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LEADERS IN LOGISTICS

Logistics Focus™

In-house Publication of Transport Corporation of India Ltd. October 2016

LIQUID LOGISTICS & SCM

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Transport Corporation of India Limited

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About us

Strong foundation and skilled manpower, TCI offers seamless multimodal transportation solutions. An ISO 9001:2008 certified company, TCIL is listed with premier stock exchanges like NSE and BSE.

The company progressed from being a "One Man, One Truck, One Office" set up to becoming India's leading Logistics & Supply Chain Solutions provider with a Global presence. After 50 years, TCI moves 2.5% of India's GDP by value and is the proclaimed market leader of the Indian Logistics Industry.

TCI Group has an extensive network of over 1000+ company owned offices, a huge fleet of customized vehicles and managed warehouse space of 10 million sq. ft. and a strong work force of 5000+. With its customer-centric approach, world class resources, State-of-Art technology and professional management, the group follows strong corporate governance principles and is committed to value creation for its stake holders and its social responsibilities.

With a Mission to be "the most admired service provider of integrated supply chain solutions", TCI Supply Chain Solutions brings a lot of commitment in its partnerships with its clients. Dedicated verticals for Auto, Retail, Telecom, Electricals, Pharmaceuticals, FMCG and Cold Chain offer specialized services to these critical sectors of the economy.

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TCI Global provides a single window advantage to its customers across all major South East Asian countries through a dedicated network of international offices in the region besides having strategic presence in high growth and emerging markets in Asia, Brazil (Latin America) and Africa. TCI Global offers its customers end to end services ranging from customs clearance, international inbound and outbound freight handling (air and sea), primary and secondary warehousing/redistribution, third party logistics, multimodal (air, surface and sea) services, ODC movements, mining logistics and project cargo.

TCI Seaways has well equipped ships in its fleet and caters to the coastal cargo requirements for transporting container and bulk cargo from Ports on the East coast of India to Port Blair in the Andaman and Nicobar Islands and further distribution within the islands.

KNOWLEDGE INITIATIVE OF TCI GROUP KNIT

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Special thanks to the content team of TCI who worked relentlessly behind the scene to make it happen viz. Kriti Sharma, Krishna Rao

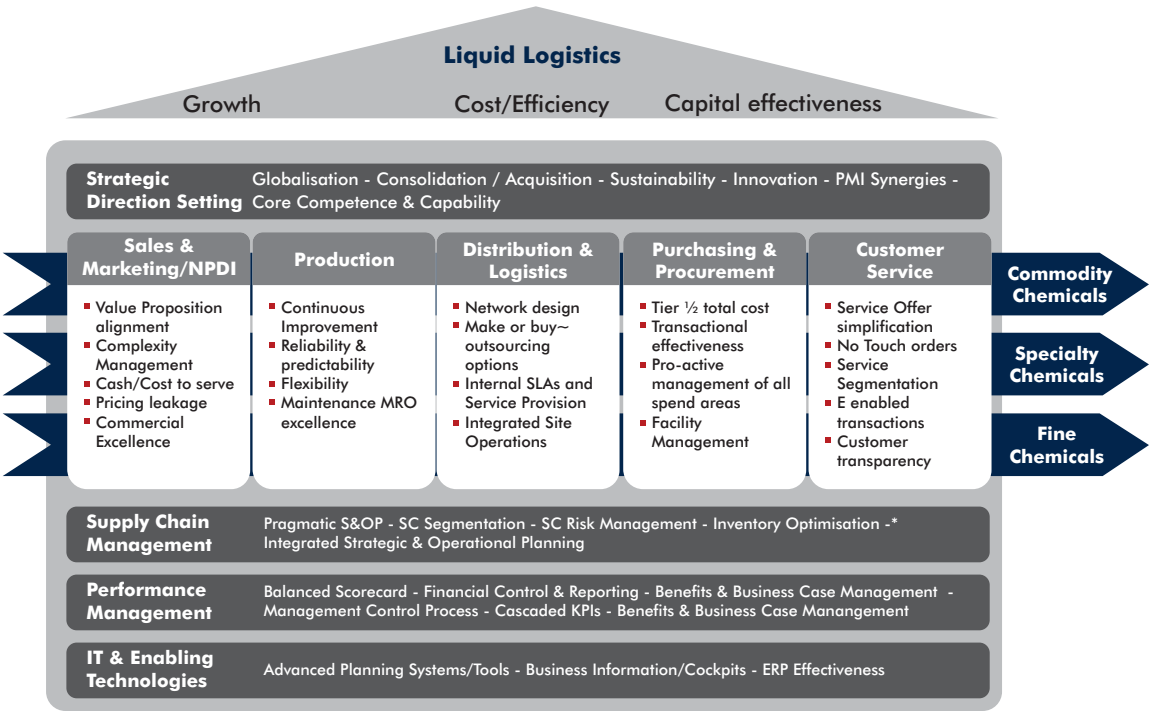
Foreword

Dear Readers,

This time the edition covers a "Liquid" topic! Liquids; we as human beings and earth as a planet are surviving because of liquids or specifically water. So no prizes in guessing that the movement of such liquids either for consumption or as raw materials for a manufacturing plant or as a beverage, the logistics and supply chain of the same remains complex and extremely challenging. The entire supply chain has to be SOLID for any company or its channel whilst handling liquids whether bulk or packaged, pun indeed intended!!

In this edition let us jointly quench our knowledge thirst by navigating through the logistics and supply chains of chemicals, packaged water, milk, wine, oil, liquefied gases, etc. Please do go over an interesting initiative, promoted by Railways too, WATER ATMs, it will be surely an interesting read.

As usual we look forward to your fluid feedback!!



Yours truly,
Ajit Singh

Ajit Singh
CEO, TCI CONCOR

Ajit Singh is a veteran in the Logistics industry with over 30 years' experience. He has worked in various capacities and at senior management positions with TCI Freight & TCI XPS. Currently he is the CEO for TCI Concor and TCI Rail divisions. During this tenure TCI has successfully forayed into Rail multimodal logistics.

01

OVERVIEW OF CHEMICAL LOGISTICS

-by Mr. Abhijit Dixit,
Head-Supply Chain, Aditya Birla Group (Speciality Chemicals)
&Grasim Industries Ltd (Chemicals Division)

Abhijit is a Supply Chain professional with more than 15 years of experience in Speciality Chemicals, Bulk Chemicals, Cement and Polymer Industry.

Overview

When we talk about liquid logistics the first thing that comes in our mind is movement of chemicals. So here we start with an overview of Indian Chemical Industry and the logistics challenges this industry is facing.

Liquid logistics is a specialized material-handling and transportation discipline that is used when moving liquid products through a supply chain.

Unlike discrete unit products, which can be moved using standard methods of transportation, liquids require specialized handling. Liquids can be shipped in a wide range of container sizes and shapes because they have no fixed dimension requirements. Because of this, liquid logistics offers money-saving opportunities that not available when transporting solid units.

Many factors impact liquid logistics, including temperature, and the transportation methods and precautions will vary depending on the materials being moved. The available quantity of a liquid product can quickly be measured by its levels in a transport tank, and visible changes in the consistency of the liquid can be early alerts to any environmental control issues during transportation. Sensors and flow meters may also be deployed to continuously monitor the condition of the product being transported.

The Industry

The Indian chemical industry is estimated to be the fifth largest in the world and second largest in Asia after China. The fact that the industry contributes about 10% of the output of the Indian manufacturing sector, 13% of India's total exports and 9% of the country's total imports underlines its criticality for the national economy. The chemical industry is very diverse with close to one lakh products across a range of categories. The end-use customer segments are also diverse and have varied requirements.

Industry structure ranges from highly fragmented in some segments to highly consolidated in others. Products exist in solid, liquid or gaseous forms, with some being inflammable and hazardous, and hence each product comes with different handling, storage and transportation needs.

The western coast of India has been the key hub for chemicals and petrochemicals industry accounting for 60% of trade. Gujarat and Maharashtra alone account for ~65% of chemical and ~80% of petrochemical production in India. Since production clusters are concentrated in one particular region, better infrastructure and logistics are required to supply chemical products across the country. The lengthening of supply lines makes the distribution of chemicals more transport intensive. The involvement of a large number of stakeholders (shipping lines, transport agencies, environmental agencies, etc.) in the transportation of chemical products further increases the logistics and supply chain complexity of the chemicals industry.

Given the complexity of the industry and nature of chemical products, the challenges in chemical logistics are myriad. It has been observed that the logistics burden of all chemical product segments in India has been growing at a faster rate than the sales. Logistics cost as a percentage of sales has increased by 8% in the past 4 years. The inventory levels as a percentage of sales have also increased by 7.5% in the same period, which will further add to the supply chain costs for chemical companies.

Apart from the direct elements of transportation, warehousing and handling, many other indirect elements contribute towards the overall cost burden including packaging, inventory, inventory holding costs and spend on QHSE. Respite for the chemical industry from rising logistics cost burden is not expected in the near future.

Factors expected to inflate future supply chain costs for chemical industry in India

Logistics spend in India is around 13% of its GDP, which is high as compared to developed countries (7-8%) due to inadequate infrastructure and inefficiency. In the future, there is high probability for the cost to further escalate, driven by the following factors:

Challenges in inventory planning: Due to uncertain transit times and volatile markets, companies carry excess safety stock in order to avoid losing sales due to stock-outs. Also, in the chemical and petrochemical industry, co- and by-products are common, which often lead to a complex and sometimes cyclic flow of materials. The diversity of product segments and SKUs makes inventory management very challenging. Most chemical manufacturing processes involve continuous production, requiring assets to be run at steady levels of production, which makes it difficult to implement lean solutions.

Expansion of chemical industry: As the chemical industry is expanding across the country, complexity of supply chain and logistics will increase. New routes and locations for transportation will be added to the existing network. Each new link will bring its own local complexities regarding the availability of logistics assets, local laws and regulations, and infrastructure, further compounding the logistics cost burden on chemical companies.

Increased focus on QHSE: There is increasing political and public pressure to reduce industrial risks and accidents. End consumers are also becoming more and more quality conscious. Environmental and sustainability concerns will gradually push chemical companies to increase spend on QSHE to meet customer demands. Shift to greener transport modes, adoption of safety standards/ culture and putting security procedures in place will incur additional expenses for companies. Adoption of green logistics without incurring incremental costs will be challenging.

Rising fuel prices: Diesel price has increased by 26% in the last year which directly affects the cost of transportation. The trend of rising crude oil and natural gas prices will have a two-fold impact on the chemical industry with respect to fuel cost and feedstock cost.

Though rail freight rates have increased by just 1% in the last 3 years, with the adoption of the dynamic fuel adjustment component (FAC), rail freight rates will no longer remain insulated from hikes in fuel and energy prices. Railway, which has been the preferred mode of transport for bulk commodities accounting for ~50% share in bulk transportation, will get costlier.

The upward trend is expected to continue in the coming years, which will only add to the logistics cost for the chemical industry.

Process inefficiencies and lack of infrastructure: Apart from rising fuel prices, the transportation cost burden on chemical companies in India is heightened due to higher transit time and lower turnaround of vehicles because of multiple check-points. Bad road conditions, over-saturated railway network, unsuitability of rail wagons to carry different types of cargo, port congestion, shortage of CFSs and insufficient draft at ports to handle large vessels are the major infrastructural issues that Indian companies face in logistics. Moreover, there is a shortage of 3PLs specialized in transportation of bulk liquids and gases, especially hazardous materials

Table 1: LOGISTICS EFFICIENCY INDICATORS

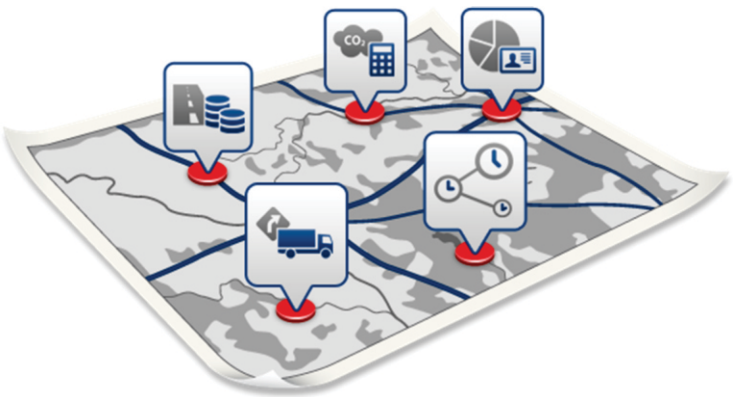
Indicators	India	Global
Average truck speed (in km/hr)	30-40	60-80
Four lane road length (in kms)	7,000	34,000 (China)
National highways length (in kms)	66,590	1,900,000
Average distance travelled by a truck per day (in kms)	200	400
Avg Inventory (in days)	33	24 (China)

Key levers for managing supply chain

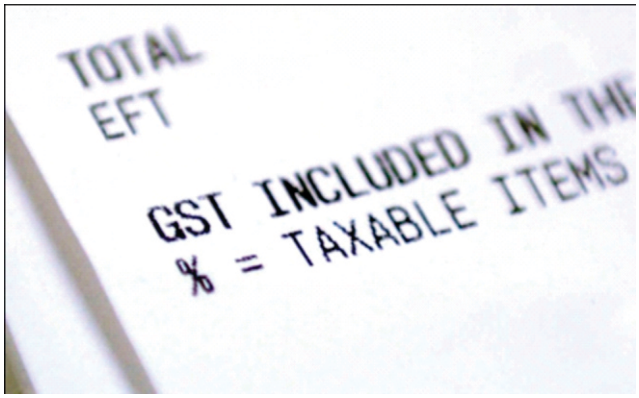
Given the above factors, the logistics cost burden in the Indian chemical industry is here to stay. The chemical industry in India needs to focus on Supply Chain as a key lever to manage their business and develop solutions towards optimization of logistics costs to remain competitive in the global marketplace.

A thorough analysis of global best practices in chemical logistics and comparison with India suggests that the following levers need to be managed for reducing logistics cost.

1. **Differentiated Replenishment models** along with increased visibility and reverse/ re-transfer logistics is an imperative for the future. Traditional demand planning and forecasting methods are not conducive to today's volatile environment. A small error in the process results in magnifying the problem and saddling the distribution network with high volume of inventory for some items and stock outs for others.
2. **Network and Route planning** has to take into account real time events like traffic and availability of equipment and personnel for loading/ unloading, materials handling and flexibility to switch between modes. The traditional view of lowest cost model for transportation is long outdated. The actual cost of the service is fairly insignificant in comparison to the product values, cost of carrying the inventory and more so loss of sales or opportunity. There is a need for a more dynamic approach and having options to enable you to select the most appropriate solution.



3. **Adopting and complying with QHSE norms** and related asset development is going to become a necessity for the industry as customer and consumer become more aware. While it could involve a complete overhaul of operations, the benefits far outweigh the cost. While today the number of incidents is far and few, this is not by design. The collateral damage on account of a mishap can be significant and far greater than the lifetime cost of adopting good practices.
4. **Technology and skill development:** The logistics workforce in India, predominantly operational front-line staff (drivers, goods handlers and workers for loading/unloading) who are minimally educated, lack knowledge of the hazards of the products and the necessary skills for handling. There is a need to undertake skill development initiatives at the lowest levels and adopting latest technologies and IT systems. Improper handling of chemical products will lead to wastage and add to the handling costs. Training the manpower in these aspects will lead to significant reduction in damages, delay and cost.
5. **GST Readiness:** Implementation of GST would standardize tax rates on a pan-India basis and lead to consolidation of logistics and warehousing units at central locations. A gradual changeover to a hub and spoke supply chain model is expected. Chemical companies will then have to determine their supply chain network on the basis of logistical considerations rather than taxation. This could imply changes like a shift towards larger vehicles for transportation. For example, there could be a transition from road to rail as rail is better suited and more economical for bulk volumes and longer distances. Many companies in the sector have already recognized the importance of supply chain and have initiated steps in addressing the issues in the right earnest.



02

BULK LIQUID HANDLING AT INDIAN PORTS

-by Mr S. K. Shukla,
GM-Commercial and Logistics, IGL

Mr. Shukla is management graduate having 27 years' experience in field of logistics. Currently he is heading Logistics & SCM division at India Glycol Ltd. and has been instrumented in establishing best &effective practices across the supply chain.

As India's chemical trade rises, the pressure on the already overburdened Indian ports will increase. A review of current liquid chemical handling infrastructure and performance at ports highlights a clear need for better planning and a more supportive policy framework. Going ahead, 'chemicals' are expected to be among the most attractive cargo types and ports must align their capabilities to leverage this opportunity.

Growth in chemical trade

Indian chemical industry has been growing at 10-15% per annum over the past few years. Rising chemical exports is a significant contributor to this growth. At the same time, imports for certain chemical products, in which India is traditionally deficit, have increased with rising demand from growing domestic end-use sectors.

Going ahead, chemical trade volumes are set to grow at a fast pace. Increasing volumes will merit a shift from containerized movement to bulk, increasing the burden on Indian ports.

Figure 3: Major ports in India

Infrastructure and connectivity at major ports

Of the over 70 operational ports in India, the 13 major ports handle over 50% of the country's trade by volume. Utilization rate of these major ports has been hovering between 80 to 90% over the past 3 years. When compared to international average of 70% utilization, these rates indicate potential overburdening of existing infrastructure at India's major ports. There is a need for capacity ramp-up, especially for chemical commodities, which are largely neglected in favour of bulk commodities such as iron ore and coal.

Ports with major liquid chemical traffic such as JNPT (6.9 lakh tonnes) and Kandla (56 lakh tonnes) have liquid chemical storage capacities of 7.4 lakh and 8.4 lakh KL, respectively. A comparison of number of pipelines, type of tanks, distance of tanks from water-front etc. for chemical terminals at these ports with

Figure 4: Comparison on Tankfarms[1] at different ports

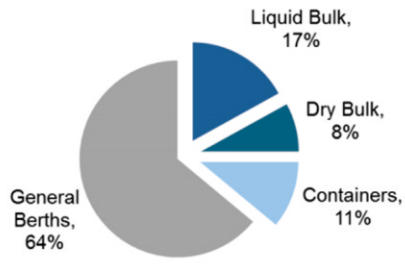
Parameters	Antwerp	Kandla	JNPT
Tank Capacity @ sample terminal in KL (Chemicals)	480,015	140,000	157,795
No of Tanks[1]	100+	44	38
No of Jetties[1]	12	1	2 (Shared with other Tankfarms)
Pipelines[1]	Most tanks have dedicated product lines with connections to the jetties	Common pipelines for multiple products 1 x 12" 1 x 16"	Common pipelines for multiple products 1 X 08" (CS[3]) 1 X 10" (SS[2]) 1 X 12" (CS[3]) 1 X 16" (CS[3])
Distance from Waterfront[1]	Less than 1 km	3+ km	5+ km
Overall chemical handling capacity and throughput at different ports			
Tankage capacity at port (Lakh KL – Chemicals)	30	8.4	7.4
Total throughput at port (Lakh Tonnes – Non POL[4])	116	56	6.9

Notes : 1) Illustrative example of a sample terminal at the respective ports, 2) Carbon Steel 3) Stainless Steel 4) Petroleum, Oil & Lubricants

terminals at some of the leading international ports like Antwerp, sharply brings out the inadequacy and lack of planning behind chemical infrastructure at Indian ports.

Inadequate number of stainless steel tanks and pipelines restrict the different types of products that can be handled by the tank farms. Furthermore, limited number of pipelines from the water-front to the tank farm, directly impact the turnaround time of vessels and duration of port stay, thereby increasing costs.

Figure 5: Types of berths at Major ports

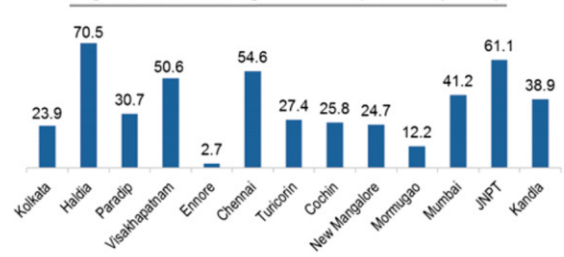


Source: Performance Audit of Functioning of Major Port Trust in India - Ministry of Shipping

Turnaround time also increases with distance between storage tanks and the water-front. Though the Coastal Regulation Zones (CRZ) notification by the Ministry of Environment and Forests (MoEF) allows for construction of storage terminals for several petroleum products in CRZ-II zones, it does not accommodate chemicals and petrochemicals. This means that liquid chemical storage terminals have to be built outside CRZ zones, which are far away from the waterfront.

In addition to the inadequate port infrastructure, lack of connectivity to hinterland and the absence of multimodal transport options drive up distribution costs for importers and create a challenge in moving products inland. The challenges become especially acute for chemical products in view of strict SHE norms associated with the products. Liquid chemical transportation through rail requires specialized wagons in view of applicable regulations. However, Indian Railways has little focus on providing such wagons specifically for the movement of liquid chemicals. This is ironical considering the fact that rail is considered to be a safer mode for transporting hazardous chemicals compared to road, which is currently the predominant transportation mode for chemicals in India.

Figure 6: Pre-berthing time for Liquid bulk (Hours)



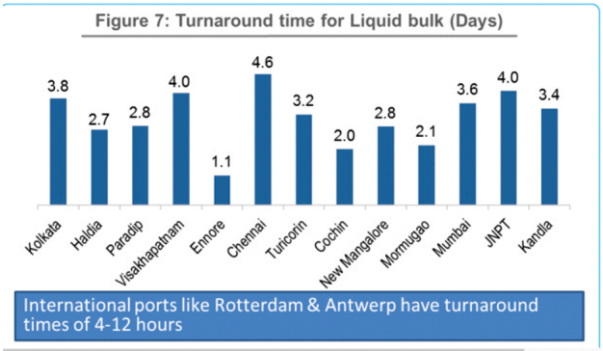
Source: Crisil research , Analysis by Tata Strategic

On the other hand, the Cabotage law restricts movement of foreign flag vessels along coastal routes making unloading and distribution of chemicals along the coast challenging.

Performance at major ports

As chemical trade increases, the nature of cargo to be handled will become more specialized and will have specialized handling requirements. However, 64% of berths at major Indian ports are general cargo berths. Waiting time (pre-berthing time) for bulk liquid vessels (which include POL and liquid chemicals) is long, and goes as high as 70 hours at Haldia and 60 hours at JNPT (see figure 6). This is abysmal compared to other advanced ports such as Rotterdam which do not have a concept of waiting time.

Figure 7: Turnaround time for Liquid bulk (Days)



Turnaround time for liquid bulk vessels at major Indian ports ranged from 1.1 days in Ennore to 4.6 days in Chennai in 2012 (see figure 7). This, again, is very high when compared to turnaround times of 4-12 hours at Rotterdam and Antwerp

New generation chemical parcel tankers can carry upwards of 50 different cargoes in a fully segregated manner and are equipped to load or discharge up to 14 cargoes simultaneously. While some international ports are equipped to match this capability, Indian ports lag far behind.

Way forward

As Indian ports gear up for handling the increased chemical volumes expected in the future, there is a need for a focused effort on better planning, infrastructure up-gradation, policy reforms and SHE awareness & training.

In view of future volumes and advanced parcel tankers, ports handling large liquid bulk chemical volumes, must invest in setting up high quality, dedicated pipelines which allow multi -product discharge and faster discharge rates for unloading & loading of chemical cargo. Pipeline networks should be well planned and layouts optimized based on unloading and storage locations at port.

Ports must create high capacity berths with specialized handling equipment and infrastructure for chemical products. Material handling teams and labour need to be trained in effective use of the specialized equipment and precautions associated with handling of chemicals.

Policy reforms such as making the coastal shipping or cabotage law more flexible for foreign flag vessels to operate on Indian waters would enable availability of vessels for distribution through coastal movement. Amendment in the CRZ law too is critical for reducing capital requirement and operating costs of tank farms. High volume chemicals such as Phosphoric Acid, Ammonia, Xylenes (PX, OX, MX), Methanol and MEG should be included into the permitted products list, to allow storage tanks to be built closer to the water-front. This would mean shorter pipelines, reduced capital investment, ability to lay larger number of pipelines, reduction in loss of time for product change over, faster discharge and quicker turnaround of ships.

Improved efforts on SHE training and awareness are also required. Introducing specialized courses on chemical handling and related SHE norms in maritime training institutes would help in ensuring availability of appropriately skilled labour trained in safe handling and storage of chemicals.

Going ahead, 'chemicals' will be among the key cargo types in terms of attractiveness and ports must align their capabilities to leverage this opportunity

THE JOURNEY OF BOTTLED WATER

-by Editorial

How did this bottled water get into your hand? To answer that we need to examine the fundamentals of transportation as part of logistics, and logistics as part of the supply chain.

In the Beginning

In the Beginning, the bottled water did not suddenly materialize in your hand. You may have taken it out of your refrigerator, or from a vending machine, or from a corner store (as in this story), or any of several other places. That it is, it was stored. Storage in the context of logistics is most often associated with a warehouse or a distribution center. Here we have a distribution center we happen to call a corner store.

We will be building a picture of the aspects of transportation, logistics, and the supply chain as we go along. "You and the Corner Store" is where this story currently stands.

You had something of value to exchange with the store in return for the bottled water – money. You concluded that the bottled water was of more value to you than the price you had to pay. The corner store concluded that what you were willing to pay was of more value than keeping the bottled water on the shelf or in the cooler. The two of you made a deal. This notion of value and its exchange is also a fundamental tenet of supply chain management.

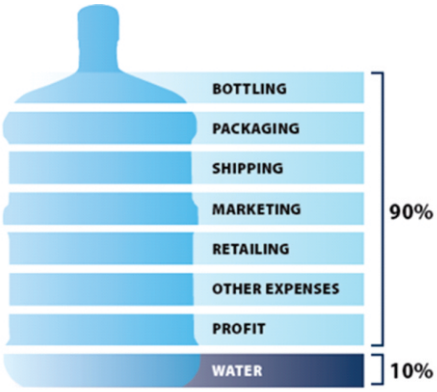
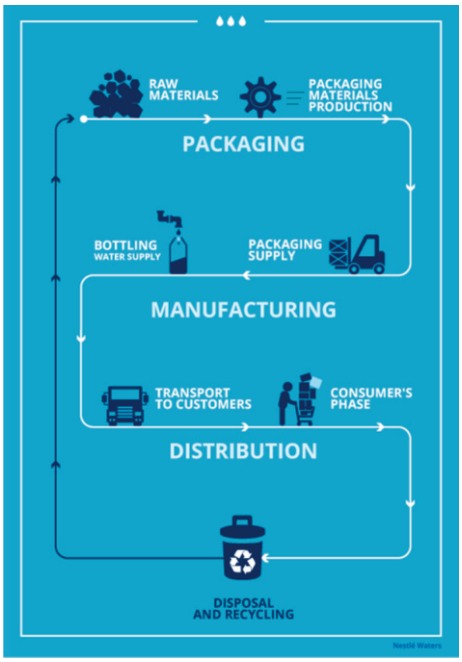


Figure 1: Breakdown of bottled water costs

"Nothing happens until someone buys something."

We have an exchange of value – the bottled water and the selling price – that illustrate two of the fundamental themes that take place in transportation, logistics, and the supply chain; the movement of product and the movement of money. How did you know to go to the corner store for the bottled water? Because you had information, another fundamental theme of transportation, logistics, and the supply chain.

It sounds easy doesn't it? Put some water in a bottle and sell it. But it is not nearly that simple and involves 20,978 miles of travel before it finds its way into the shops of downtown. It might be convenient to pop into a shop and buy some water, but it is far from convenient to organize the manufacture of the product and shipping of what makes up the plastic bottle. Of course the major cost is making the plastic bottle to contain the water. According to charity The Water Project it takes three liters of water to make the packaging for one liter of bottled water.



Bottled water distribution facts

Optimizing Distribution

Transport has always been a key consideration for the bottled water business model. Transport policy focuses on the following five key areas:

- Reducing distance to consumers
- Using alternative transport
- Exploring new technologies
- Optimizing payload

Reducing Distance to Consumers

Because the bottled water industry involves large volumes of product, transport is a primary consideration. While distance is an important economic and environmental consideration, the bottled water industry has limited flexibility in choosing the location of its sources and factories. This is particularly true for natural mineral or spring sources, which require stringent requirements, guaranteeing consistency of its original and natural composition. These unique sources are typically located outside of urban centers.

Using Alternative Modes of Transport

- Use of boats for our imported international brands:
- Use of trains for our imported brands
- Decreasing CO2g/liter emission

Exploring New Technologies

Carefully following the development of any new technologies that would improve environmental performance for any given mode of transport. initiating pilot projects to replace regular truck fleet with hybrid trucks (gasoline and electric engines). This transition is expected to accelerate in future years as the technology improves and our current delivery trucks are replaced.

Optimizing Payload

Payload is one of the areas of the distribution phase where there are opportunities to reduce environmental footprint. Local regulations define the maximum allowable weight of the final product that can be loaded onto a truck. Based on current limitations, one has to actively work to optimize the ratio between actual load and the authorized allowance to reduce the environmental impact of transport per liter. Increasing payload regulatory limitations can be very beneficial in order to decrease the number of trucks on the road, thereby reducing the environmental impacts per liter transported.

04

THE COMPETITIVE EDGE OF AN INTEGRATED SUPPLY CHAIN - OIL & GAS

-by By Mr. A. K. Deb,
Sr. Advisor, ONGC Petro-additions Limited (OPaL)

Mr Deb is an electrical engineer with 43 years of experience spanning oil and gas industry and railways. He superannuated from ONGC as Group General Manager.

Post superannuation, Mr. Deb served 2 one-year terms as 'Advisor' in ONGC and OPaL (ONGC Petro-additions Limited), sharing his vast experience in developing solutions to the challenges in the field of feedstock logistics of petrochemicals.

In today's fast-paced and competitive global market, there's no room for inefficiency, optimization is the name of the game, especially when it comes to logistics. In transportation of crude oil, oil products, gases (LPG, LNG or NG) limited storage capacity, maintenance of equipment and machines and vessel needs, availability and healthiness of pipeline capacity, availability of jetty, SBMs, railway terminals and workforce scheduling restrictions are all major logistical variables that, if not streamlined and well coordinated, can create expensive lag throughout the operational chain. Current generation of customers are groomed in 'JIT' (Just In Time) concept and can't tolerate any delay at the one end, whereas on the other hand, the swing in demand pattern are increasingly being complex to fathom; Accordingly, those in the business, have to respond to this variability in demand supply in quickest possible time frame to maintain the reputation and brand image of the company. The importance of Supply chain planning and optimization has accordingly never been more critical than it is today. An optimized supply chain can not only save time and money in the short term, but can also map critical action areas toward long-term business growth and profitability and building strong brand identity.

There are several logistical challenges presented by the transportation of crude oil and products from one point to another. One of the more prominent is vertical planning, or silo planning.

Traditionally, on one side of the company we'll have a team responsible for planning production and throughput. Then elsewhere you'll have another team (generally marketing) handling distribution planning. Production makes sure that given the resources they have, they maximize their output. Meanwhile, distribution is trying to maximize sale of products . The two groups may have long- and short-term goals, chances are the two are not aligned always.

The silo approach can be costly because the two teams are not planning collectively: If oil product distribution is outpacing production, eventually customers will be waiting on orders that have not been fulfilled in a timely manner. In addition, to meet this accumulate demand, the refineries will have to run over capacity thereby causing strain on the equipment and requiring additional maintenance outages, causing an even bigger distribution bottleneck. The same principles apply when the situation is reversed. If distribution is faced with a production surplus, then the products and crude inventory needs to be stored for longer duration with higher inventory carrying cost. And in some cases of Oil and Gas operation like in gas processing plants, if you can't store or ship your product (e.g., Naphtha, LPG etc.), you may have to shut down your Plant along with the upstream gas wells, thereby resulting in huge losses; where such throughput gas is getting produced as ;associated gas' along with the crude oil, one may require to flare the natural gas in order to maintain crude oil production . It's extremely expensive to flare natural gas because you're losing a non-recoverable resource; it's also bad for the environment.

Rather than having these two teams work independently of one another, a smarter business goal is to plan horizontally via an integrated system that combines production and distribution, wherein marketing raises product demand of the month based on which production and crude throughput is planned.

Relevant planning steps have to be executed simultaneously. In horizontal planning, we look at the whole supply chain: extraction / sourcing of crude oil, supply to the refinery, refining the crude oil into final distribution of products such as diesel and gasoline etc. to receiving terminals and from there to customers across the globe.

With this approach, one can avoid surprises as whole supply chain is planned keeping the final demand and available storage facilities of the crude and products in view. The two are optimized in alignment instead of acting in separate silos. Through a single, integrated supply chain planning system, you can also determine both long- and short-term goals that incorporate both product restrictions and demand forecasts.

Moving on to the actual shipping of product, you cannot send a vessel with a diesel shipment from location A to location B, unload, and then immediately continue with a gasoline shipment from location B to location C. Between products the vessel requires cleaning – a time consuming,expensive process that can generate waste. By determining which products at what quantity need to go where on which vessel and planning shipments accordingly, you can minimize time spent cleaning each vessel, reduce environmental impact, and maximize profits per shipment.

One example of an integrated and well planned supply chain business model is LNG (Liquefied Natural Gas) business. Where gas is produced from the well and transported in a shore based gas liquefaction plant through pipeline where it is liquefied and then shipped in specialized LNG vessels to a distant re-gasification plant where again the liquefied gas is re-gasified for supply to consumers through a network of transmission and distribution pipelines. The super cryogenic (-162 degree Celsius) LNG vessels operate on a fixed schedule between the load port and discharge ports, storage capacities at both ends are planned to cater to any temporary upset in the demand / supply, though long terms contracts ensure that demands can't outstrip supply thereby causing major supply chain disruptions.

Along with environmental sustainability, health and safety are also critical factors for consideration. Accidents need to be prevented at all costs. Think about it from a planning perspective and begin by taking business rules into account.

For instance, an oil tanker needs to go into dry dock for maintenance every five years, just as your car has to go in for regular maintenance every several thousand kilometers. However, the major difference here is that if you postpone maintenance on your car for a year, it isn't necessarily a big problem. You don't want to take that same risk with your oil tankers. For an optimized supply chain, dry-dock activity is a constraint that needs to be incorporated into distribution plans.

The planning puzzles don't stop at equipment / machinery. Similarly, with workforce planning it's important to plan field service engineers to do periodic maintenance of equipment and machineries in refineries. If they aren't regularly scheduled, then machines can become faulty, which presents safety and sustainability risks. You also need to bear in mind that your engineers aren't interchangeable with one another; they each have certain skills that qualify them to accomplish specific tasks. This is another area where health and safety come into play. If you schedule an engineer for a job for which he isn't trained, you're taking a risk because you cannot guarantee his work will be top quality.

Consider this scenario: A compressor has malfunctioned on one of your customer's oil rigs. You receive an urgent request for a fully equipped crew to carry out emergency maintenance. The race against time has begun. You have to find the right people with the right skills and check to see whether they are available. You have to get them – with the right equipment and parts for the job – to the offshore platform. And you have to do it quickly.

With resource execution planning and scheduling across operations, what could have been a time-consuming logistical nightmare is now a snap. You have a complete overview of all available resources, including a list of employees scored according to criteria such as skills, experience, availability and current location. You're able to form a crew, pairing them to the right equipment and creating an optimal plan that satisfies all constraints and requirements.

What makes planning people a particularly complicated puzzle in addition to their unique skill-sets is time off – holidays, sick leave, etc. Your employees cannot work 80 hours a week; they need sufficient breaks so their quality of work is consistent. And that's what's really complex: finding an optimal solution where all the tasks that need to be executed are addressed by the correct people with the proper skill-set within the shortest timeframe. Layer this on top of your production and distribution planning and you have quite a challenge if you are managing them all separately.

The oil and gas supply chain is a complicated one, rife with obstacles and hiccups. Last-minute opportunities and emergency requests that come in require immediate decisions, allocation of resources and actions. Schedules get wrinkled and need to be redone. Fixed-price cargo becomes briefly available for purchase. Competitors are suddenly unable to deliver, and demand for your product skyrockets. These are just a handful of variables that can disrupt your entire business operation within a span of mere hours. However, by optimizing your supply chain with horizontal planning you can not only keep up with operations, but stay ahead and plan for the future.

Amul's Supply Chain Management Practices

-by Mr. A. K. Bansal,
Area Manager-Amul

He is the force behind complex operations at Amul.

AMUL is a dairy cooperative in the western India that has been primarily responsible, through its innovative practices, for India to become the world's largest milk producer. The distinctive features of this paradigm involves managing a large decentralized network of suppliers and producers, simultaneous development of markets and suppliers, lean and efficient supply chain, and breakthrough leadership. To implement their vision while retaining their focus on farmers, a hierarchical network of cooperatives was developed, this today forms the robust supply chain behind GCMMF's endeavors. The vast and complex supply chain stretches from small suppliers to large fragmented markets. Management of this network is made more complex by the fact that GCMMF is directly responsible only for a small part of the chain, with a number of third party players (distributors, retailers and logistics support providers) playing large roles. Managing this supply chain efficiently is critical as GCMMF's competitive position is driven by low consumer prices supported by a low cost system of providing milk at a basic, affordable price.

Gujarat Cooperative Milk Marketing Federation(GCMMF)

GCMMF is India's largest food products marketing organization. It is a state level apex body of milk cooperatives in Gujarat, which aims to provide remunerative returns to the farmers and also serve the interest of consumers by providing quality products, which are good value for money. GCMMF markets and manages the Amul brand.

The distribution network

Amul products are available in over 500,000 retail outlets across India through its network of over 3,500 distributors. There are 47 depots with dry and cold warehouses to buffer inventory of the entire range of products. GCMMF transacts on an advance demand draft basis from its wholesale dealers instead of the cheque system adopted by other major FMCG companies. This practice is consistent with GCMMF's philosophy of maintaining cash transactions throughout the supply chain and it also minimizes dumping. Wholesale dealers carry inventory that is just adequate to take care of the transit time from the branch warehouse to their premises. This just-in-time inventory strategy

improves dealers' return on investment (ROI).

All GCMMF branches engage in route scheduling and have dedicated vehicle operations.

Largest Cold Chain:

AMUL has the largest cold chain network in India (i.e.more than 100000 Deep freezers) as compared to any other company. The chemical components of milk are water, SNF and solids. Milk is very perishable product so it has to be consumed within 24 hours. In order to avoid wastage

AMUL converts the milk in to SNF and milk solids by evaporating the water, which comprises up to 60-70% of milk contents. This is possible only if the distribution channel right from the producer to the consumer is well organized. It will be surprising to know that AMUL makes even the Sarpanch to eat pizza i.e. it supplies pizzas even to rural market.

The Business Model

From the very beginning, in the early 1950s,

AMUL adopted the network as the basic model for long-term growth.

The network explicitly includes secondary services to the farmer-suppliers.

Several of the entities in the network are organized as cooperatives linked in a hierarchical fashion.

Customers:

In comparison with developed economies, the market for dairy products in India is still in an evolutionary stage with tremendous potential for high value products such as ice cream, cheese etc. The distribution network, on the other hand, is quite reasonable with access to rural areas of the country. Traditional methods practiced in western economies are not adequate to realize the market potential and alternative approaches are necessary to tap this market.

Suppliers:

A majority of the suppliers are small or marginal farmers who are often illiterate, poor, and with liquidity problems as they lack direct access to financial institutions.

Again, traditional market mechanisms are not adequate to assure sustenance and growth of these suppliers.

Third Party Logistics Services:

In addition to the weaknesses in the basic infrastructure, logistics and transportation services are typically not professionally managed, with little regard for quality and service. In addition to outbound logistics, GCMMF takes responsibility for coordinating with the distributors to assure adequate and timely supply of products. It also works with the Unions in determining product mix, product allocations and in developing production plans. The Unions, on the other hand, coordinate collection logistics and support services to the member-farmers. In what follows we elaborate on these aspects in more detail and provide a rationale for the model and strategies adopted by GCMMF.

Simultaneous Development of Suppliers and Customers:

From the very early stages of the formation of AMUL, the cooperative realized that sustained growth for the long-term was contingent on matching supply and demand. The member-suppliers were typically small and marginal farmers with severe liquidity problems, illiterate and untrained.

AMUL and other cooperative Unions adopted a number of strategies to develop the supply of milk and assure steady growth. First, for the short term, the procurement prices were set so as to provide fair and reasonable return. Second, aware of the liquidity problems, cash payments for the milk supply was made with minimum of delay. This practice continues today with many village societies making payments upon the receipt of milk. For the long-term, the Unions followed a multi- pronged strategy of education and support. For example, only part of the surplus generated by the Unions is paid to the members in the form of dividends

Managing Third Party Service Providers:

Unions focused efforts on these activities and related technology development. The marketing efforts were assumed by GCMMF.

All other activities were entrusted to third parties. These include logistics of milk collection, distribution of dairy products, sale of products through dealers and retail stores, some veterinary services etc. It is worth noting that a number of these third parties are not in the organized sector, and many are not professionally managed. Hence, while third parties perform the activities, the Unions and GCMMF have developed a number of mechanisms to retain control and assure quality and timely deliveries. This is particularly critical for a perishable product such as liquid milk.

Coordination for Competitiveness:

Coordination is one of the key reasons for the success of operations involving such an extensive network of producers and distributors at GCMMF. Some interesting mechanisms exist for coordinating the supply chain at GCMMF. These mechanisms are:

Inter-locking Control

The objective for developing such an inter-locking control mechanism is to ensure that the interest of the farmer is always kept at the top of the agenda through its representatives who constitute the Boards of different entities that comprise the supply chain. This form of direct representation also ensures that professional managers and farmers work together as a team to strengthen the cooperative. This helps in coordinating decisions across different entities as well as speeding both the flow of information to the respective constituents and decisions.

GCMMF Supply chain Model:

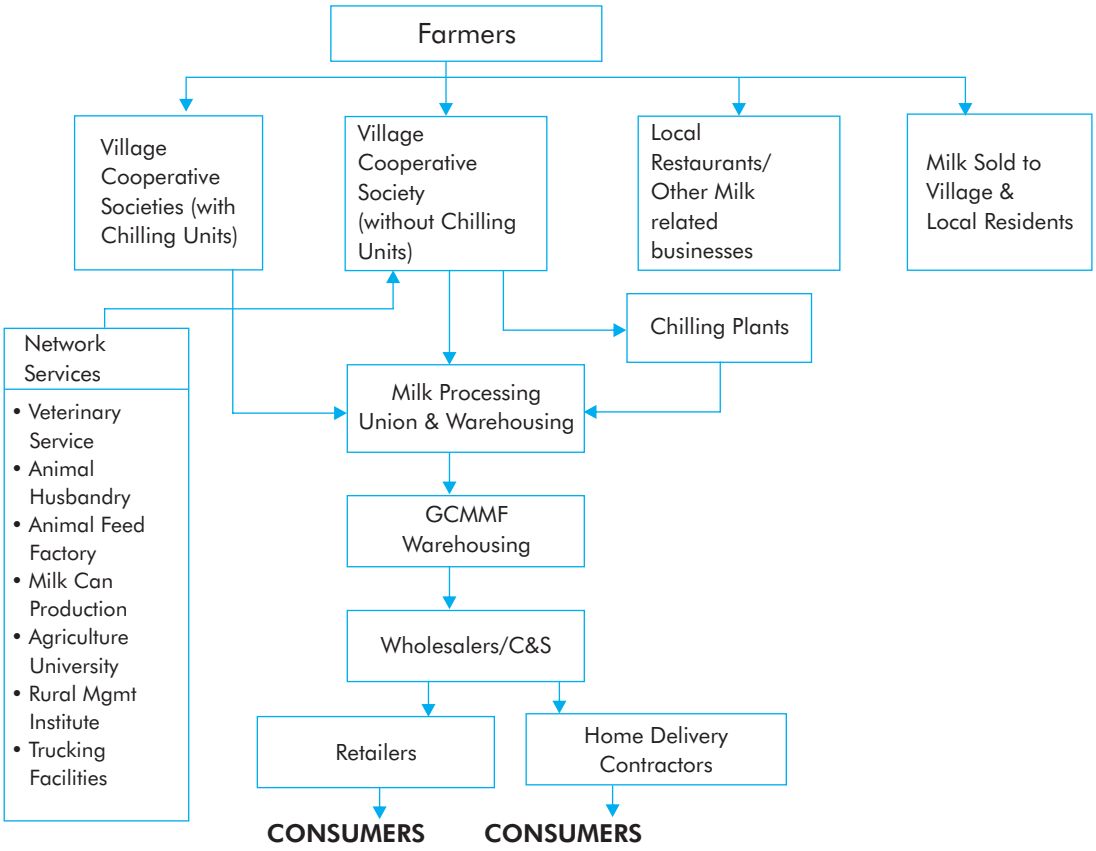
Coordination Agency: Unique Role of Federation

Its objective is to ensure that all milk that the farmers produce gets sold in the market either as milk or as value added products and to ensure that milk is made available to an increasingly large section of the society at affordable prices.

Supplier Enhancement and Network servicing

Their objective is to ensure that producers get maximum benefit and to resolve all their problems. They manage the procurement of milk that comes via trucks & tankers from the VSs. They negotiate annual contracts with truckers, ensure availability of trucks for procurement, establish truck routes, monitor truck movement and prevent stealing of milk while it is being transported.

GCMMF Supply Chain



Amul Yatra Programme

The Amul Yatra Programme ensures that every new distributor visit Anand before commencing business, thereby imbibing an appreciation of Federation philosophy and culture as well as operational systems and processes.

All new distributors salesmen are trained in the Federation's philosophy and methods as well as in selling skills.

Amul Yatra programme has been continuing to bring our channel partners to Amul to give the man exposure to our cooperative institutions. This year our emphasis was upon our newly appointed distributors and channel partners from various business segments like Organized Retail, Caterers etc.

Note: This article is carried from the previous issue of logistics focus on QSR, published in Mar'14. Some data points might have changed since then.

BREWERY INDUSTRY IN TRANSITION: CHALLENGES & TOP PRIORITIES FOR THE INDUSTRY IN CURRENT BUSINESS SCENARIO

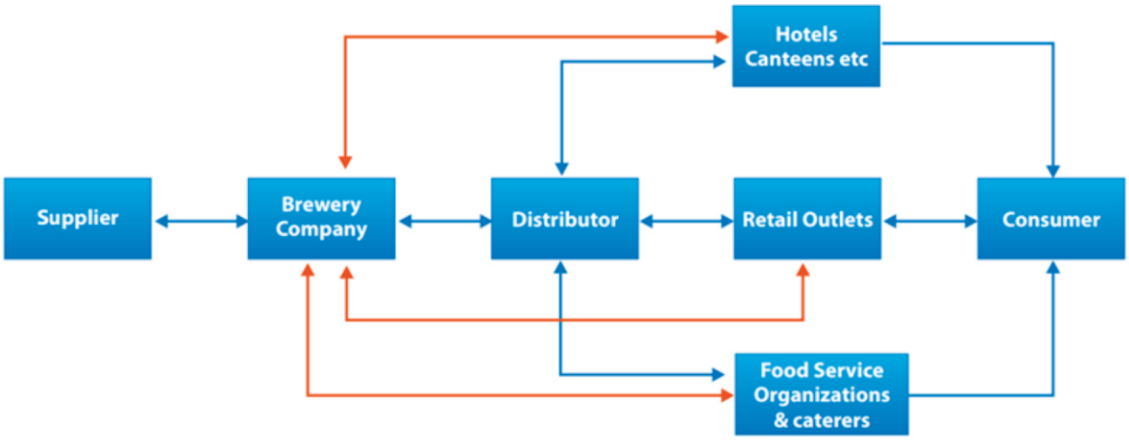
-by Editorial

The brewery industry is going through a particularly challenging phase given the current economic, social, and cultural changes globally. While technology advancements can help address these massive structural shifts, there needs to be a deeper comprehension of the strategic requirement before embarking on technology and business initiatives. In this challenging environment, it becomes imperative that the industry completely understands the emerging industry trends and technology developments.

Breweries have their business priorities mainly in the areas of Product Innovation, Packaging, Supply Chain Management, Geographical Expansion, Brand Building. Strengthening their sales force and increasing their retail impact on consumers are also important. We believe that for such end-to-end optimization undertakings, IT systems will play a major role in creating sustainable processes. Mobile enablement of sales force operations, trade promotion solutions, 'templatized' approach to IT integration across geographies, Digital Marketing solutions, Supply Chain and Vendor Management solutions and PLM solutions are a few of the levers to attain their business goals.

Supply Chain / Distribution:

The traditional distribution system in the brewery industry involves a three-tier structure with delivery enabled through value-added distributors. These distributors merchandise, sell, and deliver the product to the end consumers. This structure often creates a conflict of interest between the value-added distributors and the beer manufacturers. The manufacturer's profits from increased sales is at the expense of distributors' margins whereas distributors could profit by selling products at higher profit margins, which forces the manufacturer to cut or optimize their own costs. The diagram below captures the complex interactions among the various stakeholders in the Brewery Supply Chain:



The conflicting interests of manufacturers, distributors and retailers coupled with government regulations force manufacturers to revaluate their supply chain systems to address some of the following challenges:

- Address commodity price volatility
- Manage expanding portfolio of multiple variants of different products/stock keeping units (SKUs) and eliminate non-profitable variants
- Provide higher service levels demanded by distributors and retailers
- Comply with government regulations in batch management and traceability requirements

• Accurately understand the complexities of working in emerging markets and the high cost to serve variation between urban and rural markets

The global diversification of operations is forcing brewers to adopt a model that will work on the concept of a centralized supply chain, which looks at integration of Sourcing, Distribution, and Manufacturing processes across various markets and geographies. The primary reason for adopting such a model is to have a supply chain that provides tangible improvement in logistic networks by rationalizing warehousing and transportation capacities. This ultimately enables the brewery organization to establish well in local as well and new markets, through cost competitiveness, increased focus on consumer-facing activities and faster product launches.

Integrating and optimizing the entire supply chain:

With diversification into emerging markets, the cost of reaching customers is also increasing. The ratio of number of rural customers to urban ones is high in these markets and hence it proportionally increases distribution and marketing costs. Companies should focus on optimizing their supply chain to reduce distribution costs and increase profitability in such markets. Supply Chain optimization is the most important lever for global breweries to tackle costs and keep them in check. The most important aspects that companies should consider during supply chain optimization are reducing cycle times, increasing forecast accuracy, reducing order-delivery cycle and reducing inventory cycle. Some of the important levers that will be useful in reducing costs along the entire supply chain are:

SKU Rationalization

Mergers and acquisitions necessitate a high level of consolidation in the number of SKUs handled by companies. Its impact is immense and has a ripple effect over the entire supply chain. The broad areas in the supply chain that are affected by this phenomenon are highlighted below:

- Supplier rationalization and consolidation
- Manufacturing asset rationalization and demand driven manufacturing Integrated planning and scheduling
- Network design for consolidated supply chain
- Distribution planning and inventory optimization Demand forecasting for new products
- Packaging capability enhancement Logistics efficiency – route planning, space utilization, etc.

Some of the measures that the manufacturers should look at to solve these issue are:

- Planning tactical distribution Improving strategic sourcing
- Redesigning supply chain network

Warehouse automation

The number of new SKUs and product variants introduced by companies are pressuring them to rethink their warehousing strategy. In addition to this, rapidly changing packaging configurations, traceability needs, green packaging regulations and shortening product life cycles are immensely affecting the way beer companies have to be agile when it comes to warehouse planning. Brewery majors are moreover also forced to improve cost effectiveness. Automation of warehousing planning and providing an equally agile distribution system could help companies reallocate their scarce resources for maximum return.

Centralizing the supply chain

The centralization of the supply chain would be a trend that would be put to action by most companies looking to optimize their supply chain costs. The key reason for institutionalizing such a model is to have a supply chain for one brewery at one location instead of having one which operates for 'n' breweries in 'n' locations. A centralized supply chain addresses the needs of various geographies and markets while keeping cost at a minimum. It will integrate enterprise group procurement, supply chain and logistics functions into one. Such an initiative would be able to:

07

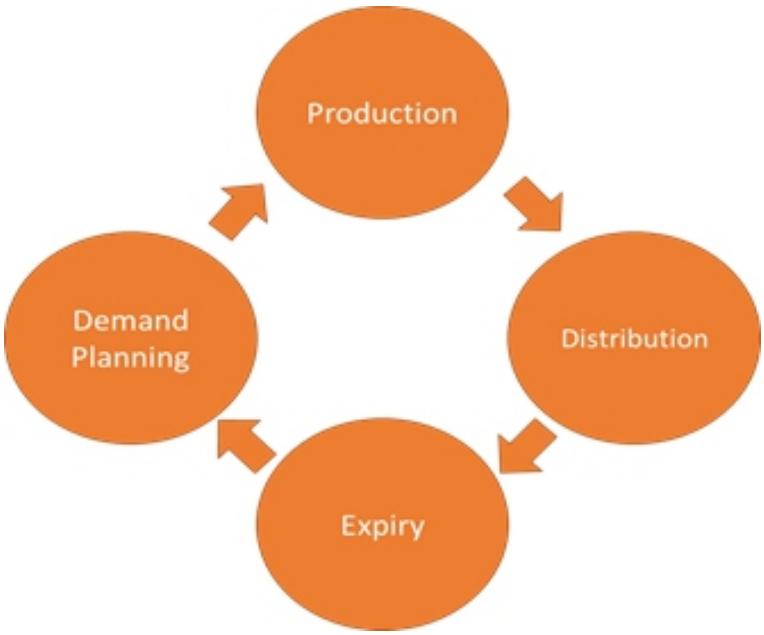
TACKLING SUPPLY CHAIN CHALLENGES IN AN INDIAN BEVERAGE STARTUP

-by Mr. Shashank Sharma,
Supply Chain & Automation Manager at Hector Beverages

Shashank has a keen interest in product development, he is also actively involved in sales force automation, ERP Automation to improve operational efficiencies at Hector. He has an MBA in Operations from IIM Kozhikode and B.E (Hons.) in Computer Science from BITS Pilani –Pilani Campus

Indian beverages industry has seen a sudden shift in the consumer demand. An industry which was heavily dominated by cola& soft drinks is now ready to try sports drinks, fruit drinks, bottled water, ready to drink tea and coffee etc. Handling these new age drinks for a company as they are prone to contaminate if comes in contact of other products & deteriorating shelf life are some of the challenges companies face. Cold storage is another new additional hurdle to keep the product safe.

For a startup with a perishable product, decision to produce on a day or not is a very big question. A loss in sales is a reputation loss which company can't risk and overproduction is loss of precious company money which can hinder growth. Having an efficient & agile supply chain becomes very important for a high growth startup company with a perishable product. Normal product life cycle for a beverage company



follows this pattern.

In a beverages company, challenges of supply chain can be broadly divided into following categories

Vendor Identification & Finalization

It is very important to create vendors who can be your long time partners in the journey. As you are also not very sure about success & growth of your product, it becomes rather difficult to convince vendor to provide you the best rates & services. It is imperative for the supply chain team to negotiate well as their negotiation will decide the COGS and margin of the product.

Your vendors will keep the secret about some of the technologies or innovations introduced by you to swiftly gain the market share. You should have full confidence on your vendors or rather need to find a vendor who can be trusted with confidential information.

Resource Handling & Logistics

Procurement of the ingredients and then backward logistics of same to plant needs to be handled very smartly. Most of the ingredients require special handling like keeping the temperature below 7 deg. Cen. Requirement of specialized cold storage to keep them safe once delivered at the plant and specialized

vehicle to transfer them to plant is something always in the mind of supply chain. Convincing the vendors to all these luxuries with less margin and low volume is a daunting task supply chain team faces.

Even the logistics of finished goods requires proper handling as the product is very susceptible to leakages & contamination. With improved technology in packaging, need to have specialized cold storage vehicle has reduced. Today, Beverages can be transferred in a normal vehicle by only keeping them safe from other food products and rains.

Demand Planning & Distribution

As the product category of juice itself is fairly new in our country, its demand planning is not impossible but difficult feat to achieve. Many of the FMCG rely on the past data of cola and soft drinks, which itself increases the error percentage. Also the decision of supply chain to produce or not to produce can on one hand lead to loss of COGS in case of expiry or loss of GM and opportunity in the market.

One of the methods which is preferable in such scenario is to have demand planning for small duration and to be agile based on market feedback. An established category has a demand planning duration of a year, where company understands the product demand across months and season. For a new category, this period can be reduced to a month or season (approx. 3 months.), this way you not only reduce the expiry or over production but also manage your good will in the market with less stock outs.

Reverse Logistics

With the advent of new technology in packaging, reverse logistics has reduced drastically. In Past, Coca-Cola used to have separate reverse logistics to bring back all the glass bottle for refilling as glass bottles were expensive and disposing them off was rather difficult. Now with new packaging, we have seen significant cost reduction in terms of packaging material. Even disposing them off after drinking is not hazardous as compared to glass bottles.

The new challenge is the volume of reverse logistics which is very small and consists of mostly expired or damaged products. Cost of logistics in transferring this to your manufacturing location for disposing is very high. There are many companies who have taken disposing of expired products as a new business stream. Technology like incineration, Co-processing etc. has mushroomed up. These technologies reduces air as well water pollution. Due to these companies, normally reverse logistics is limited to transferring the product from your distribution to their plants. This reduces significant reverse logistics cost for the company.

Automation & Information Technology

Increased use of automation keeps you ahead of curve from traditional FMCG companies. You can not only reduce your manpower cost but can also be more agile in bringing changes with information present at your fingertips. As implementation is easier for a startup from established firm, it is very important for a supply chain team to take advantage of it to improve their efficiency.

IT & Automation should be used starting from procurement, backward logistics, Manufacturing, Demand Planning & Forward logistics. With a minimal cost, at each stage you can save significantly in terms of manpower as well bring more optimization. More information also enables you to take relevant decision faster without lagging behind in cutting losses through wrong decisions.

With all these challenges, role of supply chain has become more crucial for a beverages company specialized in new age drinks. Keeping the brand mantra alive for a unique product and convincing vendors to reduce cost is a difficult task, which if achieved can pave the way for huge success for the company.

CASE STUDY ON

A true Case of “Life Saving Logistics Services”

Customer Background

The client is the second company in the world and first in India to launch the purified Vero Cell Rabies Vaccine (PVRV). It operates one of the largest plants in the world for veterinary vaccine which is WHO-GMP & ISO-9001 certified.

Customer Challenge

The client was facing an enormous challenge of safe and timely transport of the vaccines from its Hyderabad plant to different states (Distribution Centres & Medical Stores). This triggered the need of effective supply chain management to make it leaner and more reliable.

In practice, a cold chain is complex. Vaccines are often made in one country or state and used in another country or state. Vaccines must be carried to places where the roads are bad and faces many haphazard while transportation.

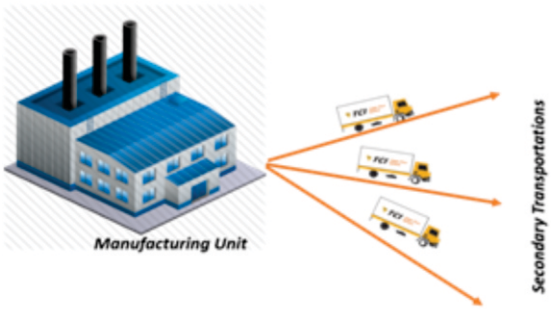
Customer Objective

1.100% Safe Delivery

2.100% on-time delivery

Snap Shot

Volume of Vaccines handled so far	2500MT For Humans: Polio drops
Types of Vaccine	For Animals: Bovine, Caprine, Ovines, Porcines & Canines
From Location	Hyderabad Plant
To Location	Pan India
Temperature Maintained	20C-80C
No of shipments done so far	6100 shipments



Our Approach

TCI SCS approached the issue with a holistic perspective. A cross functional team was formed and a road map was prepared.

The scope of work was to transport the Vaccines from to the plant to the different distribution centres and medical outlets by maintaining at the temperatures higher than 80C (the optimum temperature range for vaccine storage is 20C-80C)

Our extensive network of dedicated distribution operations enables us to fulfill our commitments to the customer end anywhere in the country.

Effective resource allocation towards the same

The Client presented the challenge that involved safe and on-time delivery of the vaccine involving advanced tracking and tracing systems and cost-effective distribution processes catering to the time-sensitive nature of their business.

In this regards TCI SCS Cold- Chain ensured the effective resource to the project both in terms of infrastructure and manpower so that the objectives are met.

The above graphics depicts the manpower as well as infrastructure allocated in order to ensure the delivery of desired result.

Quality implementation

We integrate our inhouse IT System with the process to ensure that there is a GLASS PIPELINE for Flow of information .

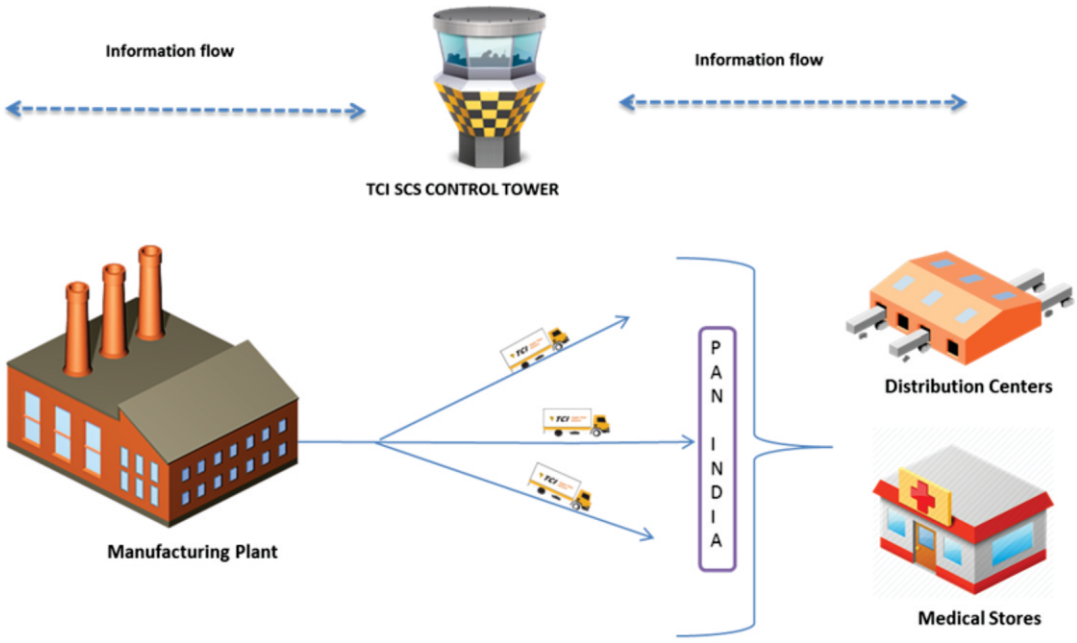
We implement Six Sigma Process, Control Charts for Quality Improvement

Also we follow the below trend as an important aspect:

Inspecting Vehicle, container AC and data logger Guideline given to driver for cooling floe patterns

- **On-line monitoring the temperature**
- **GPS installed in all the fleet to track the position.**

Data logger report
Trip sheet report



Focus on excellence :

SLA / KPI Management

One time in Full (OTIF)

- *Pickup*
- *Temperature Mapping*
- *On-Time Delivery*
- *On-Time POD*
- *Safe Delivery*

Window Time Adherence

SAFETY

- *Temperature control*
- *Hygiene*
- *Contingency Management*

Besides the above, there is a Control Tower in the HO where EACH SUPPLY CHAIN is monitored from End to End and an 11 Am MIS gives the picture to the Top management for early intervention

In Conclusion

TCI SCS has handled over 6100 shipments over the past 7-8 years, with zero level failure so far the service level is above SIX SIGMA level. As a LSP we are influencing over "TEN MILLION LIVES"

CASE STUDY ON

Movement of Bulk Denatured Ethyl Alcohol by Rail

About Client

The client a leading company that manufactures green technology based bulk, specialty and performance chemicals and natural gums, spirits, industrial gases, sugar and nutraceuticals. The company was established as a single mono-ethylene glycol plant in 1983. Since then, it has brought together cutting-edge technology, innovation and an unflagging commitment to quality, to manufacture a wide range of products that have found global demand.

About TCI Concor

TCI-CONCOR Multimodal Solutions Pvt. Ltd. is a Joint Venture between TCI & CONCOR – the leader in the domestic container transportation business. TCI Concor provides Rail+ Road end-to-end solutions creating efficiencies in supply chain.

The Challenge:

- The client was facing challenge in moving a huge volume of approx 6000 MT per month of DEA from Pipavav port, Gujarat to their plant at Kashipur, Uttarakhand on continuous basis. The Chemical being the main ingredient to various end products manufactured in the Kashipur Plant, the client couldn't afford to have any contamination in the cargo or run out of stock . Because any of these would result into complete stoppage in production line.

  So the main challenges were:

  - Huge Volume & Long distance.
  - Safe Delivery without any contamination of cargo.
  - Growing congestion and poorer road conditions making it difficult to do movement by road.
  - Increasing oil price / persistent oil dependency.
  - Deteriorating climate and local environment making company's main aim to "Go Green."

The Approach

Over the last few years there has been a continuing trend to transport an increasingly wide range of cargoes in ISO Tanktainers. Tanktainers have been part of this shift – they have provided safe, reliable and cost-effective transport for liquids, both hazardous and non hazardous, foods and chemicals. Although the shift to containers was aimed primarily at improving efficiency and cutting costs, containerization has also helped to protect the environment by lowering the carbon footprint and reducing waste.

So to address the challenge of carrying huge volume, Safe delivery without any contamination, covering long distance in short time and Go green initiative of client, TCI Concor has started movement of DEA in ISO Tanktainer by Rail.

ISO Tanktainers: reusable, recyclable, re-manufacturable

Tanktainers are manufactured in a range of capacities, with various configurations of valves and fittings. Typically, a standard tank carries 25,000 litres and has a maximum gross weight of 36 metric tonnes. A discharge valve is mounted at the rear end; access for loading, cleaning and maintenance is at the top. Accessories can include steam heating, ladders and walkway access to the top.

Operations

1. A rake with 90 ISO Tanktainers reach at loading point.
2. Loading on-wheels is done in all ISO Tankatiners at one go.

3. After loading a seal is put on each and every valve of ISO Tanktainer.

4. After Loading Rake is dispatched to its destination.

Conclusion:

TCI Concor has handled around 1.5Mn. Metric Ton of cargo safely, with zero level failure so far. The main aim is to use resources efficiently and minimise waste. Improve continuously environmental, health, safety and security knowledge and performance so as to avoid harm to people and the environment.

GLOSSARY

1.QHSE :

QHSE Policy (Quality, Health, Safety and Environment) -the four components of a responsible corporate management that aims to achieve the highest standards of Quality, Health, Safety and Environment throughout its operations. QHSE, in all aspects of operations and activities committed to providing a safe and healthy working and living environment that broadly includes :

- Ensure all operations are fully compliant with statutory regulations governing the health and safety of employees and the community.
- Committed to attaining the world's most recognised occupational health and safety management system certification by implementing OHSAS 18001 standards.
- Continually analyze and assess risk factors, both physical and social, that may affect the safety and health of employees.
- Recognize that people are most important asset and provide them with appropriate health and safety awareness to minimize risk of injury or sickness, via circulars, internal workshops and toolbox talks, as well as external training/courses.
- Promote the physical and psychological health of employees to enable them to discharge their responsibilities effectively at an optimum level.
- Provide and maintain First Aid facilities and training at all work sites, offices and employee housing areas.
- Provide basic Emergency Response facilities and training to employees.
- Maintain adequate medical records of employees, and provide them access to quality medical services with proper health insurance coverage.

2.CFS:

A container freight station (CFS) is a port facility typically located in proximity to an ocean, port, or airport where cargoes are consolidated into or deconsolidated from containers for transport to their next destination. The term CFS at loading port means the location designated by carriers for the receiving of cargo to be loaded into containers by the carrier. At discharge or destination ports, the term CFS means the bonded location designated by carriers for devanning of containerized cargo. A CFS is an extension of a port/airport/LCS/ICD customs station, set up with the main objective of decongesting the ports, where only a part of the customs process mainly the examination of goods is normally carried out by Customs.

3. Cabotage Law :

Cabotage refers to the transport of goods or passengers between two places in the same country along coastal routes between foreign sea ports, by a transport operator from another country to the restriction on the operation of vessels between sea ports within a particular country. It now applies to aviation, railways, and road transport as well.

The Indian Cabotage rules are contained in Sections 406 and407 under Part XIV of the Merchant Shipping Act 1958 (the Act).

In Shipping : Cabotage laws apply to merchant ships in most countries that have a coastline so as to protect the domestic shipping industry from foreign competition, preserve domestically owned shipping infrastructure for national security purposes, and ensure safety in congested territorial waters.

In aviation : It is the right to operate within the domestic borders of another country. Most countries do not permit aviation cabotage, and there are strict sanctions against it, for reasons of economic protectionism, national security, or public safety.

4. CRZ :

As per the notification, Under the Environment Protection Act, 1986 of India, notification was issued in February, 1991, for regulation of activities in the coastal area by the Ministry of Environment and Forests (MoEF) the coastal land up to 500m from the High Tide Line (HTL) and a stage of 100m along banks of creeks, estuaries, backwater and rivers subject to tidal fluctuations, is called the Coastal Regulation Zone(CRZ). CRZ along the country has been placed in four categories as CRZ-1, CRZ-2, CRZ-3,CRZ-4.

CRZ-1 : These are ecologically sensitive areas these are essential in maintaining ecosystem of the coast. They lie between low and high tide line. Exploration of natural gas and extraction of salt are permitted

CRZ-2: These areas form up to the shore line of the coast. Authorized structures are not allowed to construct in this zone

CRZ-3: Rural and urban localities which fall outside the 1 and 2. Only certain activities related to agriculture even some public facilities are allowed in this zone

CRZ-4 : This lies in aquatic area up to territorial limits. Fishing and allied activities are permitted in this zone. Solid waste should be let off in this zone.

5. PLM :

Product Lifecycle Management (PLM) helps to manage complex, cross-functional processes, coordinating the efforts of distributed teams to consistently and efficiently develop the best possible products. The PTC PLM software system manages all aspects of the product development lifecycle, from concept through service and retirement. By optimizing product development processes and using a single, secure source of information, you can develop products that are competitive, cost-effective, and high quality.

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- Faster time-to-market
- Increased productivity
- Design efficiency
- Increased product quality
- Lower cost of new product introduction
- Insight into critical business processes
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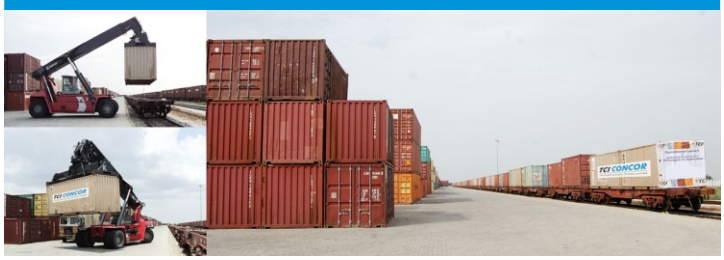

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The core values offered by TCI Supply Chain Solutions are operating on shorter product life cycles, scientifically and professionally managed inventory, supplemented with state-of-the-art material handling equipment warehousing and multi-modal transportation. And also managing and integrating the flow of information amongst hundreds of outsourced supply chain partners and the enterprises that employ them.

Key Industries

Retail / E-tail

- Network Design
- Vendor to DC / Store platform and logistics
- Distribution Centre Design, Management,
- Value Added Services : QC, kitting, packaging
- Distribution - Milk Run, B to C, Collection on Delivery
- Reverse Logistics & Processing

Chemical

Adherence to Statutory Health Safety & Environment Practices

- Solids, Liquids, Gases
- Production Logistics
- Raw Material Stores, QC, Silo Charging
- Finished goods store & Value Added Services
- Freight Desk, Transportation
- EXIM Services : Bonded warehousing, Custom Clearance

Auto

Design to Execution:

- Production Logistics, Returnable Management, Kitting and Line Feeding
- CBU Logistics, Multi-modal Logistics, Yard Management
- Aftermarket Logistics & Distribution Center
- Parts Consolidation Center (PCC) for EXIM

Hi-Tech

Consumer Products:

- Production Logistic, Kitting and Line Feeding
- Distribution for B- B & B-C over surface & air
- Distribution Center Management
- Aftermarket & Reverse Logistics

Projects & Equipment

- Site logistics Plan & Execution
- Yard / Distribution Center Management
- Reverse Logistics

Cold Chain

- State of the art Reefer vehicles
- Temperature view over GPS
- City Delivery & Cross Country
- Emerging Cold Room network

Pharma & Health Care

Ambient & Cold Chain

- Distribution Center Management
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- 24 hour Track & Trace
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