8		176.6	
	Total Tax Paid				26.6
Warehouse (Karnataka) to Tamilnadu WD	Value addition	50		50	
	Basic Price	223.8		226.6	
	Excise	22.4	12.4		
	VAT	30.8	30.8		
	GST			36.2	25.7
	CST	5.5	5.5		
	Final Price	272.4		252.2	
	Total Tax paid		72.4		52.2
Warehouse (Tamilnadu) to Tamilnadu WD	Value addition	50		50	
	Basic Price	223.8		226.6	
	Excise	22.4	12.4		
	VAT	30.8	30.8		
	GST			36.2	25.7
	CST	-	-		
	Final Price	266.9		252.2	
	Total Tax paid		66.9		52.2

Scenario 1

Scenario 3

Scenario 2

Scenario 4

Summary:

Pre/Post	GST Scenario	Final Price	Net Tax Paid
Pre GST	Scenario 1	272.4	72.4
Pre GST	Scenario	2 266.9	66.9
Post GST	Scenario	3 252.2	52.2
Post GST	Scenario 4	252.2	52.2

As per the above analysis one can understand the reason for establishing the warehouses in most of the states and using stock transfer (to prevent CST impact) as a preferred mode of transaction. Post-GST scenario the net tax paid will be less which reduces the price of the products. It also questions the need for two warehouses in both states.

The above analysis leads to further scenarios which also need to be analysed:

- Warehouse only at Karnataka
- Warehouse only at Tamil Nadu
- Warehouses in both states (one each in Tamil Nadu and Karnataka)

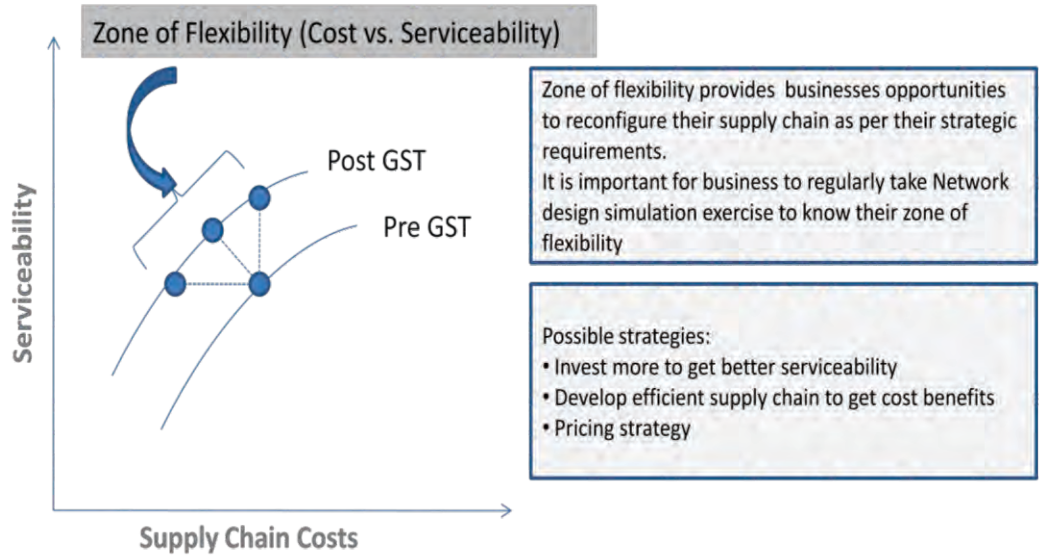
The three scenarios should be analysed with other costs added such as inventory cost, primary and secondary freight cost. The decision should also be based upon the degree of service levels achieved and responsiveness. A quick summary of analysis done on a CPG major in India (post GST) is given below:

- The number of warehouses has reduced to 36 from (current) 45. Many existing warehouses closed and new warehouses opened.
- Days of inventory reduced by 20%
- Primary freight cost reduced and secondary freight cost increased slightly

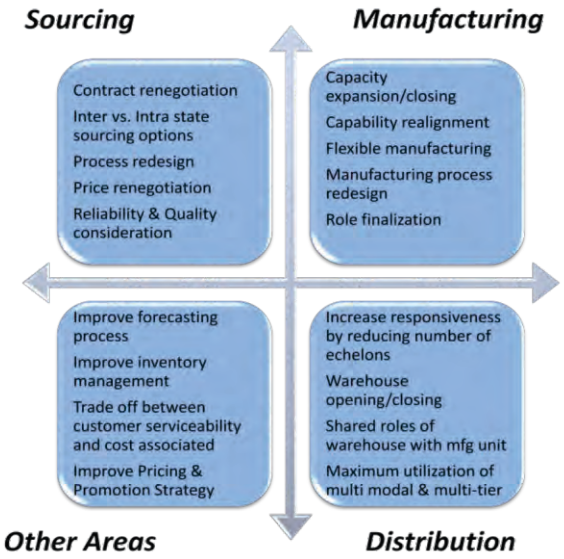
There are many positives and some negatives associated with this reduction in supply chain complexity.

Positives	Negatives
Bigger consolidation of demand at warehouses	Route planning becomes a challenge as warehouse have to deal with dealers in a bigger geography
Reduced variation in demand at warehouses	Secondary freight cost will increase
Improved inventory management	Truck load utilization will reduce in secondary distribution
Improved demand planning	In lower lead times the service level will experience a little impact.
Reduced production complexity (less changeovers)	
Reduction in number of echelons in supply chain	
Increase in truck load utilization (especially in primary freighting)	
Reduced cost for improving service level	

The figure below gives a comparison between supply chain cost and serviceability achieved. Zone of flexibility is a zone which provides businesses with a delta of supply chain cost to improve serviceability in post-GST scenario when compared with pre-GST scenario. Businesses get the flexibility to adopt the best possible strategies which align with their business objectives.

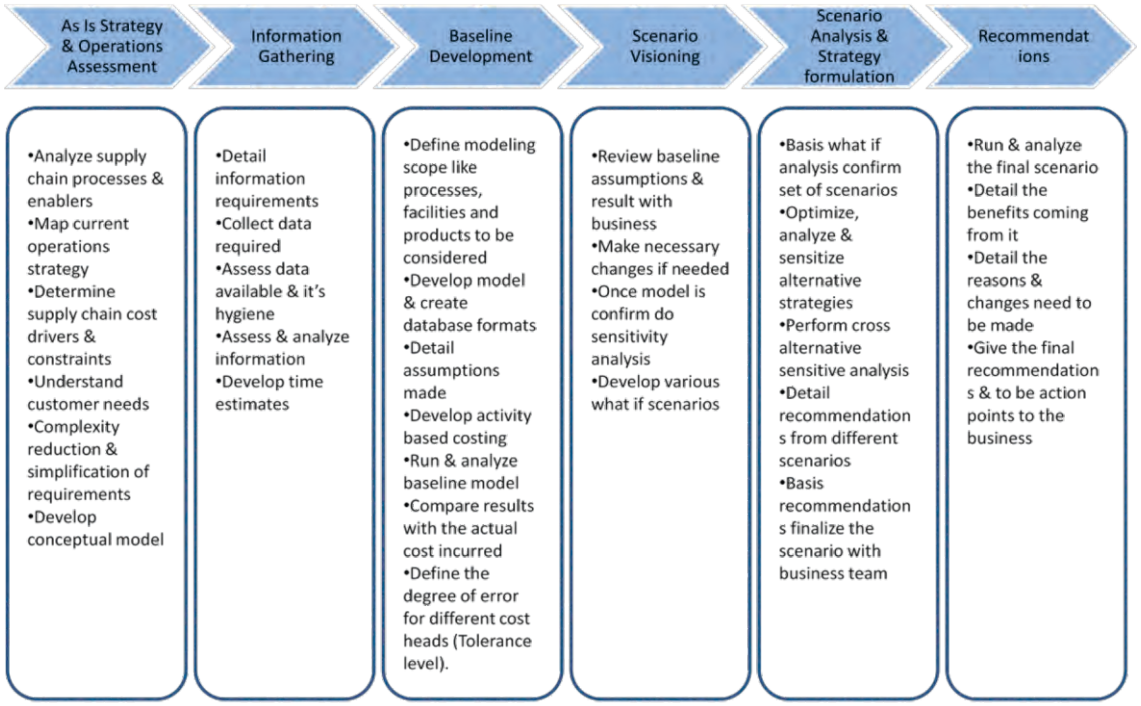


Post-GST companies will look forward to enjoy the benefits of economies of scale and align their objectives to take advantage of operational efficiency. The figure below gives the list of future action points in different areas.



Methodology for Supply Chain Network Design – Post GST in India (Our approach)

Network design exercise provides platform to analyse all the things explained above. It is a powerful modelling approach to suggest timely changes in the network in a pre- and post-GST scenario. The feature for sensitivity analysis provides platform to analyse various "what if" scenarios. Our approach for doing network design exercise is as follows:



Post GST – Network redesign approach

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7
Activity	Understanding strategic Objectives	Data collection & aggregation	Baseline Modelling (Pre GST scenario)	Include forecasted values	Impose GST	Optimize network	Post optimization analysis
Outcome	Existing network analysis, forecast for next 5 years	SKU wise costs involved. Customer, product & geographical clustering	Variable based model for cost estimation & validation	Logistics cost of existing network without taxes	Logistics cost of existing network with GST	Zone of flexibility & analysis of alternatives within it	Selection of best possible network

Summary

GST introduction will be one of the strong compelling factors for companies to revisit their supply chain network. The envisaged changes would be large-scale and bring into question the roles of many existing facilities (sourcing/manufacturing/distribution). The optimum network post-GST may result in realignment/closing/opening of facilities. Such transitions are seen to have long lead times, three months to three-four years, depending on the type of industry and type of transition. Companies must revisit their network considering next two to five year horizon so as to be proactive enough to answer the changes happening in big ticket reforms like GST.

References

- **CII paper: Gearing for GST**
- **ICAI paper on Goods & Services Tax in India**

About the Authors

Rohit Shukla is a Lead Consultant in supply chain practice in ITC InfoTech India Ltd. He holds a degree in electrical engineering with MBA in operations and supply chain management with over 7 years of experience in supply chain management in electronics and CPG domain.

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About the ITC Infotech Business Consulting group

ITC Business Consulting Group provides rich business consulting capabilities across key business functions such as product design & development, manufacturing & supply chain management, sales & service, loyalty & customer relationship management, etc. The group has expert practices around Enterprise Performance Management, CRM and Loyalty, SCM and Operational Excellence, Auto ID Solutions and Corporate Sustainability. Our domain experts and management consultants bring in expertise of addressing customer needs and problem statements in these areas across verticals such as CPG, Retail, Process & Discrete Manufacturing, Travel & Hospitality, Banking & Financial Services and Logistics & Transportation.

6(a)

Case Study - Auto Spare Parts

A Case Study on India's largest Automobile company focusing on its Spare Parts Division and its supply chain management to deliver upto the expectations of customers.

About The Automobile Company

The Group comprises over 100 operating companies in seven business sectors: communications and information technology, engineering, materials, services, energy, consumer products and chemicals. The group has operations in more than 80 countries across six continents, and its companies export products and services to 85 countries.

The company is the leader in commercial vehicles in each segment, and among the top three in passenger vehicles with winning products in the compact, midsize car and utility vehicle segments. It is the world's fourth largest truck and bus manufacturer. It has also come out with lowest cost four-wheeled passenger vehicle in India.

The company runs a separate division for managing its spare parts business.

The Approach

In the first phase of approach, the company was in the verge of identifying a 3PL service provider who could manage inventory of varying spare parts for the Passenger Vehicle segment as well as cater to the customers on a volatile requirement basis in co ordination with their Sales Team.

The Challenge

The challenge foreseen was the Bull Whip Effect which is a norm of the industry, High order skewness, high pressure environment to manage and deliver sales order and High through put. Their focus on Supply Chain Management triggered the need to revolutionize the distribution model, the go-to-market strategy.

It involved a close coordination and transparency- from the vendors or suppliers to LSP and the multi level distribution channels, keeping the cost low.

Looking into the capability and experience in handling and managing spares as well as with a strong network and fleet, the LSP was chosen as the 3PL partner for its end to end Spares Management.

Scope of Work

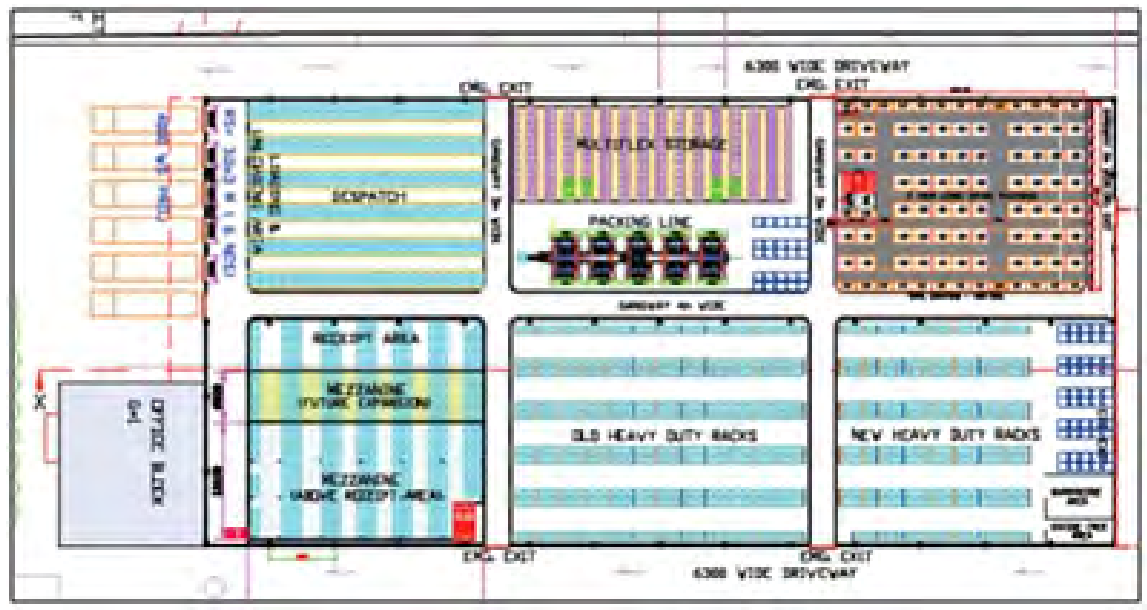
Spare Parts Management			
Item Master Configuration Manager	Stock Purchase Manager	Stock Fulfillment Manager	Settlement Manager
	Stock Return Manager	Stock Transfer Manager	Stock In / Stock Out Manager
	Stock Inventory Manager		Stock Replacement Manager

LSP to manage Warehouse Operations INBOUND- STORAGE- OUTBOUND. Also, Distribution to 110 customers across Northern Region.

The warehouse is an independent facility for the Spare Parts Division of the Automobile company. The total area is 14126 sqm, warehouse size is 6691 sqm. There are 6 docks for truck

Process Flow for Auto Spares

The nature of spare parts in the Passenger Vehicle segment managed by the LSP is Warranty Parts, VOR Parts and Casual Ordered Parts. The activities involved are- First, the order Registration and Pooling is done which enable the pickup of spare parts from various vendors. It is then brought by the LSP to a Regional Unit level warehouse where the parts are stored in different storage equipments as per the size and shapes of the spares parts.



placement and loading/ unloading. The Putaway of spares are done in Racked area, Open area, Heavy Duty Shelves, Long Span Shelves, Adjustable Shelves, Mezzanine Floors and Cage Bins. For fast and safe movement of spares inside the warehouse certain Material Handling Equipments are used.

Material Handling Equipments			
High Reach Truck	1	Nos	9 Mtrs/2 Tons
Electric Forklifts	2	Nos	5.5 Mtrs/3 Tons
Battery Operated Pallet Trucks	4	Nos	200MM/2.5 Tons
Hand Operated Pallet Trucks	12	Nos	200MM/2.5 Tons
Slat Conveyor	1	Nos	22.5 Meters
Wooden Pallets	2800	Nos	1200 x 1000 x 100 MM
Light Picking Trolley	20	Nos	
Heavy Picking Trolley	20	Nos	
Plastic Crates	7000	Nos	
Dispatch Trolley	22	Nos	
Special Trolleys	20	Nos	
Dock Levellers	2	Nos	3000x2600 MM/9 Tons

During dispatch, Unit Packaging is done and distribution is done to Multilevel Channels- Distributors, Dealers and Company Authorized Service Centers.

The value adds provided by the LSP in the whole process are Kitting, Packing, Labeling, Banking, Order Management, Warranty Management, Carrier Management, Claims management, Returns Management and Insurance Management.

In Conclusion

The partnership of the Automobile Company with the LSP is now over 12 years old and the LSP has been able to perform upto the expectations of the customer by managing and moving the right spare part to the right customer at the right time. Consistency in the Service level of the LSP and its expertise in Aftermarket Services has built this strong relationship among all odds.

6 (b)

Case Study - Consumer Packaged Goods Vertical

The Case Study on World's Pioneers & leaders in water and air purification systems, vacuum cleaners and security systems and how LSP has been able to deliver to their expectations focusing mainly on SPARES.

About A Leading Consumer Durable Brand

The company is now one of the largest direct selling companies in the world, cited as a classic direct sales reference by marketing 'guru', Philip Kotler, in his famous textbook 'Marketing Management'. It is the first to introduce the state-of-the-art Air Purifiers that ensures pollution free homes.

It has five major Divisions:

Direct to Home, Consumer Division, Industrial Equipment, Spare Parts, Rectification and scrapping.

The consumer channel has over 15,000 dealers across 1800 + cities and towns in India to bring a better quality of life to customers who seek the means to safer, healthier lives. The Industrial Equipment Division is to provide health and hygiene solutions to industrial and institutional

customers. The institutional channel strives to create safer, healthier work environments and enhance productivity and efficiency.

The Spare Parts Division reaches out to the customers by providing spares for rectification and defect handling.

The Challenge

The team could foresee the challenge in moving the SPARES in the market place and the key role which distribution will play. Their focus on Supply Chain Management triggered the need to revolutionize the distribution model, the go-to-market strategy.

This was easier said than done, as it involved a close coordination and transparency- from the customers all over to Business Partners (BP) and supplying to BPs who further distribute to the respective customer complainant. All these with accuracy and keeping the cost low.

The Approach

The first phase was to identify a 3PL service provider who could manage the flow of spares upto the is EFL Business partners for further distribution. Distribution to Business partners was a bigger challenge as it required co ordination and the reach of right spares to the right Business Partners. The fundamental of this approach was forging of a true partnership between the Consumer Durable Brand and LSP.

Typically the entire After Market services are broadly classified in 3 areas:

1) Consumables:

The consumables are handled from 25th to 5th in a month. These are Bulk Storage and sale items (like any branded genuine accessory)

2) Emergency Spares (Like VOR in Automobile Vertical):

These spares are stored and sold when an emergency requirement comes.

3) General Spares:

4) Defective Management/ Returns Management

The Defective Management is done through replacement at the customer end only. Once the customer complains, the Service BP goes and inspects the product and place an order to the warehouse for replacement if it cannot be repaired. LSP team then dispatches the material to the concerned BP.

For Returns Management- In Direct Sales, the seal is opened in front of the customer after sale has happened and in Consumer Division, the seal is broken by the dealer after invoice is prepared for the customer. Therefore, if any defect is found in the product originating from customer/distributor location, a material inspection note with no shortage certificate is given by the Service Team only after which sales return is approved. LSP team then brings the material and allows inwarding of it at the warehouse with proper documentation including material inspection note and the same is confirmed in the system.

Scope of Work

The LSP to provide Warehousing of Spare Parts and distribution to its 165 Business Partners.

This involved Storage of spare parts from the smallest size to larger ones, delivery at 165 locations with the help of dedicated trucks.

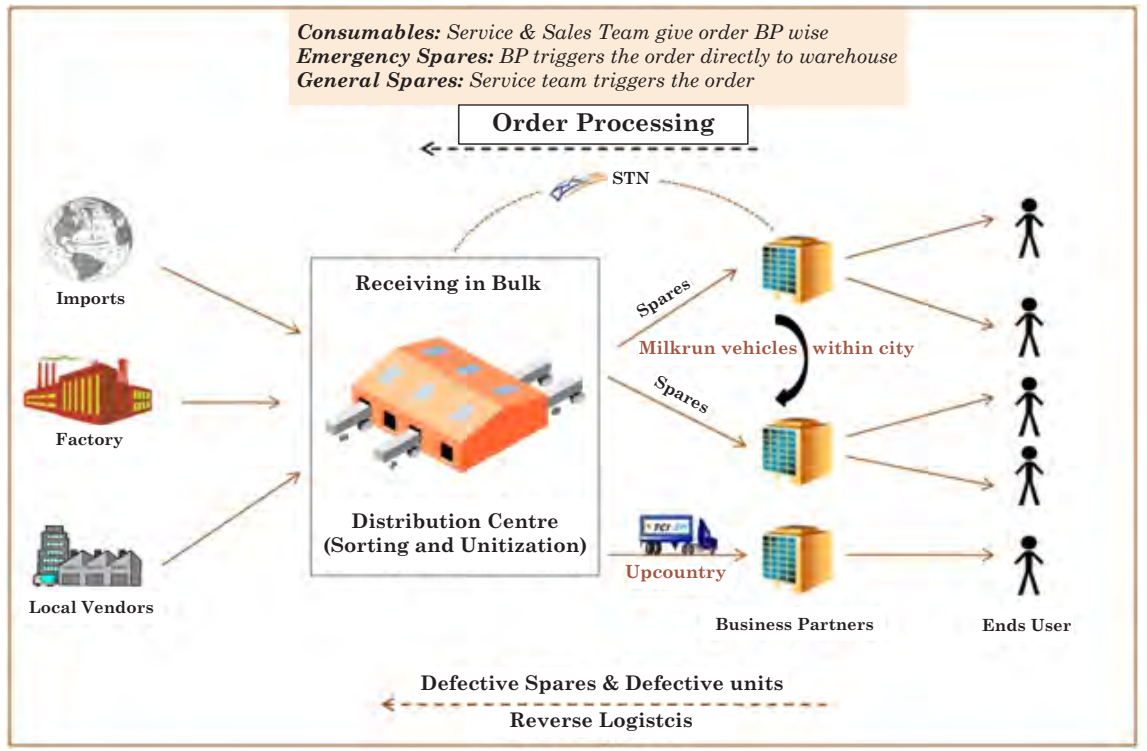
First, the customers complain on web to Business Partners (BP), BP gives order to LSP warehouse for dispatch.

After receiving the spares from factory, local vendors and imports, its putaway and storage is done inside the warehouse.

Storage of Spares in LSP Warehouse- Since the spares are of varying sizes and shapes, the storage of spares has been done as follows:

Small size spares are stored in **Pigeon Hole Rack (PHR)**. A Pigeon Hole rack is divided into 7 aisles. Each aisle carry 2 bins. Each bin is coded for identification as such- aisle location bin- **40201107**

Process Flow for Spares & Consumables



Medium size spares are stored in **Multiplex (MPR)**. A Multiplex has 10 racks for storage.

When an order comes, the spares are picked up from the respective locations and dispatch to the Business Partners through STN (Stock Transfer Note) majorly at Chennai, Delhi and Hyderabad.

LSP Strength in Handling of Spares:

LSP has implemented new processes in order to improve the accuracy in

dispatches.

Due to the variety of spares, it was difficult to track and identify it in a warehouse when an order comes. To overcome this, a Location Master was developed- Locationing / Put away of received items in predefined bin locations, the item wise locations are maintained in separate excel file "Location master".

When an order comes, a pick list is generated on the basis of PO given by Spares coordinator. We make an excel pick list in which we make provision of bin /location no., Picked Qty., Invoiced Qty, Box No. in which the material is packed, Total no. of Boxes Packed for the particular PO, and each pick list has a unique Sr.No. and Box/boxes is packed against that particular pick list/ PO also have unique Sr.No. Also, the BP address is updated in the Pick list.

Before dispatch, Pre-Packing of each item in poly bags is done. A packing slip is generated where a record is kept of material picked and packed, snap record of each shipment before dispatch, and record keeping system for box wise item details.

The Snap Record System was introduced to overcome the complaints of mismatched/short/Excess of BPs, a snap of the spares before packing it into the box is taken, that way if the complaints of mismatched/short/Excess is raised by the BP, we can cross check with the snaps we have against that particular shipment to the BP.

After Packing, a Packing Tag is made that is sticked on the Box after packing, It

contain the details of BP' name, BP's Code, BP's PO, and the Unique Box No. and the most important information of how many line items are packed under that particular Box. Also, a different colour is given for every BP's sticker in a single route.

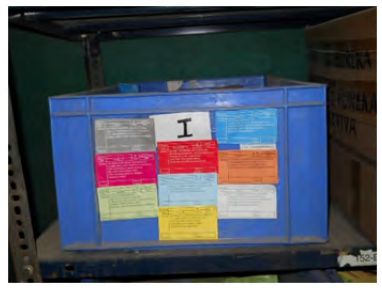
Sticker printing and labeling of material by standalone Bar code printing software is developed by LSP.

Daily MIS is generated regularly of a "SAP base- MIS" circulation to sales, accounts and commercial of PO execution and also having details of lead time from pick list generation to STN preparation.

A Single window solution for Customer care, dispatch details, vehicle tracking and complaint resolution is provided.

In Conclusion

The partnership is now over 2 years old and LSP has been able to deliver indirect and intangible benefits to this leading Consumer Durable Brand over the more obvious innovative; implemented and quantified KPI's & SLA's.



6 (c)

Case Study - Fundamentals of Telecom After-Sales Logistics

'Reverse Logistics in Telecom may never get the attention given to forward distribution, but now-a-days there is shift of attitudes amongst the corporates due to the cost associated with returns. The emphasis on after sales service and the need to fulfill customer demands for rapid replacement or repair of products is growing exponentially. After sales is a crucial part of the supply chain for all OEM Telecom companies. A good after-sales supply chain would ensure competitive advantage for the OEM in case of acquiring or retaining customers. The recent work by consulting firm Accenture mentioned that "after-sale parts and service are the new frontier of competitive differentiation and profit enhancement, offering nearly double the profit potential of first time product sales".

Customer needs and behavior	Logistic management	Budget limit
IT infrastructure	Product upgrades	Phase-out products support
Warranties	Repair	Customer support
Customer installed base visibility	Long supply and repair lead times	Intermittent and probabilistic demand
Integration and coordination between different stakeholders within the supply chain	Variability across the entire supply chain	

As shown in the diagram above in a typical supply chain in the telecom sector, circuit packs are manufactured in factories, forwarded to a DC and warehouse for intermediate storage, for customer support. As parts such as circuit packs are remanufactured, the supply chain also includes the remanufacturing vendors, so defective parts can be integrated into the spare pool after a recovery process.

A Wharton school prof. M. Cohen has rightly differentiated the Manufacturing Supply Chain and the After Sales Supply

Chain shown below:

Hence it can be seen that if After Sales Supply Chain needs to act more like its manufacturing counterpart it needs to

employ more planning into the system. Indeed it is proposed to implement effective SCM information system

to enable accurate planning based on master production schedule for spare parts and labor.

In the After Sales service industry there are two basic objectives.

1. to obtain a capability to start a new service in order to improve the capability to serve 2. to improve an existing service to improve upon the performance levels.

Supply Chain Design To tackle the challenges of after sales supply chain companies should address the issues at different levels i.e. Strategic, Tactical, and Operational.

Strategic Level

1. Service Parts Portfolio: OEMs should obtain information about the installed base of parts that need support, where these are located, the response time and the SLA to commit

2. Supply Chain Network Design: Location strategy for both warehouses and repair vendors should be viewed together when designing the network. The common rule to set up the logistics is to work with 3PL distributed warehouses to commit to SLAs same day delivery parts contracts and a centralized warehouse for next day deliveries. It is also recommended to consider the centralized warehouse as the DC for the rest of the warehouses to formulate a optimized cost supply chain. Reverse Logistics network must also consider elements such as repair capacity, transportation cost etc. so that the overall cost can be minimized.

3. Prepare a Master Parts Data File: This file enables the organization to know part detail information and is an effective planning tool.

4. Avail 3PL services: Alliances with 3PLs are usually long term and provide more flexibility and opportunity to OEM to dedicate more focus on core business.

Tactical Level

1. Analyze Demand: There are 2 sources of information required to forecast demand of services, failure parts records and Mean Time between Failures by parts numbers that can be used by OEMs.

2. Analyze Lead Times: There are 3 different lead times that should be considered namely: transportation time, repair TAT and defective parts collect time. The variability in all these cases is different. Transportation time can be affected by infrastructure and different state regulations. Repair TAT variability depends on the capacity and effectiveness of repair. Finally the defective collect time is affected by customer performance.

3. Optimum Inventory Position: Once we are done with strategic level planning and have the demand and lead time analysis is place the next step is to determine the optimum spare parts pool required.3

4. Inventory Management: Of spare parts should include lead time for all spare parts plus all critical related information, such as unit price, unit of measurement, numbers of part, etc. Operational Level Planning starts when we have the optimal inventory position calculated, such as repair and defective collect prioritization, new inventory buys,

scrapped analysis, etc. In order to solve the complex puzzle of managing inventor

usually to make strategic modification in a long planning horizon, recalculate inventory and demand on a monthly or

even weekly basis and plan for inventory allocation daily as well.

Once the supply chain is operational there should be KPIs assigned to monitor the processes. From customer's perspective the KPIs should monitor the delay of the part request and from the OEM perspective there are various other KPIs related to availability of the services such as part fill rate, the fraction of demand for parts that is available in stock at the site receiving the demand..

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Case Study - Reverse Logistics

A Case Study on World's one of the first handheld manufacturer and largest manufacturer of mobile phones. The case study depicts how the LSP has been able to deliver to their expectations during a stage when the company was undergoing replacement of its parts due to functionality problems faced by users. The situation was Mission Critical !!!

About The Equipment Brand in Telecommunications Industry

A wired and wireless telecommunications company, the client is a pioneer of cellular network in the country. This brand has played a dynamic role in the growth of cellular technology in India, starting the first ever cellular cell sixteen years ago. It started its India operations in 1995, was the world's largest vendor of mobile phones from 1998 to 2012. It was the world's largest manufacturer of mobile phones in 2011. However, over the past five years it has suffered declining market share as a result of the growing use of smart phones from other vendors.

The brand which successfully connected millions of people had to face a debate on Mobile phone batteries lately, since some functionality problems had been experienced by their users. It became a serious area of concern since around 100 complaints had been registered globally that such batteries experienced overheating initiated by a short circuit while charging. This could make the battery to dislodge and cause great problems with normal phone handling.

The world's biggest mobile phone maker advised customers on August 14, 2007 that up to 46 million batteries used in some of its handsets could pose a risk of overheating. This was applicable to a particular model no. of battery manufactured by a specific manufacturing partner between December 2005 and November 2006.

The Challenge

The company finally decided to replace all faulty batteries of that particular model no. They created a link on the website where one could check whether the owned battery is faulty and register for replacement of the same.

The challenge was big in moving the BATTERIES to individual homes across the

country. This had to be fast and accurate.

The Approach

The first phase was to identify an LSP who could manage the intricacies involved in moving the batteries across the country from a single point. It was seeking a cost effective solution for distribution of new batteries to individual customers when replacing the faulty ones. The LSP looked capable of moving the parts through its customized supply chain model, for which a true partnership resulted between the two.

Scope of Work

The LSP to pick up the new batteries from the mother warehouse of the client, bring to its branch/ HUB and finally distribute to individual customers across India.

Process Flow for Spares- BATTERIES

First, the customers check on web if their batteries are faulty, if yes, they register on the web itself with name, address, pin code.

These registrations are considered by the client as complaints and they give it as order to the LSP. The LSP on receiving of orders sorts as per pin code & match them against Air Way Bill Numbers (AWB) & generate barcodes against each AWB. The LSP picks up the material from the client mother warehouse and brings to 140 own HUB/ branch. Next, the verification is done of barcode labels against delivery challan, packing is done of delivery challan & battery in a single cover & bar-code label is sticked on the cover. This is again put into Plastic / Canvas bagging for safety in transit. The deliveries were done through express service, safely and timely to customers at corners of the country.

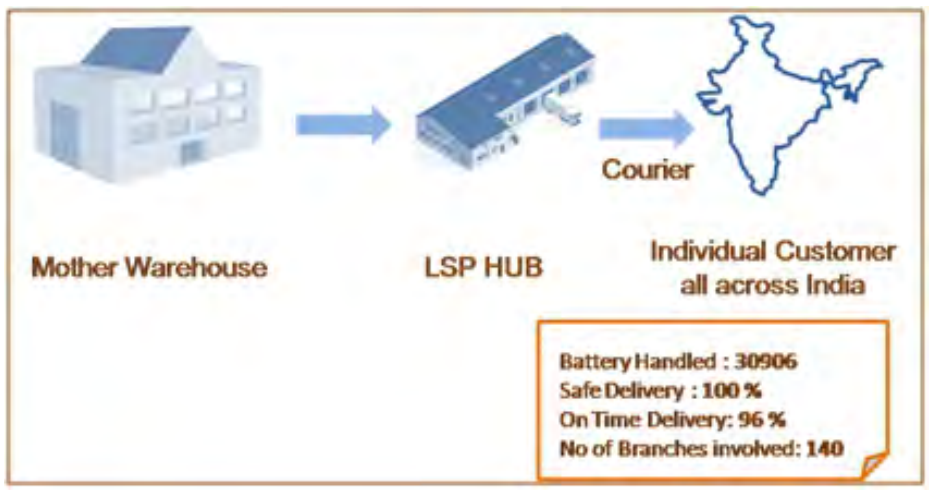
A special team had been kept for tracking of consignments till delivery.

The LSP handled 30906 numbers of batteries, Safe delivery was 100%, Timely delivery was 96%.

In Conclusion

The LSP along with the Telecommunication Company managed to perform this Reverse Logistics of Spares (Batteries) in Mobile phones. The Company along with the LSP's pioneered logistic services could overcome the challenge taken to replace all faulty batteries anywhere in India, keeping in mind the safety of customers and to retain the trust in their brand.

Process Flow for Spares- BATTERIES



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Glossary of Aftermarket Terms

Abrasives: Substances used to wear away a surface by friction.

Accessories: Comfort, convenience and safety products not essential to the performance of a vehicle such as audio, security products, floor mats and seat covers.

Additives: Chemicals that are added to the engine, cooling system, air conditioning system or transmission to maintain or enhance performance.

After-market Distribution Segment: Companies that provide repair and maintenance products for passenger cars and light trucks.

Appearance Products: Chemicals and accessories that enhance the appearance of a vehicle, such as waxes, polishes, protectants and upholstery cleaners.

Auto Electric Segment: Businesses specializing in electrical and lighting products for commercial vehicles.

Auto Parts Stores: Establishments where automotive products comprise more than 50 percent of total inventory and where retail sales comprise more than 50 percent of total sales.

Automotive Aftennarket : 'the maintenance, repair, parts, accessories, chemicals and fluids for vehicles after their original sale. This term often refers only to the aftermarket for cars and light trucks.

Body Shops: Firms whose primary activity is motor vehicle collision repair.

Buying Group: A group of businesses that buy together in large quantities to get discounted prices.

CAFE: Corporate Average Fuel Economy. These standards set requirements on automakers for improving the average fuel economy for new light-duty vehicles.

Captive Jobbers: jobbers that are owned, in part or in full, by their primary supply warehouse.

Car Dealers: Establishments that primarily sell new or used automobiles. They usually have a service and parts department either on premises or at another location.

Canier A person, partnership or corporation engaged in the business of transporting goods.

Category Management: A business discipline where vendors and retailers work

together in the management of product categories in order to streamline operations and increase sales.

Chain Stores: Retail establishments, which are part of an organization operating four or more similar types of stores.

Convenience Stores: Compact, self-service retail stores that are open long hours and carry a limited line of brands and sizes, possibly including gasoline. Examples include 7-Eleven and Circle K.

Core: The rebuildable portion of automotive components, such as starters, alternators and carburetors.

Counterman: Sales person at a retail or jobber outlet responsible for looking up parts and handling customer needs.

Department Stores: Large mass merchandise retail stores, which carry a wide variety of products. Many department stores include automotive service departments. Examples include Sears, : EC Penney, Macy's and Bloomingdale's.

DIFM: Do-It-For-Me. Refers to when consumers use professionals to perform the maintenance and repair work needed on their vehicles.

DIY: Do-IA-Yourself. Refers to when consumers perform the maintenance and repair work needed on their vehicles.

Discount Stores: Retail establishments that meet the requirements of a department store, but have lower cost structures and typically sell at lower prices than conventional department stores.

Distribution Centers (DC): Firms with products distributed primarily to other distributors, most of which are either of common ownership with the DC,T, or substantially related to the DC in the distribution channel.

Drug Stores: Establishments that primarily sell pharmaceutical and other health care products. Many sell a limited or intermediate line of automotive products. Examples include CVS, Walgreens and Eckerd.

Fleet Shops: Vehicle service shops owned by a company not principally engaged in the business of vehicle service but which operate shops for the primary purpose of maintaining their own vehicle fleet.

FOB: Free on Board. Term designating that the purchaser pays freight from the time the shipment is placed aboard a truck or train. Legal title for the goods passed to the buyer at this time and location.

General Repair Garages: Establishments engaged in automotive repair that do not specialize in one facet of repair, such as transmissions or exhausts.

Grocery Stores: Establishments that primarily sell food for home preparation and consumption. Many also sell non-edible grocery items and a limited range of automotive products. Examples include Safeway, Kroger and Ralph's.

Gross Combination Weight (GC): The total weight of tractor-trailer combinations, including the trucks, trailers and payload.

Gross Vehicle Weight (GVW): The total weight of the loaded vehicle, including chassis, body and payload.

Hard Paits: Solid engine parts, such as crankshafts, pistons and flywheels.

Hardware Stores: Establishments that sell a variety of basic hardware lines such as tools, paint, glass, housewares, appliances and cutlery. May also sell automotive products. Examples include Ace and True Value.

Headlining: Fabric or vinyl upholstery on the interior of the roof of a vehicle.

Heavy Duty Aftennarket: The portion of the aftermarket that deals with the maintenance, repair and aftermarket products for commercial, industrial and agricultural vehicles after their original sale.

Heavy Duty Distributors: Firms primarily involved in maintaining and selling an inventory of products specifically intended for the maintenance and repair of Glass 3 through Class 8 commercial vehicles.

Heavy Duty Parts: Parts for large commercial trucks and commercial vehicles.

Heavy Duty Vehicles: Vehicles classed by Gross Vehicle Weight as follows:

Class 7: 26,001 - 33,000 lbs. (home fuel, refuse, tow, city transit bus, furniture, medium conventional, cabover)

Class 8: 33,001 lbs. and over (fuel, dump, cement, refrigerated van, intercity tour bus, fire engine, heavy conventional, cabover sleeper)

Home Improvement Centers: Establishments that carry a wide range of home products, such as hardware, lumber, building materials, garden supplies, plumbing and electrical supplies. May also carry automotive products. Examples include Home Depot and Lowe's.

Independent Service Providers: Vehicle service shops that do not have a significant relationship with either vehicle manufacturers or petroleum marketers.

Independent jobbers: Jobbers that are not owned, in part or in full, by a warehouse.

Independent Truck Repair Facilities: Firms that are primarily involved in the diagnosis, repair, maintenance or accessorizat ion of commercial motor vehicles and have no significant relationship to vehicle manufacturers or to petroleum marketers.

Inventoty Turns/Turnover The number of times inventory is replenished within a particular time, calculated by dividing the cost of goods sold by the average inventory for the period.

jobbers: Finns that sell more than 50 percent of their products to repair shops and more than 50 percent of their purchases are from distributors.

Jobber/Retailer: NX/holesalers who also sell parts, chemicals and accessories to retail customers. Retail sales account for more than 50 percent of a jobber/retailer's total sales.

Leased Operators: Owner operators that lease themselves and their vehicles to trucking companies.

Light Duty Vehicles: Vehicles classed by Gross Vehicle Weight (GVNX/) as **follows:**

Class 1: 0 - 6,000 lbs. (passenger car, minivan, utility van, multipurpose/sport utility vehicle, compact and full-sin pickup)

Class 2: 6,001 - 10,000 lbs. (minivan, utility van, step van, crew cab pickup, full-size pickup, mini-bus)

Class 3: 10,001 - 14,000 lbs. (mini-bus, walk-in, city delivery)

Manufacturers: Firms that are the principal owners of the brand and trade names of more than 50 percent of the products sold by their companies.

Manufacturers' Representatives: Independent sales and marketing agencies which represent, by contract, the products of multiple manufacturers in the aftermarket.

Markup: The difference between the cost of the merchandise and its initial retail price.

Mass Market: The general public.

Mass Market Retailers: General merchandise retailers including department stores, discount stores, grocery stores, drug stores, hardware stores, variety stores, home centers, warehouse clubs, appliance stores, catalog showrooms, lawn and garden stores. Some use "mass market" to refer to discount stores only.

Medium Duty Vehicles: Vehicles classed by Gross Vehicle Weight as **follows:**

Class 4: 14,001 - 16,000 lbs. (conventional van, large walk-in, landscaping/utility, city delivery)

Class 5: 16,001 - 19,500 lbs. (large walk-in, city delivery, bucket)

Class 6: 19,501 - 26,000 lbs. (rack, single-axle van, beverage, stake body, school bus)

Mobile Repair Units: Firms primarily involved in the diagnosis, repair or maintenance of motor vehicles and whose activities are predominantly conducted at a site not owned or leased by the firms.

Motor Vehicle Aftennarket: The enure aftermarket, including all products and services for light, medium and heavy duty vehicles after their original sale.

Mobile Tool Distributors: Distribution firms selling primarily tools and equipment with sales activity primarily occurring at the site of the buyer from inventor), available on the distributor's vehicle.

NAICS Codes: North American Industry Classification System codes. The standard statistical classification codes underlying all establishment-based Federal economic statistics classified by industry for the United States, Mexico and Canada.

New car Dealers: Firms primarily involved in the retailing of new, personal-use motor vehicles, which also provide service for those vehicles after the sale.

NHTSA: National Highway Traffic Safety Administration. 'The agency that develops and administers educational, engineering and enforcement programs for safe vehicle use and cost-effective highway travel.

OE: Original Equipment. Parts and components supplied to manufacturers for motor vehicle production.

OEM: Original Equipment Manufacturers. Companies that supply pans and components for die production of motor vehicles.

OSHA: Occupational Safety and Health Administration. The regulatory and enforcement agency for workplace safety and health.

Owner Operator Someone who owns one or more commercial trucks and personally drives at least one of them. If they own more than one vehicle they are also known as small fleet owners.

Paint, Body and Equipment Specialists (PBES) Segment: Specialists in providing vehicle refinishing products and supplies to the collision repair industry.

Parc: European terminology used to describe the total number of registered vehicles within a certain geographic region.

Performance Products: Products that enhance the speed and handling of a motor vehicle.

Program Group: A group of businesses purchasing, selling and marketing under a common banner.

Quick Lubes: Service establishments specializing in providing fast oil changes. May also offer other automotive services.

Remanufacturen A rebuilder of motor vehicle engines and hard parts.

Replacement Rates: The percentage of vehicles in operation kr which a particular component or service job was purchased during a particular year.

Service Stations: Establishments, which may or may not sell products over the counter, for which gasoline accounts for more than 50 percent of total sales. Examples include BP, Shell and Exxon.

SIC Codes: Standard Industrial Classification codes. The standard statistical classification codes underlying all establishment-based Federal economic statistics classified by industiy. Largely replaced by the NAICS Codes system in 1997.

SKU: Stock Keeping Unit. Refers to each single item carried by a retailer. Every color, style and item having its own vendor or vendee number has its own SKU.

Specialty Repair Shops: Establishments specializing in one facet of automotive repair, such as transmission, ignition or exhaust. The outlet's specialty accounts for more than 50 percent of total sales receipts.

Specialty Stores: Retail outlets, such as auto parts stores, that restrict its appeal to a specific type of merchandise. These outlets generally offer wider assortments in a narrower range than department, discount or variety stores.

Speed Shops: Specialty stores selling high-performance automotive products.

Three-Step Distribution: 'fradirional aftermarket distribution process where products flow from the manufacturer to the warehouse distributor to the jobber to the service outlet.

Tier One Suppliers: Automotive parts manufacturers that supply final equipment directly to vehicle manufacturers. Increasingly, tier one suppliers are becoming producers of major subassemblies and modular components that can be installed into a vehicle as a unit, such as a complete drivetrain.

Tier Two Suppliers: Manufacturers that produce components for Tier One suppliers.

Tier Three Suppliers: Manufacturers that supply raw materials used in the production of components.

Tire Dealers: Stores that generate more than 50 percent of their sales from automotive tires.

Tool and Equipment Segment: Specialists in providing the tools and equipment needed to perform repair and maintenance of motor vehicles.

Transplants: Cars and trucks manufactured in the United States with a foreign nameplate.

Trim Segment: Companies that manufacture or distribute interior and exterior fabrics and the associated hardware and products used in the repair or restoration of motor vehicles, boats and aircrafts.

Trim Shops: Firms involved in the repair or accessorization of products primarily from the trim goods category, such as carpet, vinyl, leather, fabrics, thread and zippers.

Truck Dealers: Firms primarily involved in the retailing of new commercial motor vehicles. These firms also provide service for those vehicles after the sale.

Truck Stops: Firms primarily involved in the distribution of petroleum products and the diagnosis, repair or maintenance of commercially-operated motor vehicles.

Two-Step Distribution: Distribution process where products flow from the manufacturer to the warehouse distributor to the service outlet directly, eliminating the jobber.

Two-Step Warehouse Distributors: Firms that sell more than 50 percent of their products to repair shops and more than 50 percent of their purchases are from manufacturers.

Universal Product Code (UPC): Also known as bar code. Numbers printed on product package that can be electronically scanned for information such as brand, manufacturer and price.

Variety Stores: Establishments that sell a variety of goods at low prices, such as apparel, accessories, gift items, stationery, toiletries, light hardware, toys and candy (e.g., Ben Franklin).

Vehicle Class: A method of grouping vehicles according to their Gross Vehicle Weight. Classes range from 1 to 8. See Light Duty Vehicles, Medium Duty Vehicles and Heavy Duty Vehicles for examples.

Wagon jobber: A distributor operating trucks stocked with fast-moving parts and tools, usually calling on service stations, garages and car dealers.

Warehouse Clubs: Self-service establishments selling a variety of products, generally in bulk sizes. Membership fees are typically required.

Warehouse Distributors: Firms that sell more than 50 percent of their products to automotive jobbers or retailers.

Wholesaler/jobber: Firms that sell more than 50 percent of their products to repair shops and more than 50 percent of their purchases are from distributors.

S. No.	Abbreviations	Full Form
1	3PL	Third Party Logistics
2	ABC	Activity Base Costing
3	ACO	Accountable Care Organization
4	AMS	After market services
5	BP	Business Partner
6	CST	Central Service Tax
8	EDA	Electronic Design Automation
9	ERP	Enterprise resource planning
10	FG	Finished Goods
11	FSE	Field Service Engineer
12	FSN	Fast, Slow moving and Non-moving
13	GPS	Global Positioning System
14	GST	Goods and Service Tax
15	HTMS	Human Resource Tracking System
16	JIC	Just In Case
17	JIT	Just In Time
18	KPI	Key Performance Indicator
19	LAN	Local Area Network
20	LSP	Logistics Service Provider
21	MES	Manufacturing Execution Systems
22	MIS	Management Information system
23	MPR	Muliple Racks
24	MRO	Maintenance, Repair and Operations
25	MRP	Material requirements planning
26	MTBF	Mean time between failures
27	MTTF	Mean time to failures
28	MTTR	Mean time to repair
29	OEM	Orignal Equipment Manufacturer
30	PDM	Product Data Management
31	PHR	Pigeon Hole Rack
32	RFID	Radio-frequency identification
33	SAP	System Application & Products
34	SLA	Service Level agreement
35	SPM	Spare Parts Management
36	STN	Stock Transfer Note
37	TAT	Turnaround Time
38	VED	Vital, Essential, Desirable
39	VOR	Vehicle Off Road

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