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Logistics Focus®

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Packaging in Logistics

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KEY FACTS

Group Turnover	Employee Strength	Vehicles/day Managed on Road	Cargo Ships (Coastal Waters)	Warehouse Covered Area	Own Branch Network
$600 Mn. (in 2017-18)	6000+	12000	6	12 (million sq. Ft.)	1400+

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About Us

Group TCI, with revenues of over Rs. 3,600 Cr, is India's leading integrated supply chain and logistics solutions provider. TCI group with expertise developed over 6 decades has an extensive network of company owned offices, 12 mn. Sq. ft. of Warehousing space and a strong team of trained employees. With its customer-centric approach, world class resources, State-of-Art technology and professional management, the group follows strong corporate governance and is committed to value creation for its stakeholders and social responsibilities. TCI was the first to launch several solutions in the logistics field.

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Credit rating and certifications: The company received AA-/ Stable rating for long-term debt instruments and A+ for short-term rating from CRISIL. ICRA rated A1+ rating for its commercial paper. The company was also accredited with ISO 9001:2008, reflecting its conformance with quality standards. It was also certified by IATA.

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Foreword

Dear Readers,

We welcome you all to yet another edition of Logistics Focus, whose motive is to share the best industry practices, benchmarks, achievements and challenges.

This edition focuses on 'Packaging in Logistics'. Packaging, also called as the '5th P of Maketing' worldwide, is one of the critical aspects of brand building. it remains at the centre of operational strategy for any organization because without proper packaging, no goods can move in the entire value chain. With varied roles ranging from safety & security to aesthetics values attached to it, packaging has to up its game in order to drive consumer's attention. With much diverted attention towards the nuances of packaging, supply chain also needs to substantiate its crucial role in making goods reach safely while sustaining the essence of packaging till the last mile. With this issue, we address the best practices of logistics and supply chain industry and how companies can ace their packaging strategies in the wake of rising competition.

Finally, sincere thanks to all the writers for their contribution. We await your valuable feedback and intend to continue enriching your reading experience through Logistics Focus.

Thanks,
Jasjit Sethi

Jasjit Sethi
CEO, TCI Supply Chain Solutions

Jasjit heads TCI Supply Chain Solutions, which is part of Transport Corporation of India Group. Jasjit is an Alumni of Harvard Business School, Amity Business School, besides short term courses with NITIE, Powai and National University of Singapore, amongst others.
He is Past President of Delhi Roundtable of CSCMP, member of FICCI National Committee on Infrastructure etc.

Fundamentals of Packaging

Packaging is a fundamental element in logistics systems. Packaging not only affects every logistical activity; it is also recognised as having a significant impact on logistics costs and performance. For logisticians and packaging professionals to gain insight into packaging-dependent costs and performance, the interactions between packaging systems and logistics systems must be understood.

Sunu Mathew has 22+ years of business experience which includes 5 years of his start-up LEAP, decisive executive leadership with CHEP India for 6 years and LOREAL India for 12 years. His experience ranges from strategic management, marketing and sales, with a rare combination of supply chain solutions. He is an MBA from FMS/IIRM, SMP from IIM Calcutta and MDP from INSEAD (France).

The packaging industry is evolving. We now know that packaging no longer refers to a box or a carton, but rather to a coordinated system of preparing goods for safe, cost-effective, and efficient movement throughout the whole supply chain that eventually leads to maximizing consumer value, sales and hence profits.

This means packaging also plays an integral role in supply chain management. It protects products from damage, allows for their efficient distribution, communicates to the consumers, and is one of the major product promoters in a competitive marketplace. In fact, packaging design has recently developed into a mature communication discipline on its own – and clients now realize that packaging is a critical and central element in the creation of an effective brand identity.

To achieve a successful supply chain management, packaging systems must relate to aspects of marketing, logistics, productions, and the environment.

Why do we need packaging? This diagrammatic representation answers all queries.

Logistics demands for packages that can be easily handled throughout all processes and for the consumers. Marketing, on the other hand, requires for appealing packages that can engage costumers. Production usually demands for one size of packaging for all types of products to minimize time and labour costs. Good packages can satisfy all these aspects while also fulfilling consumers' expectations to create the desire to try the product.

Below are the types of packaging involved:

1) **Primary Packaging:** It surrounds the product & feature labelling.
2) **Secondary Packaging:** It is the box or crate into which a number of primary packages are placed for ease of manual movement of products.
3) **Tertiary Packaging:** This is the base pallet, strapping & wrapping used to bundle the boxes or crates for transport & distribution.

For logistics, a package system requires 3 types of information to design viz..

1) Severity of the distribution environment.
2) Fragility of the product.
3) Performance characteristics of various cushion materials.

For uniform & smooth logistics, labelling of the packaging is important. It consists of:

1) Retroflective labels
2) Batch numbers
3) Weight
4) Specific contents
5) Instruction for use
6) Information to allow passage through customs
7) Compliance labelling
8) One or two dimensional bar codes
9) Smart labels or RFID labels

The new concept of packaging logistics brought by companies like LEAP India Pvt Ltd is now focusing on the synergy achieved by mixing packaging and logistics systems with the efficiency and effectiveness of supply chain management through the improvement of both logistic and packaging activities. In other words, it is the relationship and interaction between packaging and logistic systems that increase add-on values on the complete supply chain, from raw material producers to the disposal of empty packages by recycling, landfill, or incineration.

Yet in current operational environments, these innovations must also take into consideration emerging factor: the environmental function. It aims to lower the negative impact of the packaging system over the environment by focusing on issues like using fewer inputs while achieving the same outputs and the re-use of materials and facilitating packaging recycling in supply chain management.

In fact, an increasing number of businesses are now choosing environmental friendly approaches and techniques since it became clear that the packaging system has a substantial influence over the environmental aspect of the supply chain. LEAP India- a SCM Pro Award winner, is one of the best example that has brought in the pooling model to improve supply chain efficiency by providing reusable & innovative pallets, crates, totes, inserts and containers that helps to reduce product damage and saves customers time and money. This returnable concept of LEAP is a win-win situation for both environment & companies.

Conclusion

Packaging today involves far more than boxes and bags, but even though there has been an incredible revolution in the industry, packaging optimization still needs to be at the centre of all efforts leading to supply chain management enhancements.

Countless marketing studies over the years have concluded that optimized packaging will deliver results in many aspects of the supply chain. It can increase product efficiency, smooth the handling of materials at the production floor, ensure the efficient use of modern supply chain technology like stackers and pallets, creates better operational activities at both the warehouse and the plant, and makes for an easier damage control process, inventory management, cycle counts, and space usage.

Simply put, packaging optimization enhances the overall supply chain cost optimization and leads to a maximized return on investment.

Packaging – Enhancing Value

Packaging & labeling act like a Passport for the product as they effectively connect the products with the people. While packaging is the last operation at manufacturing, it is the first impression at selling. It boosts both, smooth selling of the product as well as smooth sailing of the brand. Learn the art & craft of packaging by design or by default from the veteran himself through this article... by Prabir Kumar Das, Head – Packaging Tech. Services, OSD, Mylan Laboratories Limited, India.

Prabir Kumar Das is a packaging enthusiast with over three decades of experience in this vast territory. He started his career with a packaging material manufacturer and packaging converters to strengthen the basics. Post this, he served at one of the top Indian Pharmaceutical Companies (erstwhile Ranbaxy Laboratories) for 2 decades before joining Mylan Laboratories. He is a B.Sc. Honors from Calcutta University and a Master's Diploma from Indian Institute of Packaging.

WHILE choosing Packaging as a career 33 years ago, back in 1985, I was not fully aware of its role and importance in our lives. The concept of globalization and consumerization was nascent in this part of the world. But after completion of the course, I soon realized that it is a subject where science, arts and commerce are homogeneously blended to make it a technology driven and application-oriented subject with immense potential in coming days.

Many different types of materials and technologies are involved in packaging, directly or indirectly. Because of this wide variety of materials, many different conversion processes are also involved, which covers a large section of the industry. The technology world suddenly started looking wider than the real world. A wide range of packaging materials, designs and processes are available for adoption, depending on the nature of the product, intended end use and mode of distribution. It ensures the product retains the same quality through its assigned shelf life. It takes as much care for the product as a mother takes for her child. Very silently, it establishes the connectivity between the product and the people. Now I can proudly claim that the growth & success of globalization and consumerization is a triumph of Packaging with its valuable contribution.

I feel proud to be associated with the healthcare industry for the past 27 years where Packaging is regarded as a complement to the product and instrumental in maintaining the efficacy of the product throughout its shelf life. The profession and the industry have helped me to establish myself in the society and evolve as a person with numerous qualities. The most significant learning is a timely service to the distressed and deserving people who are struggling to live a healthy life.

The added advantage

I have observed, apart from primary Packaging functions of protection & preservation, there are many secondary functions that have emerged due to consumerization and globalization. Many value-added features have started getting embedded in packaging and labeling to comply with various regulatory, quality and patient compliance to sustain and survive in the industry.

While some of these features are for consumer convenience, tamper evidence, and authentication, others are for product positioning, safety and security across the supply chain. With all these primary and secondary functions, Packaging has now become responsible & accountable for brand building for the product and trust building with the people. For the consumers to be able to trust the brand, packaging empowers the brand to dispense medical products to its customers with ease. This not only ensures customer convenience, but also guarantees delivery without damage, spillage or breakage. Furthermore, auto-reminders are now in vogue to ensure punctuality for the users, adding to the convenience of product usage. The socio-ecological drive also prompts packaging to be smart and environment-friendly to promote the campaign on Reduce, Reuse & Recycle program and to promote disposability & biodegradability.

Growing awareness

Spreading awareness in the industry, in academia and the media have also taken a new shape with the evolving scenario. Now, the subject of Packaging has scaled up exceptionally and exponentially. However still, there are unexplored opportunities prevailing at different levels and sectors of the industry. While big players at the top layer have understood its importance, medium and small sectors are yet to recognize its full potential. They are hesitant to take risks and realize the returns. It is experienced that a good product may fail to attain success with bad packaging, but a poor product can achieve it with a good packaging. Packaging demands as much attention and passion as the product itself. With a balanced and compliant feature embedded in packaging, it can transform the entire brand building and product positioning exercise for an organization and this is what we call consumerization.

Smart packaging at the fore

Over the years, a trend of change has been observed from the style of conventional packaging to convenient and smart packaging, efficiently backed up by operational changes from manual to semi-automatic or fully automatic packaging lines, not only to scale it up for volume, but also to reduce variability and improve consistency in quality and compliance. Various technologies started blending to assist automation through standardization and harmonization of packaging designs and systems. The streamlining and smoothening of processes also allows for the industry to expand to more geographies, allowing room for progress. Hence the adoption of a global paradigm becomes a possibility and ensures advancement of the business. Online processes are designed to ensure stronger controls and compliances. Combination of mechanical-electrical-optical engineering and introduction of digital electronics have brought about a technological revolution in various

conversion industries, including packaging. All these technologies adopted and adapted to ensure improvement in productivity, quality, stability, safety & security. With this rapid unconventional growth of the industry, a parallel threat has also grown proportionately to tarnish the trust of people on successful products and brands. Many value-added features then appeared and embedded in packaging to prevent tampering, theft, duplication, diversion, etc. On the compliance front, there came child-resistant features, senior-friendly features, punctuality compliant features, easy dispensing features, age-band specific designs, and many other features based on dynamic regulatory & customer compliance requirements.

However, the growth rate of technology was much faster than the overall growth of the industry. Only bigger, more progressive players could afford and adopt them based on their strength, leaving the weaker players behind in the competition. A few bigger players were also left behind due to lack of foresight and reluctance in investment risk. Few faced limited infrastructure for extension or expansion of packaging facilities to embrace changes and challenges. Newer compliance challenges emanating from statutory and regulatory guidelines from local and global agencies further brought high investment and larger space requirements to sustain and survive in the industry. Such challenges often end up with either finding loopholes in the law or result in strong lobbying to bend the rulings. Such a situation sometimes creates chaotic business cases, obliterating all the innovative solutions to support control and compliance.

A rocky road

There are many challenges to keep pace with this regulatory and technology-driven environment. The key challenges are harmonization of regulations from different geographies, integration of different technologies, training and skill development of people, simultaneous development of product and packaging, strong and reliable supply chain network, backward integration of raw material and conversion industries, academy-industry-regulators networking, awareness building among the people through seminars / conferences, etc. People need to understand that a consumer gets the product in their hand only with its packaging and entire trust building process takes place through it. The consumer is sure to get a product with its intended quality, if the internal and external issues are foreseen and countered before they occur. For instance, internally, the product is affected by the quality of packing and labelling, it may be exposed to heat and light or even be damaged. During transit, the product may be subjected to poor handling or storage issues, may be exposed to humidity and gases and may also face spillage or mix-ups. For these reasons, all of these issues are to be carefully taken into account and prevented if the consumer is to receive the product with its integrity intact. Most of these issues are taken care of by employing expert packaging and organization practices.

The change of packaging has the power to affect the consumer's impression of a product and affect the product's mind share. Good and smart packaging effectively communicates and transfers the value of the product silently. We have

a long way to travel with many more challenges and threats in the days ahead. Digitization and communication will be two major drivers in all sectors from development to distribution. Services will be equally important as goods and consumer expectation will be as dynamic as ever along with regulations to safeguard public health. All layers of the industry need to get a true professional to channelize the resources for critical functions and allocate sufficient provision to adapt to quick changes. Unfortunately, packaging today is still considered a non-critical service function in many organizations that operate based on prompt resolutions.

In conclusion, what I have learned is – Packaging connects the product with the people. So, it is vital to understand the product, understand what people want and understand the process itself – How people can easily access the product and how the packaging function helps facilitate it by applying knowledge on material and technology, rules and regulations, logistics and distribution, economy and environment.

The Efficiency – Risk, Safety and Security

THREATS – Damage, Spillage, Breakage, Pilferage, Exchange, Diversion

EXTERNAL CONDITIONS – Heat, Light, Humidity, Gases, Natural disasters

HANDLING & STORAGE – Automation, Standardization and Palletisation

LOGISTICS & DISTRIBUTION – Containerization, Travel (Land, Water & Air)

DESTINATION & DEMOGRAPHY – Geography, Weather, People & Practices

RULES & REGULATIONS – Environmental, Commercial, Logistical, Safety

Value Added Features in Packaging

AUTHENTICATION – To ensure genuineness of the product and its ownership

TAMPER EVIDENCE – To prevent pilferage or theft

TRACK & TRACE – To monitor movement across supply chain, to ensure genuineness and to prevent pilferage / diversion

DISPENSING EASE – To enable customers to take the medicines without damage, spillage or breakage

AUTO REMINDERS – To facilitate punctuality to the users without a miss.

Technology and Innovation in Logistics Packaging

For an industry of high magnitude and scale, it becomes paramount to bring forth speed, efficiency, and optimization across the logistics packaging value chain. Every change, big or small, can have a long-lasting impact and can transform the way packaging is managed in the industry. Gulshan Kaushik, Director - Strategy & Operations (North Region), Bizongo, enlists 5 big areas in which technology combined with innovation can transform the essence of packaging in logistics...

Gulshan Kaushik has 13+ years' experience in logistics. He has completed his post-graduation in General Management from IIMA and has worked in diverse functions of operations management, business development, and people management through his career.

LOGISTICS is an ever-growing industry. According to a leading media report, India's logistics industry, which is currently worth around US$160 billion is forecast to reach US$215 billion by 2020, as per a Current Affairs article published in November 2018. On average, packaging accounts for ~5% of the turnover in any industry. In effect, this means that by 2020, packaging costs in the logistics industry is likely to inch towards ~US$11 billion. This accounts only for the actual packaging costs. Apart from the direct costs that go into procuring packaging, there are many other areas like capital expenditures, loading, and transportation, all of which need significant investments. This humungous investment calls for steadfast automation in the way packaging is enhanced for the entire value chain.

Implementing End of Line Automation with Technology

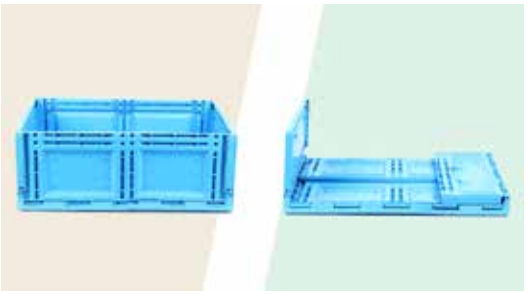
Process automation is one of the ways technology can be used in the logistics industry. Automation of processes has the power to impact businesses in a way that can transform how people remember using a product or a service. A classic example of automation is how Uber changed the way people perceive cab services. Automation in logistics packaging can have the following benefits:

- It can reduce the need to deploy manpower to complete tasks.
- It can keep track of data points in an environment with multiple variables.
- It can complete tasks much faster than with manual intervention.
- It can enable accurate and meticulous packaging of products to ensure that they are well protected and delivered correctly to the required location.

An outcome of all this would be a faster and high-quality service to the end consumer.

Robotics

The current state of logistics involves prevalent automation because environments with highly mechanized systems have been created. The adoption of robotics in the Indian logistics sector is still at a very nascent and undeveloped stage.



Some of the applications of robotics in logistics are as below:

Unloading Robots for Containers

Goods that are shipped to distant locations may often be stacked from the floor to the ceiling in a container. The main purpose of doing so is to reduce spends on transportation. While this practice definitely helps optimize transportation cost, it adds on overhead in terms of loading and unloading these containers. Products were put into crates or master cartons and then put onto pallets, prolonging the process. Unloading robots helped to load products individually to utilize container space optimally, reducing overhead.

Piece Picking Robots

Another activity in logistics that can be time and resource intensive is picking up products from different parts of the warehouse and putting them together for delivery. Many logistics warehouses have people employed to carry these tasks. With the general size of the warehouses and nature of the job, these employees need to walk a few miles every day. An organization can look at minimizing these efforts with a goods-to-picker robot also known as a stationary piece picking robot. Another variation of this category of robots is the mobile piece picking robot developed by IAM Robotics that functions as a human would and goes around the warehouse picking products.

Auto Sorting Solutions

An activity that consumes an exceptional amount of time in logistics is the sorting of products according to a particular category. An example of this is the requirement to sort products for delivery according to its pin code. Usually, this type of activity needs the knowledge and understanding of pin codes and how to sort them. The dependency on these people become so high, that in the event of unavailability of manpower, the sorting for a particular region of pin codes for deliveries for that day would get halted. To reduce the required manpower and eliminate such dependencies, automatic sorters can be used to sort productsw according to a particular category. The auto-sorting project was undertaken in response to the increase in the volume of parcel shifts across the globe due to the online ordering system.

RFID Tags

Simply put, RFID- also known as radio frequency identification, is a system through which logistic packaging can be tracked. This is possible through two components which are - RFID tag and RFID reader. Let's take an example to explain the application of RFID. Assume that there are 1000 packets that have been dispatched to a delivery center. Now at the time of delivery, instead of checking each packet individually, the entire consignment can be tracked at once with an RFID scanner. Information such as quality & test certificates or similar data can also be stored on RFID tags to be used in real-time. At warehouses, RFID tags can also be used to track and fetch parcels on the huge and complicated warehouse floors with ease.

Streamlining Packaging Procurement with Digital Technology

Packaging procurement, as a stand-alone activity, can be extremely tedious and resource demanding. If the entire process has to be

outlined from the top, it involves the following steps:

- Identifying and finalizing packaging manufacturers that fulfill your requirements
- Placing and tracking orders with different manufacturers
- Managing inventory for order placement to strike a fine balance between timely availability of inventory and controlling warehousing costs
- Creating POs and making payments.

These steps have to be done many times over as each different type and category of packaging requires a different manufacturer. This multiplies the effort spent in each step depending on the number of packaging categories required.

All these steps can be simplified with the implementation of a digital platform that manages end-to-end procurement for businesses. An example of such a platform is Procure Live- Bizongo's solution to address all packaging procurement related challenges.

By using Procure Live, businesses can:

- Get their packaging sourced from local manufacturers as per requirement at the best available price This is made possible through the community of manufacturing partners created by Bizongo, which are then mapped to business requirements using the digital platform.
- Place orders conveniently with a customized catalog. These orders can then be tracked at every step to ensure timely deliveries.
- Keep track of the available inventory on Procure Live to set into motion a system that facilitates the availability of inventory as and when required.
- Make payments and keep track of activities associated with it effortlessly. This has been possible with the clear demarcation of payment status to ensure complete transparency.

Adopting Simplistic Packaging Solutions

While the common approach towards building optimized and time efficient packaging solutions is rigorous research, it doesn't always have to be the case. Sometimes, looking at challenges by keeping in mind the basic principles can create a noteworthy impact. Following are a few packaging solutions that can result in considerable optimization in terms of cost as well as space utilization:

Crate with Rivets & Rings

Crates with lids are often used in the logistics industry. However, one challenge that organizations face with these types of crates is that after a certain period of time the lid breaks off at the hinge rendering the crate useless. From an expense standpoint, when the scale is involved, replacing these crates with new ones adds to the overhead. A solution to addressing this issue could be using crates with lids that are attached with rivets and rings at the hinge. This essentially means that every time the lid breaks off at the hinge, it can be fixed by simply replacing the ring.

Foldable Crates and Nestable Stackable Crates

Foldable crates are a packaging design innovation that optimizes the usage of space and brings down costs. These crates can be assembled when required to transport or store goods and materials. During other times, these crates can be folded and stored aside and occupy only ~1/5th of the space in comparison to when they are open. In terms of reverse logistics, these crates will require very little space in the transport vehicle after they have been unloaded. In the context of the warehouse, the space occupied by these crates will be significantly lesser when not in use. Nestable and stackable crates have a similar application as well. They can be nested when not in use and stacked when packed with goods.

PP Corrugated Boxes

In the more recent innovations in packaging is PP corrugated boxes, a smarter alternative to cardboard boxes. Why? Well, there are many reasons for it. One of the reasons is that PP corrugated boxes can be used multiple times as opposed to cardboard boxes which are disposed of after one use. PP boxes reside in a sweet spot between corrugated boxes and plastic crates. They can be reused, they have the strength and features to carry valuable and delicate items, they are returnable and in comparison to crates, they are cost-effective. Today, many organizations use PP corrugated boxes for internal delivery of spare parts. However, the market is yet to see widespread adoption of this sustainable packaging solution.

Introducing Transparency in Transport and Delivery

Transparency in tracking the transport and delivery of products is often a major challenge for most companies. A few global stalwarts in logistics have incorporated GPS technology to track their shipments transparently. However, a large percentage of the industry is yet to adopt the GPS technology. Also, with the easy accessibility to smartphones, these systems can be integrated as mobile applications as well. Here's a look at some of the benefits you can expect after incorporating GPS technology into the logistics for various businesses:

- It allows you to manage your fleet remotely. Along with planning trips for your vehicles, you can also have access to the status of every vehicle at any given point in time.
- It allows you to optimize your business by isolating defaulting drivers and identifying the real cause of delays in deliveries.
- It helps you track a driver's safety and performance. This is especially useful as you scale up operations in terms of fleet size and the number of locations.
- It helps in providing emergency assistance to vehicles if the need arises.
- It helps you carry out a granular level cost analysis to optimize associated spends.

PP corrugated boxes can be used multiple times as opposed to cardboard boxes which are disposed of after one use. PP boxes reside in a sweet spot between corrugated boxes and plastic crates. They can be reused, they have the strength and features to carry valuable and delicate items, they are returnable and in comparison to crates, they are cost-effective. Today, many organizations use PP corrugated boxes for internal delivery of spare parts. However, the market is yet to see widespread adoption of this sustainable packaging solution.

All these reasons point as to why big and small enterprises alike should adopt GPS technology into their business processes. While larger organizations prefer having ingrown and customized solutions, there are many off-the-shelf products that are effective as well.

Transforming Logistics Warehouses with Technology

Piece picking robots, RFID tags, auto-sorting solutions, and simplistic packaging designs like foldable crates are few solutions that can be adopted in the scope of warehousing. However, no matter what you do, one challenge will remain unsolved. If anything, it is predicted to grow with the growth in volumes of packages being transported around the world. The one major resulting challenge is that of space availability. Buying warehouses is a cost-intensive expense. Adopting any kind of space optimization technique is only a stop-gap measure to hold off the future. How can this challenge be addressed?

The One Thing that Still Remains to be Addressed

The technology available for the consumption of the logistics industry is growing by leaps & bounds to support the growing scale of this industry. However, the one thing that still needs addressing is the usage of these platforms as connected systems. Currently, all available technology is used in silos. So, a fleet management system is talking little to nothing with an RFID system. While independently these systems work beautifully- this needs to change. The power of an omni-channel experience can only be enjoyed when a larger number of systems are connected to each other to observe the multidirectional flow of information.

Alternate methods of packaging

Viewing the entire supply chain from a bird's-eye perspective is what is required to select the packaging for product transport.

Ashish Ranjan Roy heads the Marketing, Business Development & Special projects department of TCI Supply Chain Solutions as the Vice President. Ashish has 20+ years of work experience in the areas of leading and managing the Supply Chain Operations. He holds experience in diverse fields in TCI, from operations, control tower, accounts to business development. Ashish is a Cost Accountant from ICWAI, Kolkata. He is an active member of CSCMP and has also undergone an executive training program at Indian School of Business (ISB, Hyderabad) and Capstone Business Simulation course from IIM, Ahmedabad.

COMPANIES, over the years, have widened their paradigm and have started considering the full length of the supply chain when it comes to selecting packaging methods and technologies. For companies such as these, cost savings is just one of the many factors that must be taken into consideration. In this day and age, packaging planning also includes consumer sentiment and marketing opportunities. The evolution of consumer needs and the increased sensitivity towards sustainability, manufacturers are now considering the adoption of alternative packaging methods and viewing them as an opportunity.

The Government plans to crack down on the environmental villain – single-use plastic. Many companies have already started making efforts to eliminate plastic for packaging.

New packaging methods are being viewed as opportunities to strengthen their brand image and give their products a more refined appearance to ensure an improved brand recall value.

Keeping this in mind, manufacturers are considering expenses more on the basis of cost-per-use than cost-per-acquisition. Although, the companies are willing to make a larger up-front investment, since lower cost-per-use often means a higher up-front cost. One of the reasons for this being, investment in returnable packaging ensures the use of the initial investment over multiple uses. Multiple usage justifies not only the initial

acquisition investment, but also the investment made to package products creatively, thus ensuring attractive packaging with better recall value, combined with multiple use. The adoption of close supply chain has thus been amplified over the last few years.

Reusable and Returnable Packaging

Reusable packaging, while providing branding and cost benefits, also make it critical to track the packaging in order to avoid losing the assets. The costs of installing tracking technology must also be added to the overall expenditure. Thought the reusable packaging material may prove expensive, it provides multiple benefits and opportunities to enhance product experience. For instance, installing temperature tracking mechanism in egg trays proves useful for product longevity and protection, ensuring the eggs reach the customers in the best condition. Returnable packaging also offers excellent branding opportunities for manufacturers. In a marketplace, consumers interact with branded crates over 45% more than non-branded crates. Crates that carry the company colours and logos have the potential of influencing the purchase decisions, promoting higher sales. This shines a new light at the value of the supply chain from many perspectives, as it presents marketing and advertising opportunities. It is due to this fresh view that a supply chain is increasingly being viewed more as a valued investment than a cost.

Employing returnable packaging in the supply chain is also advantageous from an environmental perspective. It promotes the sustainable agenda as the amount of product dumped in landfills and the quantity of raw material used to create the packaging is lower. On the flip side however, the manufacturers must be wary of the lowered box strength, which can be a result of shorter fibres of the materials. This needs to be countered by the usage of specially designed tape that works well with the material in order to fortify the packaging.

Recently, the market has seen a surge in sustainable packaging. Several computer electronics giants are resorting to mushroom-based packaging for heavier products. It offers a look and functionality that is similar to Styrofoam. For its lighter products, a leading IT giant switched to bamboo-based packaging. Although, this packaging method was limited to the lighter products, as it did not prove ideal for heavier products like servers and desktop rigs. Some more of the world's big brands have announced their aim of replacing 100% of their packaging with sustainable materials by the year 2025.

When it comes to food packaging, several food giants of the world are moving towards eliminating the use of EPS (Expanded Polystyrene) for their cups. EPS is notoriously difficult to get rid of, considering its bulk and limited recyclable properties. Alternatives to EPS include PLA (Polylactide), corrugated board and moulded fibre products made from wood pulp. The challenge with replacing EPS is that none of the alternatives offer the protection and longevity that EPS provides, which is an important part of the equation in the food industry. PLA carries similar properties to EPS and most consumers may not be able to tell the difference between the two, but PLA is nearly twice as expensive to procure and implement as EPS in the market.

A Fresh Alternative

A research centre in Finland called VTT Technical Research Centre has developed an attractive alternative to EPS. This alternative is a foam-formed-cellulose-based material which is 100% renewable. The recycling properties of this material are similar to cardboard and it can also be burned

A research centre in Finland called VTT Technical Research Centre has developed an attractive alternative to EPS. This alternative is a foam-formed-cellulose-based material which is 100% renewable. The recycling properties of this material are similar to cardboard and it can also be burned or composted like paper.

or composted like paper. Additionally, this material has several technical benefits, since the foam-forming technology allows the combination of short and long fibres. This helps provide improved protection and other mechanical performance paybacks. More than that, this material can easily be combined with polymer or biopolymer fibres for greater versatility. It also becomes evident to the consumers of the product that the manufacturer has switched to a sustainable product that has less bulk and better performance.

There may be a number of solutions available in the market today, that offer a more sustainable way to create packaging for products, but using fewer packaging materials to further the intent of sustainability ranks highest. Lower number of materials, tested thoroughly before use, are key for companies to reduce their carbon footprint.

Rethinking packaging requires one important aspect to be considered- the damage rate of the product. Some products in the market require a very low damage rate. For instance, expensive electronics and food products need to be protected from any damage or breakage. Additionally, taking into consideration how the consumer is going to interact with the product upon receipt is paramount. Forecasting how end users will be opening the packaging upon delivery has become one of the key factors while reimagining the packaging of a product. How the consumers perceive the brand plays an important role when the packaging of a product is being planned as well. The consumer's perception is vital for brand awareness and loyalty, as it carries the potential to turn the consumer into an evangelist for the brand itself. To enhance brand image, manufacturers and retailers are striving to create packaging that creates a notable first impression. This is in order to ensure the consumer keeps coming back to the brand. In the recent years, the awareness of aesthetics and sustainability are has increased among consumers and this is being taken into consideration as companies around the world plan their packaging.

While considering alternative methods of packaging, the equipment that is used along with the packaging also needs to be taken in to account. Materials such as foam packaging require a specialized machine to handle and accommodating them in the existing storage area needs to be meticulously planned.

Shrink Wrapping

Shrink packaging is beyond versatile and carries numerous benefits regardless of the industry or the product. Shrink packaging or shrink wrapping is a highly useful form of packaging to improve shelf-life and protect the products throughout their lifecycle. Shrink wrapping has often been perceived as a branding tool, as most shrink wraps are transparent and the product is clearly seen through the packaging. Not only does it enhance product appeal, but also aids brand recall value. Fresh and frozen foods benefit from the extended shelf life and can carry retail-ready product appeal. New technologies to develop shrink packaging allow the use of different formulae and additives

to reduce moisture and fogging that provide additional protection for products like meat and fresh produce, ensuring freshness from shipment to shelf. Products from many industries like electronics, software and sporting equipment, benefit from shrink wrapping, as it enhances the appeal of the products and protects them, ensuring they are delivered to the consumers in pristine condition.

Recyclable air pillows

As companies around the globe are reducing the use of packaging products like Styrofoam and bubble wrap, the use of air pillows is becoming more and more popular. These prove to be great eco-friendly alternatives and are available in a variety of sizes and provide excellent cushioning for delicate items, protecting them while loading and during transit.

Air cushions are nothing but small bags, filled with air, which means they are light in weight and easy to load and transport. Additionally, they can be inflated just before packaging, thereby saving space for storage. This style of usage also cuts down on the amount of material used, when compared to other cushioning materials currently made available in the market. In addition to this, they can be easily re-used, recycled and are fully biodegradable.

Cornstarch Packaging

Cornstarch packaging is derived from the corn or maize plant. It is an organic material which has recently seen success in the packaging industry- particularly the eco-friendly packaging industry. It is a great substitute for plastic-based packaging, as it carries plastic-like properties that can easily be utilized in place of plastics. Cornstarch can be used for many forms of packaging like bottles, loose-fill packaging and other moulded forms.

Although it is a more environmentally friendly alternative to conventional forms of packaging, it is not devoid of issues of its own. As it is derived from a crop, the demand of corn is bound to go up and the crop may prove to be expensive in the future. This may translate into corn proving more difficult to access in areas where it is a dietary staple.

Seaweed Packaging

The gelatinous substance found in seaweed, called Agar, has already found many applications in modern times. In the food industry, Agar is already making in-roads as a vegetarian alternative to gelatin. But in recent times, it has been recognized for its value in the packaging industry as well. A prototype for packaging with the use of Agar has already been designed and may soon find its way into the industry. Originating from a plentiful and highly sustainable raw material, this packaging material may be the next level of eco-friendly packaging.

Eco-friendly is now becoming the mantra for smart business owners and it starting to seem more and more like the natural progression for the packaging industry to flow into. With the sheer number of eco-friendly alternatives in the market, especially at competitive prices, many businesses are recognizing the opportunities in switching to these products. Looking at these opportunities, the new-age business owners are seizing the opportunity to make the change and gain an edge in the market.

Packaging waste that ends up in landfills and oceans take hundreds of years to degrade, and there's increasing concern about the toxins they release into the environment. One of the best ways to reduce the packaging waste madness is to bring your own bags and containers to carry the products. Select items that come in non-plastic recycled and recyclable packaging. "Refuse" else "Reduce, Reuse & Recycle".

Packaging in Cold Chain

F&V products are highly perishable, uncertain on availability, strongly seasonal, ambiguous on quality & volatile on pricing. This makes packaging development quite complex. In F&V, almost 99% of the business is managed by unorganized trade. This is also the reason for slow adoption of new packaging developments. Hence, traditional packaging is a way of life for transportation within India, writes Mihir Mohanta, GM – Supply Chain, Mother Dairy Fruit & Vegetable (P) Ltd.

Mihir Mohanta has worked for more than 25 years in the agri-food business. He has a varied experience in the entire food-chain from crop production, procurement, cold chain, food processing as well as retailing. He has rich organizational understanding as has worked with MNCs such as PepsiCo, co-operatives such as Oil Orissa, private companies such as Aditya Birla Retail as well as the quasi-government organization Mother Dairy. His latest & most challenging assignment is in fresh produce supply chain, working directly with farmers across India. He is an MBA from MANAGE, Hyderabad.

AGRICULTURE and allied sectors in India produce an output of around 1 billion MT annually. Fruits & Vegetables (F&V) contribute to about 30% of it. These are bulky & voluminous items. Most Indian consumers prefer fresh F&V as against processed. India has 127 agroclimatic zones. During a year, it can produce any F&V at some part or other. However, all items cannot be produced in every location all year round. Hence, it necessitates movement. No inter-market movement of F&V is an indication of glut or absolute non-availability. While delayed or slow movement leads to loss of shelf-life. Packaging has a vital role to play in transportation & storage. The objective of packaging is to prevent damage, maintain freshness & shelf-life. It also brings in standardization.

Fresh F&V items are live products and they respire with intake of oxygen. However in general, lowering the temperature or reducing the oxygen availability reduces the respiration activities, thereby improving life. Vegetables contain about 90-95% of water while the same for fruits is between 80-90%. More the water content in a product, lesser is the life. Every product has different temperature & humidity requirement for storage & transportation. In general, the nutrient degradation parameters are light, concentration of oxygen, temperature and activities of water. The goodness of a product is determined by the way one manages these parameters during the processing and packaging phases.

Making safe delivery possible

The life of a product is determined by the seeds that are being sown, its variety and its genetic make-up. The post-harvest practices like pre-cooling, storage & packing materials used are all attempts to maintain the existing life of the product. However, if these are not handled sensibly, they can cause deterioration in quality. The micro-environments during the transportation, merchandizing (retailing) & consumptions also affect the quality. F&V packaging is not just physical containers, but it encompasses the surrounding micro environment also. There is a wide range of traditional packaging used for transportation of vegetables like bamboo basket in combination with banana leaves at Barpeta in Assam, wet-gunny bags with ice cubes for beetle leaves in Odisha, wooden boxes with straw for Alphonso

mango at Ratnagiri. These are traditional, bio-degradable and low-cost packages, which preserve F&V very efficiently during transit. But not much research has taken place to standardize these for logistics or accounting requirements. Banana- the highest produced fruit (30MMT) of India, is largely transported in loom without any packaging material. But a lot of banana leaves are used in the truck which provide both, cushion & humidity. Apple in Himachal Pradesh is packed in corrugated carton boxes in trays. But in Kashmir, they still use wooden boxes for packing. Over time, the dimension & counts are getting standardized. Mango for processing in general is transported without any packaging in bare trucks, however for fresh retail requirements, these are packed in corrugated carton boxes. Mango, when transported with leaves in corrugated boxes, improves shelf-life by about 7 days. These remain fresh even when transported from Tamil Nadu to Kashmir as the leaves continue to provide nourishment to fruits till they dry up. The shelf life of Kinnow, Oranges & Apples have improved a lot with the wax coating. This is helping in distribution across India.

Traditional approaches

POT (Potato, Onion, Tomato), which comprises of 30% of F&V volume are also transported the most. Potato is transported mostly in jute bags or nylon bags in a standard pack size of 80kg/50kg. In developed countries, large bins are used for storage and transportation. Potato, although stored in cold stores, is being transported in ambient environments. It uses almost 75% of the cold store capacity of 34MMT. Jute bags are better than nylon as they provide better protection, are bio-degradable & environment-friendly. Similarly, Onions are transported in 40Kg nylon bags. Tomatoes, on the other hand, are largely transported in crates. Tomato is one item which has adopted crate use to the maximum. Crates have completely replaced the bamboo & wooden baskets as these are convenient to stock and easy to account. In fact, pricing at most places are on per-crate basis. For Delhi consumers, tomato travels for more than 1000Km for the most part of the year. But

Many of the ripening items like Mango, Banana, Papaya are transported in green stages when these attain maturity. Post ripening, these fruits cannot be transported to long distances as the tissues soften. These are ripened in chambers using ethylene gas. This process is akin to natural ripening and is recommended by FSSAI. However, in trade, carbide sachets are extensively used in the corrugated boxes as a ripening agent. Carbide being carcinogenic is a health hazard and the practice needs to be discouraged.

the issue in India is empty crate transportation during return. Unlike containers, there are no crate banks. The crate dimensions are also not standardized.

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Most fresh fruits exported are moved in temperature-controlled containers in corrugated boxes. Boxes are designed keeping the ventilation and air circulation requirements in mind. Major exports that take place are Grapes, Bananas, Apples and Mangoes. Polylines, bubble wraps, foam nets & Punnett are the additional packing materials used for extra protection. Grape guards (Sulphur strips) are also used to prevent fungal spread. Grape and Apple packaging is most standardized across the globe as these are traded the most.

Best practices

The Pack-house concept in India is hardly in use except for the packing of grapes for exports. The basic concept of Pack-house is to pre-cool the product before being transported. The study by NCCD & NABARD indicates that the gap between requirement and availability of pack houses (required 70,000 and available 250) and transportation (refer vehicle required 62000 and available 10,000) is high.

Many of the quick service restaurants use MAP (Modified Atmosphere Packaging) technology for distribution of vegetables to their retail outlets. MAP packs have micro-pores, which allow the F&V items to breathe. By controlling the amount of oxygen present in a package, the food product remains fresh for a longer period and ensures it remains attractive to consumers. These packages function best when kept in conjunction with the prescribed storage temperature. While transporting in temperature-controlled vehicles, commodity-specific transportation is recommended as every commodity has a different set of storage parameters. For example, Carrot & Sweet Corn will have two different sets of temperature & humidity requirements for storage & transportation.

AMAP (Active Modified Atmosphere Packaging) is an advanced form of MAP packaging. These are designed as product-

specific packages. The number of laser-cut micropores are decided on the basis of the respiration rate of the produce measured through the Fast Respiration Meter. These packs enhance the product life by the way of reduction of the rate of respiration by reducing availability of oxygen in the pack. Such packs are now available in India also.

The smart packages or intelligent packs use RFID tags & micro-chips which are embedded in the packs. These help in product traceability and inventory management. Some of these packs use thermal sensors, which can record the time & temperature history of the products. The thermochromic inks change color when the tolerance limit is exceeded. Such packaging would help the consumer ascertain the product's safety for consumption. There are packages which are antimicrobial also. These packages inhibit the growth of undesirable micro-organisms by emitting or diffusing antimicrobial agents from the packs onto food. For India, such packages are futuristic in nature. Large-scale adoption of these packing is dependent on convenience, cost viability & food safety compliance demand.

The evolution continues...

Fruit & vegetable packaging in India is evolving. The logistics & packaging environment is also undergoing transformation. As more and more organized players step in and there is greater investment, the industry will get streamlined and standardized. However, we cannot just copy packages of developed countries such as Europe or US because our availability, distribution, consumption pattern and environmental requirements are very different from theirs. Although a less attended sector, a lot of research is required for the adoption of transportation & packaging for F&V. It has a long way to go both in development and adoption.

Packaging in Pharma Industry

Transporting temperature-sensitive pharmaceuticals, biologics and combination products from the point of manufacture to a medical facility— and ultimately the "last mile" to the patient, requires the prevention of temperature excursions throughout the complex supply chain and that's where packaging plays its part.

The industry of pharmaceutical packaging has seen a massive surge in the adoption of passive temperature-controlled packaging systems over the recent years. Adoption of this packaging technology has risen as mechanical issues and external forces do not constrain packaging efficiency, as per a Digital journal article published in June 2014. The expert article also projects a 9% CAGR between the years 2017 and 2027 for this packaging market, forecasting the value to touch a staggering $18 billion by 2027.

In the recent years, especially considering the surge in international business of pharmaceutical products, the need for transporting specialized pharmaceutical products has risen considerably and so has the need for its packaging and logistics. Passive temperature-controlled packaging involves containers and packages that are specially designed to maintain a controlled environment that limits the exposure of the packed products to the environmental and ambient changes that it may be subjected to during transit.

The surge in business however, comes with a down side. The cost of advanced Temperature Controlled Packaging (TCP) proves too high for products that are more price sensitive in nature. This cost consideration is in turn tilting manufacturers' preference for rented and reusable packaging. It is due to this that many manufacturers are opting for rented and reusable packaging. It is due to this that the revenues are shifting from the sales of passive TCP globally.

India at the world stage

India has taken the world stage and has established itself as the world's pharmacy, with its incomparable strength in the manufacture of generic drugs, for US and other major global markets. While the drugs and medical equipment industry are transitioning into higher value areas like specialty pharma, the packaging industry has been one to take at a slower pace. This is the case because of two reasons- the expensive nature of packaging R&D and the increased regulatory scrutiny in the global markets. These issues have a direct bearing on the Indian industry maintaining a sustained competitiveness.

The Indian pharmaceutical packaging industry pyramid exists with an extended base, with the top comprising of the big players in the industry. Several large multinationals occupy the tip of the pyramid, with a few major Indian players. The fragmented base of the pyramid consists of a multitude of smaller companies that cater to a variety of sectors such as generic products, food, pharma and personal care. The companies at the bottom of the pyramid mostly cater to specific sections of a value chain like HDPE bottles and blister packaging, or in

secondary supply chain activities like labelling and pouching. This part of the pyramid therefore offers no significant differentiation as it is largely commoditized.

Factoring in reusability

At the global stage, the awareness of vaccine usage and their vital role in welfare has never been higher. This is a direct result of the increased mindfulness of the citizens of the world and the quality education among the people. Major officialdoms such as World Health Organization (WHO) are actively working towards reducing vaccine wastage around the world. This has also sparked the initiation of various programs to monitor vaccine usage and ensure optimum consumption, with a sizeable sum reaching the needy. Programs like these also aim to focus on proper handling and transportation of vaccines. These global scale actions are causing a surge in reusable pharmaceutical packaging to ensure the vaccines transported to the penurious geographies are done so in a condition that is optimal for consumption. add this here

There is also rapidly growing adoption of reusable packaging and surge in logistics as a comprehensive service in regulated markets such as US, with PCM boxes taking center stage for first to last mile delivery.

The upsurge of outsourcing

Many third-party logistics service providers are seeing the advantage of the rise of outsourcing in the field of passive TCP for the pharmaceutical and food verticals around the globe. The demand for passive TCP solutions in developing countries has led to improved business opportunities for global passive TCP service providers and 3PLs to expand their offerings in countries such as China, India and Indonesia. A challenge that is recently developing in this area is the high cost of diesel and fuel maintenance. Additionally, the adoption of newer tracking technologies is also contributing to the rising costs, as customers demand higher visibility. As a result, the incorporation of GPS tracking and temperature monitoring systems is to be factored in to the total costs.

Reconceptualizing primary packaging

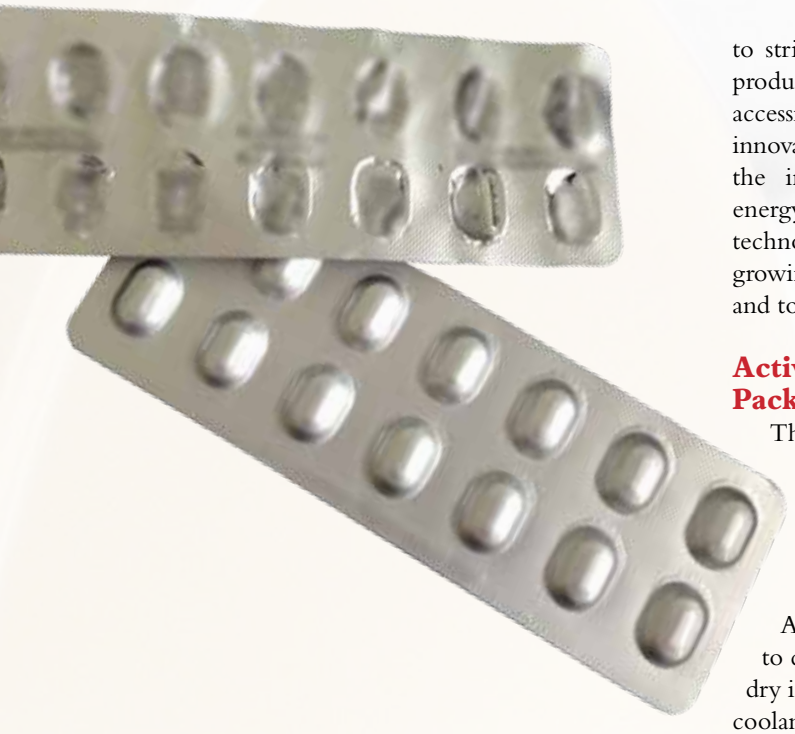
Due to the increased awareness of drug safety and regulations in the pharma logistics industry, the increased scrutiny of packaging and transit equipment has brought forth issues that require overhauling certain procedures in the supply chain. Some of these overhauls are in the packaging itself. It has been noticed that large molecule drugs that are transported in glass packaging end up interacting with the glass, compromising product integrity. Some products end up flaking the interior of the glass packaging resulting from the delamination due to prolonged exposure. Silicon oil that is commonly used in plungers of pre-filled syringes and glass vials is vulnerable to drug interactions and is capable of denaturing protein-based drugs.

It is because of issues like these in traditional packaging that the rethinking of packaging is required in the industry and new packaging solutions are being conceptualized in order to circumvent these challenges. New packaging solutions with low silicon contents or silicon-free alternatives are actively being looked at. The industry may also see the use of cyclic olefin copolymers as replacements for glass in biologic drugs.

Increased security and safety in packaging

With a surge in the business of pharmaceutical products comes the threat of falsified products and fakes. In recent times, there has been an increased demand in the industry for safety and security measures for packaging improvements during transit. The demand, although evenly originating from multiple sectors, comes primarily from pharmaceutical companies- and with good reason. The industry has been facing the issue of tampered and falsified products for years and the need has risen to put it in check. The demand for anti-tampering devices like seals and RFID tags for tracking have become a necessity in many areas. More often than not, products of suspicious origins get mixed together with batches of genuine pharmaceutical and medical equipment and this poses a severe threat to the reputation of genuine products. The demand for improved security measures is, therefore, justified. In response to this demand, special features such as thermo-insulating inserts are being employed to protect sensitive products which need to be maintained under specific temperature ranges during transit. Additionally, unique identification and traceability of the products ensure full visibility and also act as a proof of originality for the product.

Additionally, the need for serialization for regulated markets calls for integration of packaging solutions with software to ensure regulatory compliance and creates a new



segment of opportunity in pharmaceutical packaging.

Moving towards patient-centricity

As the industry increases focus on patient-centricity, delivery landscape is constantly changing to address needs that are yet to be met. Clinical and health-economic benefits of higher compliance, willingness of middle-class segment in out of pocket market and payors in regulated market to pay is triggering high engagement in delivery innovation. With a higher life expectancy, share of geriatric patients has also increased in recent times and so has the room for targeted innovation. New and advanced features such as digital timers and alarms on pill boxes are being introduced into the market to remind patients to consume their medication as per the prescribed dosage.

To add to this, dose monitoring features are also becoming increasingly popular in the market, playing vital roles in abuse deterrence and patient adherence. Extremely focused innovations in this sector are giving rise to solutions like calendar-based closure technologies and metered dosage systems that track and count pills as they get dispensed and send the data to linked smartphones. Child-locking mechanisms are also becoming fairly popular in the market, as the cases for non-fatal childhood poisoning have seen a rise. Though these products have been around in the market for years, packaging companies are striving to strike the perfect balance between making products inaccessible to children, but easily accessible to geriatric patients. Additionally, innovation in packaging has also stepped into the interest of sustainability, manufacturing energy-conserving packaging solutions. Newer technologies have been invented to cater to the growing sentiment of environment friendliness and to contribute to a greener planet.

Active & Passive Cold Chain Packaging

The cold chain packaging industry comprises of two forms of packaging- active and passive packaging.

Active systems comprise of transport containers that boast advanced electric or battery-powered temperature controls. Active packaging systems are also known to contain mechanisms to push cool air from dry ice onto the payload, using dry as the main coolant. Active systems provide greater security, minimizing the threat of pilferage and thus work better for larger shipments. Although, on the flipside, systems such as these are often prone to mechanical issues that require elaborate repair processes.

Passive packaging systems typically comprise of vacuum insulation or polystyrene insulation packages that can keep products at the prescribed temperatures for over 90 hours. These systems carry the capabilities to maintain tighter temperatures as compared to active systems and are not vulnerable to internal freezing. On the downside, these systems often need special attention to condition the refrigerant to specific requirements and the shipping configurations are known to be more complex.

A step towards smart packaging

Thanks to the digital innovations in the industry, packaging coupled with tracking devices is now commonplace. Visibility of products in transit, traceability and compliance tracking are fairly common in the industry today. However, the industry is now moving towards quality monitoring as well, getting into the intricacies beyond simple visibility and temperature monitoring. Smart packaging, as it is rightfully named, provides details on how the products have been handled, stored and shipped. The customer would know if the product was dropped, subjected to unfavourable temperature ranges, or were mishandled in any way. Smart packaging is set to create waves in the market by providing on-demand visibility

into warehousing and logistics, helping improve efficiency in the industry.

Smart packaging is also aiding the fight against counterfeiting in the pharmaceutical industry. According to a study, counterfeiters have claimed to about one-third of the entire market, estimating a sum of around $200 billion and affect over one million people each year because of toxic or ineffective drugs. Smart packaging also contributes to improving product quality through indicators that customers can harness to authenticate the products and ensure that only genuine products reach patients.

Expanding horizons

The regulatory compliance parameters have been growing in strictness and Indian pharmaceutical industries continue to expand into the regulated markets globally. As the market grows, so must the allied industries of packaging and logistics. It has become all but imperative to perceive the value proposition beyond cost advantage, especially considering the rapidly evolving landscape. Packaging industries in India need to rise to the challenge to get future-ready and take into consideration the growing sentiments of technological advancements and sustainability being embedded into packaging. However, despite the high level of awareness of the regulatory landscape in the industry, there has not been a significant change in the technological engagement in terms of development or adoption.

The future undoubtedly belongs to the packaging companies that can deliver reliability and familiarity with regulatory requirements to ensure their customers can deliver the best quality products to the consumers.

Regulatory Changes Driving Packaging Innovation Globally

Serialization is a global buzzword that is transforming packaging industry as whole, more so in pharma where counterfeit products have perilous consequences. There is growing regulatory thrust in this direction with complete unit level track and trace becoming an everyday reality. The US' Drug Quality and Security Act (DQSA) and the EU Falsified Medicines Directive (FMD) are newer developments that stipulate issue of unique serialization codes to the smallest saleable units of pharma products. Although being implemented in a phased manner, there is high frenzy around compliance preparedness in the industry given the strategic importance of these target markets for the global pharma industry.

Smart packaging brings on-demand visibility into warehousing and helps efficiency an area that, according to a McKinsey study, accounts for 95% of pharma logistics costs. For example, when smart packaging monitors temperature-sensitive products, it generates alerts in case of storage variances.

Compiled with inputs from Pushpa Vijayaraghavan, Director & Aparna Balasubramanian, Senior Consultant, Sathguru Management Consultants.

Packaging in FMCG

Packaging a product and distributing a product are two real aspects of a single process. When that process flows smoothly from end to end, companies save money and operate more efficiently.

IN the year 2017, the global FMCG packaging market clocked USD 489.4 billion and the projections for this industry estimate this number to rise to USD 623.6 billion by the year 2023, by observing a CAGR of 4.12% during the years of 2018 to 2023, according to a research report published by Mordor Intelligence. Packaging proves itself as a valuable source of communication between the brand manufacturers and their consumers. This communication is achieved by the use of logos, information about the products, packaging colours and graphics that are on the packaging.

The products that are most popular in the market are smaller products like zipper pouches, laminated containers, BOPP pouches and extrusion laminates among other such products. The market is growing at a phenomenal rate and the e-commerce industry is a crucial factor. The increasing demand in the e-commerce sector has given a boost to the packaging industry and is sure to enjoy more success in the future. This sector is one of the largest customers of FMCG packaging materials as there is a requirement of protective packaging to deliver smaller products while maintaining the integrity of the product, while at the same time keeping it convenient for the consumers to access. Differentiated packaging is an element that is crucial to influencing consumer preference and also adds critical value to the product. These factors have a significant impact on the brand market and subsequently on the packaging industry as well. There have been increased technological advancements observed in the packaging business which are aimed at working in tandem with the manufacturers, who are committed to providing products that meet the requirements of the customers.

The Need for Differentiated Packaging

Customers today are demanding additional features in the existing products that are available in the market. Technological developments and an increased consumer demand, in terms of quality and quantity, have resulted in the need for creative and differentiated products finding their way to the market. This calls for packaging that supports such products in order to maintain their integrity and functional quality when they make it to the consumer. This is usually seen as an opportunity for the manufacturers to innovate and portray the products in a different manner. This presents a chance to display the information about the product in a way that will attract the consumers' attention. It is also used

as an opportunity to convey vital information to the consumers that can aid their purchase. Along with the identification of the company's products, packaging plays an important role in the development of the image of the brand. This is the reason why the need for product differentiation in packaging is driving the growth of the packaging market in the FMCG sector.

The food industry has been making leaps in the evolving economies around the world. In the last few years, the demand for FMCG packaging market has been shooting up as a result of these leaps. The evolving lifestyles of the consumers encourage manufacturers to make their products more innovative and come up with innovative packaging solutions for products that augment the growth of the market.

Packaging technology is aimed at securing the products in an effective, multilayered protective cover for superior preservation and storage of the products, while keeping the design in mind. The requirement for innovative packages has helped boost the growth of the packaging market in the FMCG industry.

The e-commerce industry indisputably has the lion's share of consumership of the packaging market. It has a requirement for protective packaging for small as well as big-sized goods. The factor that impacts the market is differentiated packaging which plays a role in adding to the product's demand and influencing the consumer's preference. In a bid to match the needs of the end-consumer, the manufacturers are striving to improve production technology and this is the reason for the advancement in technology observed in the industry lately.

The FMCG market is essentially divided into two archetypes, end-use industries and packaging type. End-use industries comprise of products like healthcare, food & beverages, cosmetics- among which the food & beverages industry invests significantly more in packaging industries. Packaging type comprise of flexible packaging, rigid plastics, protective packaging, custom and paper-based packaging solutions. The increase in demand of the packaging solutions is observed across the evolving market, which is aiding the packaging industry.

Innovative approaches to packing used by the FMCG industries to increase the growth of global FMCG packaging market:

- **Unique shaping and packing strategy:** Giving a unique identity to the brand by using colours and logos. Shaping and styling of the packing that improves the visibility of the product.
- **Ease-of-use strategy:** Designing the packages to be easy to handle for the consumer.
- **Ease of storage strategy:** Enabling easy racking and storing of products.
- **Product protection strategy:** Safeguarding the end-users, especially children or patients, through package testing before deployment.

To stay ahead of the competition, every business activity demands constant improvement and change, which also keeps the stakeholders happy, fulfilling their expectations. Supply chain, as an industry that houses many business activities at different levels, is an industry that is highly receptive to the slightest changes being made at the manufacturers' end. For this reason, change in supply chain should be considered from various perspectives. Every member of supply chain must upgrade their business to generate better results for the entire chain, while focusing on improving their own service quality.

Retailers these days are known to be the active designers and controllers of product supply, as they have the on-ground knowledge of the demand trends. This is in contrast to how they were perceived as passive receivers assigned by manufacturers. They control and organize the entire supply chain, right from production to consumption, especially fast moving consumer goods retailers.

Food retailers, in recent times, have managed to become the most proactive and dominant members of supply chain, because of their strength constantly improving in the industry- which is mostly due to their activities of mergers and acquisitions resulting

in growing concentration. Due to the many supply chain innovations and tools that retailers have introduced over the recent years, the term Retail Supply Chain Management (RSCM) has been coined and is popular in the industry.

Some of these innovations include regional distribution centres that were popular between, outsourcing of transport activities, employing reusable transit packaging, conversion of storage area into sales area, innovative cross-docking practices, in-store internet delivery, efficient consumer response development for efficient feedback etc. In the recent times, RSCM area of packaging is enjoying successful use of roll containers, rigid plastic packaging material, retail ready packing and one-touch packaging. To ensure the full of effect of implementation, innovations like these should adopt the paradigm of contribution to the supply chain as a whole and not only at the retailers' end.

The drift towards retail-ready packaging and shelf-ready packaging has created a trend which has come to be known as the science of packaging.

The ideal retail-ready and shelf-ready packaging

The key idea here is to think backwards from the shelf level. It is now possible to get an estimate of the optimal size of packing for a particular type of product, keeping in mind the quantity, for appropriate shelf size and for a known rate of sale and replenishment.

Contemporary marketing techniques aim at integrating shelf-ready packaging and retail-ready packaging in a bid to improve sales by creating an interesting promotional mix at the point of purchase.

In the year 2017, the global retail-ready packaging industry was valued at USD 63.4 billion. The industry is predicted to touch USD 81.4 billion by 2023, with a CAGR of 4.3% during the forecast period of 2018 to 2023. The report is segregated by material, type, end-user and region. The materials popularly used are paper/paperboard and plastics. The type of packaging that are popular are die-cut display containers, shrink wrapped trays and modified cases.

Retail-ready packaging refers to the packaging of retail products in such a way that they can directly be shelved without needing to unpack the contents within. Mass retails, club stores and the launch of smaller format locations are poised to drive demand for the retail-ready packaging industry, as these stores carry a limited product selection as compared to their counterparts. These stores enjoy the benefit of retail-ready packaging's ability to speed-stock the shelves and improve on the shelf-space efficacy. However, the problems of lack of standardization and additional supply chain expenses are estimated to affect the growth of the retail-ready packaging sector.

Food sector poised to offer ample opportunities

Organizations try to differentiate themselves through packaging, as packaging is the last-mile connect with the consumers. They can not only improve their own visibility, but also enhance consumer experience with their products, driving repeat purchases while maintaining positive reputations. This is how retail-ready packaging provides a platform for manufacturers to provide food products with attractive labelling, designs and improved customer engagement.

As per a PMMI study, almost 28% of consumers reported that they are willing to pay extra for additional conveniences, in terms of packaging. This creates further opportunities for the retail-ready packaging market in the future. Retail-ready have also proven to be the go-to packaging solutions because of the convenience they offer in terms of methodical product placement. Also, this method of packaging assists in the ease of identification of food products, making it easy to pull orders from distribution centres. It also aids sales by a volume of 3%-5% and reduces the likelihood of stock-outs.

The overall demand for consumer goods has been static in the developed part of the world. However, innovation on the packaging industry has become a necessity because of variables like demographic changes and increased market share competition between established FMCG

producers. This has brought in a number of new developments over the recent years:

- Resealable packs, easy-to-open pouches, stand-up pouches for convenience.
- Compact pack sizes for on-the-go usage.
- Promotional packs and brand-extensions for improved customer loyalty.
- Higher number of colourful designs and eye-catching packaging to enhance brand awareness.
- The development of mass luxury goods with plush packaging to catch the consumers' attention.

From the paradigm of packaging operations, packaging producers have to be able to come up with new shapes, materials, prints and enhance the colouring and definition on packages in an economical way. This demands an investment in equipment and training of the staff that handles the packaging activities. The packaging companies that refrain from making such investments find themselves at a competitive disadvantage. But investment alone do not suffice, the real drivers of innovation are the end-market consumers. The producers of packaging need to have collaborative relationships with their customers who are closer to the end-consumers.

It is thus the relationships with development teams of end-market facing firms and this makes its way into the manufacturer's own R&D programs that are the indicators of future growth. For instance, a good consumer packaging business may have a view of the FMCG product programs in place for years, including the rile they will play and the investments required to be made. They also prove to be active collaborators for the development of new consumer products, rather than just a supplier's quote on the design of the final packaging.

The Integration of the Supply chain

When a product is shipped, it is expected to arrive on time, in an acceptable condition and packaged according to specifications of the retailers. Missing out on any of these requirements can result in the manufacturer losing the order or even losing a customer.

Every time a product hand-off takes place, be it from production plant to packer, or packer to distribution centre, it adds to the total cost and presents opportunities for error and delay. One efficient way to ensure the products flow correctly is to recruit a skillful partner to handle both the packaging and the logistics.

Certain companies, that rely on packaging and shipping operations to multiple locations, are now using contractors who perform packaging, warehousing and distribution all under one roof.

By employing such a strategy, companies expect to ship over 25% more volume to their distribution centres. This also aids in getting the product to the consumers faster. Customers getting 60% of their orders in one day or less is now a thing of the past. The number has now risen to 85%.

By using this strategy, a company can reduce the distribution cycle by as much as seven days. This also ensures great visibility of the product for the manufacturer. Once a manufacturer delivers the product to a copacker, he no longer has sight of the progress of the goods. But when the same partner is given the responsibility to handle the shipping as well, the product never leaves the 3PL provider's WMS. In situations like these, the manufacturer can go online at any time and get an update on the progress.

In today's businesses, very few contract packaging companies understand the impact of products and services they provide. They execute orders that come down from the marketing departments of their client's marketing department without fully considering the issues of volume and speed of product delivery. On the other hand, 3PL providers think about transportation and work backward towards a solution for the packaging that satisfies the client, while at the same time minimizing the costs during the distribution cycle.

Single-source Packaging Operations

Just as integrating packaging and logistics can incur savings, so can integrating aspects of primary and secondary packaging. There are

Retail and Shelf Ready packaging drive sales and make consumer goods move faster.

significant benefits to reap from using a single partner to do both, while also to procure and manage packing materials. Many manufacturers are simplifying their supply chain by choosing to be virtual marketing companies, leaving manufacturing and packing to a limited number of partners.

Primary packaging is the direct handling of the product. Secondary packaging is the grouping of primary packages for the purposes of retail or distribution. When a single contractor is given the responsibility to perform both functions, the manufacturer can rest assured that the two levels of packaging will perform well as a single system. The manufacturer also saves on transportation costs as there is no need to move the product to a separate location for secondary packaging. This also translates into lower chances of spoilage or damage. Lead times are also improved by as much as two-and-a-half weeks which improves fulfilment rates.

The process efficiency is improved further when the contract packager takes responsibility of procuring and managing material. The contractor is bound to ensure that the quantity and quality of the material is optimum, eliminating delays and other unfavourable circumstances.

Exploring New Packaging Options

The packaging industry is beyond just bags and boxes. Thanks to the movement towards automation and sustainability, companies now have an opportunity to use packaging strategy to improve profits. The key idea is to better integrate packaging with upstream and downstream functions, which is a paradigm that logistics service providers take naturally. As the 3PL providers expand their packaging operations, it will prove fascinating to observe what these growing capabilities create for your supply chain.

Packaging in E-Commerce and Retail Industry

Smart e-commerce packaging benefits businesses and customers alike. As e-commerce becomes an increasingly vital channel for many businesses, savvy retailers are beginning to recognize the power of packaging. It is becoming increasingly evident how a product is packaged can hold just as much sway over customers as the quality and popularity of the product itself. While there's no one-size-fits-all solution for e-commerce packaging, a few important considerations can make the entire process sail smoothly.

THE ever-expanding e-commerce market is attracting many new players and the industry is witnessing new supply chain models being carved out, effectively changing the world around us. As a result, the packaging and labelling industries are constantly under a state of evolution and striving to meet the new challenges and the consumer expectations. Manufacturers of today, who ship their products worldwide, are also the ones who promise same-day delivery for their customers. As the logistics chain becomes more complex, e-commerce packages are expected to be handled up to 20 times or more during transit in a standard delivery scenario. Adding to the complexity, are the necessary advancements in warehousing and delivery systems and it is due to these reasons, there is an increased demand for robust yet cost-effective packaging solutions in the e-commerce industry.

As the evolved requirements for product durability have surfaced, so has the demand for increased focus on right packaging size. All the costs associated with shipping and delivering are considered top priority. The packaging solutions available in the market today range from traditional box packaging to posting bags and even custom styled packaging solutions. PE film is also a popular material in the market and is highly rated due to its light weight. PE film is considered the go-to packaging material to ship textiles. Many online orders however, are still shipped in hard boxes, which provide the advantages of easy machine handling, quick filling activities and low costs. They are considered reliable because of their stability and versatility of adding safety elements like air cushions, hence are considered reliable for the protection of the products. Additionally, the fact that they can be stacked with ease makes them a preferred choice from the transport and logistics perspective.

White cartons are popular choices for manufacturers to cut costs on packaging. Filling

Think Differently When Evaluating the Opportunities in the E-Commerce Global Marketplace

- Think of packages in units instead of cases.
- Design the primary package carton to function as the shipping container for larger consumer goods.
- Contribute to the efforts of sustainability: e-commerce has shifted the responsibility of waste disposal to the consumer and is generating a significant increase in curbside waste.
- Imagine a returnable consumer tote system, similar to milk delivery 50 years ago, delivering a tote of new products and retrieving the empty tote.
- CPGs are evaluating solutions to increase efficiency; for example, digital print-on-demand, single product wrapping, flexible packaging, and minimizing product leaking.
- Look for options in ceiling mounted conveying equipment to alleviate floor space constraints.

96%
of all Americans with internet access have made an online purchase; 4 of 5 in the last month.

51%
of U.S. consumers prefer to shop online.

E-Commerce May Require Building a New Line or Diverting End-of-Line

Product Bundling
Many etailers are offering multiple products or samples bundled into one sale item. Some brand manufacturers are working with fulfillment services on the option to build sets on-demand or offer pre-kit sample packs and to set up an order management system that recognizes the components as a single SKU.

Personalization
Companies are connecting with their consumers by offering personalized products, custom ordering, and an un-boxing experience.

Right-Size Boxes
With shipping costs now factoring in package volume rather than just total weight, companies are seeking solutions to form a perfectly sized box to eliminate fill when packing e-commerce products.

Environmentally Friendly
The e-commerce industry is receiving significant pressure from their customers to utilize recycled materials in their packaging and to make the packaging itself recyclable in the future.

Source: PMMI e-commerce report

boxes on the packing line utilizes blank boxes and the supplying party benefits from the lower warehousing costs for the packaging materials. For these solutions, custom printing is usually managed by employing in-line printers coupled with an appropriate software environment.

In-store vs. e-commerce packaging

There are a few fundamental differences between traditional retail packaging and e-commerce packaging. Brick-and-mortar businesses have a need to prioritize attractive designs, as it is for the dual purpose of influencing buyers' decisions and serving as advertising opportunities.

In-store packaging also requires the inclusion of additional features such as detailed product information and theft deterrents, which find little or no use in the online purchases. For

Table 1: Comparing Logistics Systems

	Traditional Retail Logistics System	E-Commerce Logistics System	Omni-channel Logistics System
Retail Types	"Bricks and mortar" storefront.	Retailer is anyone who can set up an online storefront. May be manufacturer, retailer or a third-party facilitator/ aggregator.	Both "bricks and mortar" storefronts and online. Storefronts may also serve as fulfillment centers.
Transportation Package End Point	Secondary and tertiary packaging is collected for disposal or recovery at retail level. Consumer responsible for transport of primary package.	Direct to consumer. Consumer must handle disposal or recovery for all primary and secondary packaging.	Responsible for disposal of secondary and tertiary as required by bricks and mortar storefront. If shipping direct to consumer, additional transport packaging is required and will be the consumer's end responsibility.
Purposes of Primary Packaging	Containment, protection, shelf impact, communication vehicle, merchandising.	Containment, product protection.	Can be both, depending on the final distribution channel.
Consumer Engagement with Packaging	Engagement occurs at point of purchase. Packaging plays a role in finalizing sale.	Engagement occurs after point of purchase. Packaging plays a role in purchase reinforcement.	Engagement may occur at a variety of points.
Transportation Formats	Primarily high density freight carriers, forklifts and pallets.	A wide range of transportation methods, from freight carriers to UBER drivers, and potentially drones. More touchpoints, handlers, and manual interactions to deliver direct to consumer.	Depending on the final distribution channel it may include all formats.
Return Rate	9%[7]	20-30%[8] Requires investment into more complex reverse logistics and reusable packaging.	Unknown.

Source: Ameripen

the e-commerce businesses, it becomes vital to prioritize customer expectations in order to fulfill orders keeping in mind what best serves the customer. For achieving the best balance, durability, sustainability and compactness are at the fore. Durable and recyclable packaging materials further the intent of sustainability and compact packaging designs ensure lower costs for the manufacturers and customers.

At the forefront, increased consumer awareness in the areas of sustainability and environment friendliness ensure that the packaging material caters to the eco-consciousness of the customer base. Eco-consciousness has permeated every aspect of the e-commerce business and the lives of the consumers as well. The use of recycled materials thus proves to be a significant value-addition with the hope to appeal to the next-gen consumer base.

The differentiator

The logistics for the traditional retail market is relatively linear- manufacturers ship their products which are unitized in large quantities to a warehouse or a store Godown where they are inventoried until individual units are shelved for sale. The consumer then purchases the products and is responsible for the product from that point onwards.

In the retail model, transport and logistics are focused primarily between the manufacturer, warehousing operation and the retailer. The movement of the product is predominantly facilitated in the form of freight, pallets and forklifts. To meet these requirements, packaging is designed as a system of three:

- The primary packaging that comes directly in contact with the product, is designed to protect the product and communicate the marketing message for the manufacturer. It can also be used as a theft deterrent.
- The secondary packaging is generally an aggregate of multiple primary packages into one large unit to ensure safe and efficient

Table 2: Meeting Consumer Expectations for E-Commerce—a Systems Perspective

Consumer Expects	Responsive Shifts in the Logistics System	Outstanding Challenges to Address across the Logistics System
Speed	Hub and Spoke Model for distribution.	Vast distribution network may complicate ability to aggregate orders for efficiency.
	Box on Demand Systems provide for rapid and individualized packaging per order, but may be costly and/or inefficient for small to mid sized firms to purchase.	Need to package and ship rapidly may complicate ability to optimize packaging.
		Use of omnichannel further complicates packaging design as retail inventory may be enlisted for shipment direct to consumer
Easy Return	New reusable designs, including tear strips and resealable mailers.	Depending on shipment box and consumer behaviour, size may not be optimized for return shipping.
	Increased development of reverse logistics.	Can systems be developed further for application in recovery of hard to handle materials (i.e. ice packs, flexible films).
No damage	More research and Dvelopment to ensure appropriate packaging is used to meet distribution requirements for vibration, impact, temperature.	Package testing standards that reflect ecommerce conditions need to be expanded and developed.
Easy Recovery/ Disposal	Shift towards more recyclable materials encouraged by supplier expectation programs and consumer preference.	Some packaging materials which are more durable, or provide superior product protection within the e-commerce system, may not be currently recyclable.
Food Safety	Storefronts offer the equipment necessary to keep foods cool or heated, expecting consumers to transport safely home.	New packaging materials and designs, as well as logistics systems, are being introduced to ensure safe delivery of fresh food products. Recovery systems to respond to this emerging need have not yet been established for many materials/formats.

Source: Ameripen

handling. It can also serve as a display-ready platform to serve an additional marketing opportunity through printing activities.

- The tertiary packaging aggregates multiple secondary packages, creating efficient loads for shipping and ensuring additional traversal needs, depending on the shipping conditions.

The e-commerce sales model upsets this traditional style of product sale, as the customer no longer feels the need to visit the store. The sale occurs in virtual space and the transaction takes place online before the customer receives the product. The consumer replaces the retailer as the focus point, to a handheld device, and the logistical process for this change is far more complex. Products in bulk are shipped to fulfillment centers where orders are individually segregated to meet order fulfillment needs.

While comparing the two different business models, and by extension of their logistical systems, the rapid advancement towards omnichannel distribution complicates the response of the packaging industry even further. In an omnichannel system, the consumer may choose to pick their order up from a fulfillment centre rather than have it delivered to their doorstep. In such cases, the purchase may be online, but the pick-up is in the traditional retail form and this must also be kept in mind while packaging is designed in the omnichannel distribution model.

The best-suited proposition

The packaging industry has evolved primarily to meet the requirements of the traditional retail environment. However, the industry is rapidly evolving to reflect the changing needs for shipping directly to the consumer's doorstep.

Material and Design Failures and Success

Industry research suggests that the packaging industry is moving towards replacing traditional retail style packaging to packaging that is better suited for e-commerce delivery. For instance, the traditional form of delivery leaves the products vulnerable to vibration and damage which stems from multiple touchpoints during traversal. Packaging to avoid these potentially damaging scenarios is giving rise to the requirements of impact-resistance packaging which demands the replacement of packaging materials as well.

When it comes to packaging for online shopping, an enjoyable unboxing experience—where consumers experience receiving, opening, and engaging with primary and secondary packaging—can help drive consumer engagement, which ultimately drives brand loyalty. Apple was at the forefront of the delightful, memorable unboxing experience.

Specific SKUs

The market is now shifting towards designing specific SKUs that function for the e-commerce model more than the retail model. A shift such as this requires the sourcing of new formats and materials for the manufacture of such SKUs. In the new models, secondary and tertiary packaging may not find a use since the products are shipped directly to the customers or pick-up centers.

Packaging Optimization

Packaging in the e-commerce industry has evolved to suit the purposes of optimization. The three primary shifts that have taken place due to this evolution are the following:

a. Dimensional Shipping

Under the model of dimensional shipping, costs are depending on two measurements-packaging weight and size.The costs are based on the higher one of the two measurements. Due to the shipping costs operating on this metric, e-retailers are finding it imperative optimize their packaging to rid it of as much empty space as possible.

b. Box-on-Demand

Fulfillment centers are now making full use of box-on-demand systems to design packaging that is optimized to suit the dimensions of each order received. Rather than packing products in best-suited boxes that are made available on-hand, box-on-demand offers an intricate computerized assessment to create specific packaging produced at the fulfillment center itself.

c. Consumer Feedback

In today's e-commerce market, consumer communication and feedback are very widely encouraged.This gives manufacturers and packaging experts valuable insights into consumer needs. As the consumers are provided with a platform to critically review the products and their packaging, the response to them becomes an improvement activity that proves vital to quality control and overall improvement.

Packaging considerations brand manufacturers are evaluating

- Damage prevention in the supply chain
- Leak-proof packaging
- Size and shape considerations
- Bundling and wrapping
- Smaller pack counts and rightsized packaging
- Durable materials, smart materials
- Returnable, refillable, or reusable systems to eliminate waste
- Printing directly onto the primary product and/or the secondary carton
- Material fiber innovation for sustainability
- Growth in package personalization to enhance consumer appeal

Packaging that communicates

Evolving consumer expectations, such as smart packaging features are now a norm in the packaging industry for the online retail business. Consumers are demanding a better visual appeal sustainable packing materials and convenience. Smart packaging is also including the option of auto-reordering, making it increasingly attractive to order foodstuffs at home.

The new developments in the packaging technology are incorporated using the Internet of Things as a prominent technology enabler. The smart technologies that are incorporated include QR codes, information tags about products and sometimes also employ AR or augmented reality technology that can be accessed via smartphones.

Trends to watch out for

From the way the online grocery shopping trends are progressing, packaging will be playing an important role in its response. Recent industry research shows the four primary leanings that are directly influencing the online grocery business: Sustainability, personalization, uniqueness and convenience.

Online grocery poses an excellent opportunity for edible products and packaging is bound to play a key role in their success. Smart packaging is actively playing a role in driving up the overall efficiency of supply chains, improving transparency, while also enabling a direct and interactive relationship with customers.

Convenience is at the forefront to driving the uptake of online grocery shopping. Customers that resort to online shopping are generally crunched for time and are actively looking for methods to make their lives easier. Sustainable packaging will keep evolving further, as studies indicate that the awareness for single-use plastic and the awareness of a circular economy are on the rise. These will continue to add pressure to the packaging industry and pose as a push towards sustainable packing alternatives. Recycling and reusing are trends that are picking up fast, as consumers are becoming more and more aware of sustainable practices, and are concerned with the manufacturers of their products doing the right thing. By the year 2025, experts project as many as 80% of consumer-packaged goods companies to migrate to the sustainable packaging.

Moreover, urban delivery is set to face a huge improvement by the year 2025, capable of boasting delivery in as little as 10 minutes, further adding to the logistical complexity in the trade. Supply chain is constantly evolving to incorporate a raft of new technologies like RFID and robotics to boost efficiency and transparency.

The new-age data-scanning technologies are enabling supply chains to adopt smart packaging practices that contain unique digital codes for every product. These can be read data scanning devices or even ordinary smartphones, opening up a vast number of possibilities. A certain advantage that will be seen by the implementation of these technologies, is improved interaction with the customers and a better view of usage trends. A plethora of insights will be flooding into the market, giving a better understanding of potential hotspots and consumption statistics, aiding manufacturing and marketing efforts in a big way.

Due to the high volume and complex warehousing scenarios, e-retailers are also opting for unique identifiers and robotics-enabled warehousing and distribution operations. Data availability and traceability may help them navigate complex logistical operations to improve the overall efficiency, moving closer and closer to short order fulfillment procedures, making 10-minute order facilitation a reality by the year 2025.

Experts in the packaging industry forecast that the market for e-commerce packaging will grow at a CAGR of roughly 14% from the year 2017 to 2022, reaching almost $55 billion. In the future, companies will not need to choose between durable and sustainable packaging. A constant focus on simplicity and sustainability will keep the costs low and minimize the overall impact of the packaging activities on the environment.

Keeping customer satisfaction at the forefront, the packaging industry is looking at a bright and highly sustainable decade ahead.

Packaging in Chemical Industry

For chemical companies, the need to transport products in the most secure & leak proof package holds prudent importance over any other process, as failure in achieving so may prove damaging to their reputation and may result in unforeseen and uncontrollable accidents. This story takes a look at the important role packaging dons in ensuring safe voyage...

WHILE transporting chemical goods, companies need to follow a chain of compliance under the applicable regulatory provisions. These include training, classification, packaging, labelling and/or marking, documentation, loading, stowage, segregation, and unloading. Any deviation in the set parameters can lead to potentially life-threatening or life-changing consequences.

In the whole scheme of things, packaging has a major role to play in ensuring that during the transportation, there is no exposure to, or leakage of, the dangerous chemical that would result in health or safety risks of the workers involved, or endanger the general public, or result in environmental risks.

Offering a real-life analogy to understand the impact better, any individual who has experienced an emergency stoppage in a vehicle may be aware of the massive effects of inertia in such cases, be it cars or trains. Passengers are also frequently subjected to considerable forces of acceleration and deceleration during the take-off and landing of airplanes. Heavy forces like these can have a devastating effect on people who do not use seatbelts for personal safety. The same holds true for transportation containers, if the one responsible for their loading fails to fasten them securely. Additionally, abrupt displacement of the carried load also has an adverse impact on road safety. "Organizational and technical measures go hand-in-hand, and must be planned and implemented accordingly to prevent damage or accidents, thereby ensuring the disruption-free flow of materials throughout the value chain," emphasizes Hermann Korn, head of Logistics at Saltigo, a Lanxess subsidiary.

The containers that are employed for the conveyance of chemical substances pose a unique challenge, as the style of packaging used is principally dependent on the properties of the chemical substance being transported: IBCs or Intermediate Bulk Containers, drums and sacks and Big Bags are the transport containers frequently used in transport containers. These are also available in a variety of sizes and shapes in the market today. Arrangements like these often necessitate the building of auxiliary constructions or tools that enable the loading bed to be modified for the accommodation of the containers in an interlocked fashion- or the press-fitting fashion. "In this respect, chemical logistics poses a significantly greater challenge than the shipping of standard-sized boxes containing commercial products," explains Korn. In other sectors which are regulated, like the pharmaceutical ingredient transport, the mechanism warrants additional requirements, including the provision for the documentation which is in accordance with the Good Manufacturing Practice (GMP).

Dependable application of available options

In the market today, selected safety equipment manufacturers provide special brackets that fasten containers, made up of a number of drums, to a chemical pallet securely. These brackets are

made commercially available and widely used in chemical transport. Brackets like these have the ability to withstand the rigorous testing routines that they are subjected to before being made available commercially. They are put through laborious lean and dynamic driving tests to measure their reliability in unforeseen circumstances. In addition to this, the loading beds of the trucks can be equipped with locking bar systems that are configurable- which makes it possible to organize the containers in individual compartments. The advantage of this mechanism being that the forces generated during acceleration or deceleration are distributed across the compartments primarily, rather than spread across the loading bed as a whole. "It is crucial that measures of this nature are implemented consistently and correctly by our own employees and by our service providers. Only then will we be able in the long term to prevent accidents and damage caused by inadequately secured loads", says Korn.

Load security with systematic approach

Load security measures, like the usage of tensioning straps, are frequently employed to lower the risk of load shifting that could result in container damage during traversal. In more cases than one, the regular measures taken in order to secure chemical loads are no longer enough to meet the specifications of the chemical industry. This is one of the challenges Saltigo is aiming to overcome, in partnership with its logistics and load security services. With cooperation like this, valuable insights can be gained to proactively calculate and counter the damages that may be incurred during transport, thereby preventing damage to the goods. This is in interest of all the companies involved, including the customers who receive the goods, as they are abstracted from the inconvenience of receiving goods that may be compromised during transport.

When it comes to Dow Chemicals, load security is a major concern for the supply chain and the freight industry. Dow collaborated with ITENE Research Centre to address the concerns that were faced by the consumer and manufacturing industries, primarily related to packing and shipping their goods and the need for combining multiple packaging. "Months of product testing have led to the design of new flexible packaging solutions that optimize the overall performance of the packaging systems, resulting in significantly lighter pallets through up to 25% material savings and a reduction in CO2 emissions. All this while maintaining or even improving the load stability performance," comments Helga Gomez, marketing manager Industrial and Consumer Packaging at Dow Packaging and Specialty Plastics.

Applying a thorough solution driven approach, Dow Packaging combined efforts with Specialty Plastics to create novel packaging systems that proved to be more efficient in improving the load stability of pallets, while also proving to be cost efficient to every party involved. These new systems also furthered the intent of the companies to create opportunities to enhance the sustainability footprint in the industry.

Harnessing creativity to develop new solutions

Wooden constructions can be used to fill empty spaces between containers on a chemical loading bed. Their cost-effective and simplistic designs make them infinitely adjustable in the same way as scissor tables and their versatile properties prove extremely useful in practical scenarios. Versatile wooden constructs are considered an upgrade to the traditional air cushions because the dimensions of air cushions cannot be customized and they also prove vulnerable to environmental changes. "Sufficiently stable loading units and the effective securing of loads do not always have to result in additional costs. When goods can be turned around more quickly, the reduced logistical costs quickly offset the additional technical expenses," shares Korn.

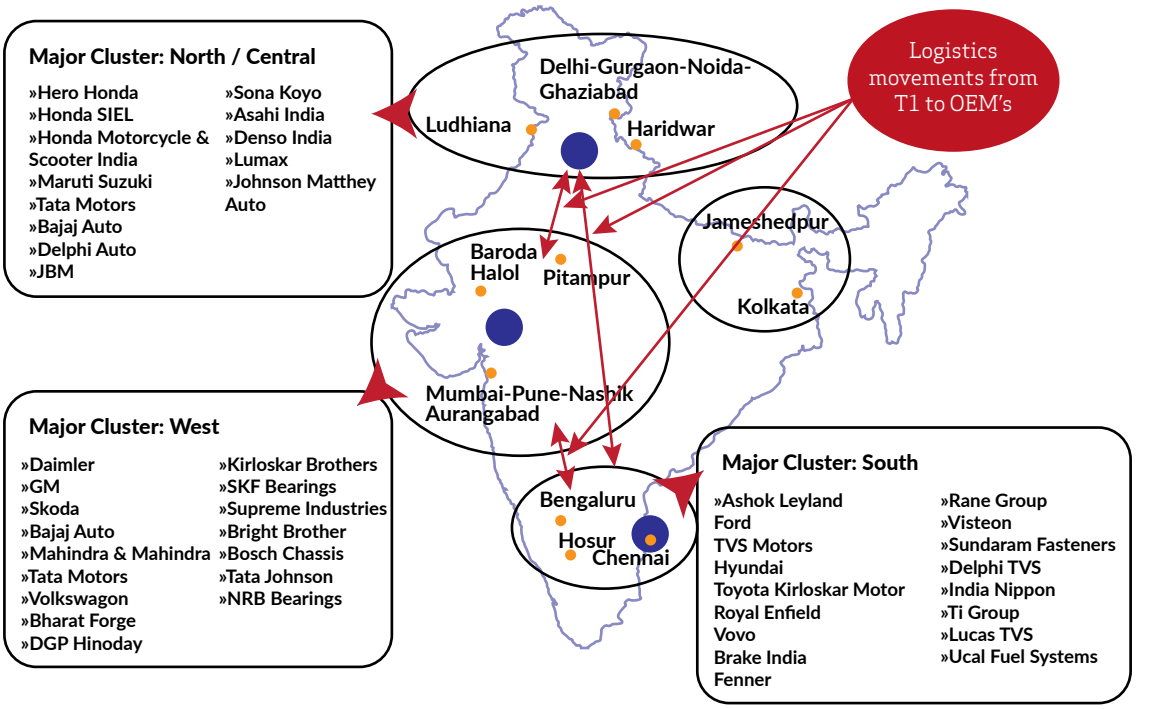
Returnable Packaging- Auto Industry Perspective

Automotive supply chain is a versatile supply chain where we manage different automotive components from small nuts and bolts to large engine parts. An automotive OEM sources More than 30,000 inbound components (line items) from different location around the world to manufacture a complete vehicle. Most of the components are sourced from within India for the domestic market. Average packaging cost for inbound components is 2% of total inbound sourced materials, shares Harshvardhan Singh, Director, Ficus Tegatai Packaging Pvt. Ltd.

Harshvardhan Singh comes with a Mechanical Engineering background having 11 years of experience in industrial/transport packaging industries. He has worked in the transport packaging segment with different organizations like Nefab, Renault Nissan, Mahindra & Mahindra Ltd. He has global exposure in automotive as well as transport packaging. He is also an active member of the Transport Packaging Community "Institute of Packaging Professionals – (IoPP), US.

THE automotive manufacturing industry comprises of the production of commercial vehicles, passenger cars, three & two-wheelers.

- India has become the 4th largest auto market since 2017 with sales (excluding two-wheelers) increasing 9.5% yearon- year to 4.02 million units. Overall domestic automobiles sales increased by 7.01% CAGR between FY13-18 with 24.97 million vehicles sold in FY '18, according to a presentation by Mahindra CIE Automotive Limited.
- Domestic automobile production increased at 7.08% CAGR between FY13-18 with 29.07 million vehicles



manufactured in the country in FY18. During April-September 2018, automobile production increased 13.32% year-on-year to reach 16.65 million units.

If we look into the Indian automotive footprint geographically, it has evolved in around three major clusters. Due to this, T1 component suppliers have to supply their component to OEMs at different locations in India and this invites a long-distance logistics model due to which transport packaging or protective packaging comes into the picture to protect components in transit, storage and optimize space in transportation vehicle as well as in a warehouse. Packaging also helps to protect and preserve product quality in transit.

Indian Automotive Inbound Packaging

If we understand the Indian domestic passenger Car sales data, with consideration of 2% average packaging cost on inbound components from T1 to OEMs, then automotive industries estimated spending is approximate Rs20 billion per year in inbound packaging. It excludes the spend on export components and after sales spare part packaging. These packaging spends include expendable packaging, owned returnable packaging and rental returnable packaging. Percentage of returnable and expendable packaging vary from OEM to OEM.

When we talk about expendable packaging, it means packaging which we can be used only once and it gets wasted in form of wood, paper, plastic, metal, etc. Among these, wood and paper comprise of major packaging wastes, which mainly get generated from corrugated board boxes, wooden crates/boxes and wooden pallets. As a matter of fact, to produce per ton of corrugated box, we cut approximate 17 trees.

Conversion of expendable packaging into returnable packaging by OEMs or T1

Expendable packaging is directly related to the cost of packaging materials, but in returnable packaging, cost is split into two parts: one is total capital investment into packaging materials like metal/plastic boxes and the other is the operating cost which includes return management (empty packaging from OEMs to T1), packaging equipment maintenance cost, loss, repair cost, cost for new packaging (damage beyond repair), cleaning cost, empty packaging storage cost, tracking cost, etc.

To understand whether any project is viable for return in terms of total solution cost and implementation feasibility, packaging experts need to study a few things before going ahead with any decision on returnable packaging investment. These factors are as bellow:

Understanding specific project supply chain flow: For making a decision on expendable or returnable packaging, we need to understand inventory and supply chain cycle days of specific project, line feeding requirements, T1 as well as OEMs plant location, volume of packaging required per day, project life, return logistics arrangements and Capex involved in the project. If we invest into returnable packaging solutions without understanding these aspects, then there would be chances of ending up with loss in a project against an assumption which will hit smooth supply chain, operation cost and dead Capex investment in packaging.

Packaging design feasibility check: Once we agree on returnable packaging implementation based on the above study, then we need to understand the selection of returnable packaging type. This would be possible by understanding part specification, part sensitivity, handling requirement at production line/in transit/ warehousing. For example, for sheet metals door panels, metal pallet is the ideal solution; for parts like headlamps or HVAC, plastic palatize foldable container is the preferred solution; for small engine components, plastics collapsible crate with PP corrugated partition is the best solution.

Few options in returnable solutions

- **Foldable large container with PP corrugated inserts and layer pad:** For delicate, large size components
- **Foldable large container without inner partition:** For bulk packaging
- **Foldable Moulded small crate with partition (palletize or individual type):** For small delicate components
- **Foldable Moulded small crate without partition (palletize or individual type):** For small B and C class components
- **Polypropylene corrugated box with or without partition:** For small lightweight components with short project life
- **Metal collapsible/non-collapsible bins:** For large component in bulk packing like sheet metals B and C class components
- **Metal trolley:** For delicate components with complicated profile which requires specific resting or locating points in packaging to arrest part movement and to provide support in transit.

Logistics arrangement check

Return logistics management of returnable packaging is one of the important factors to optimize returnable packaging cost. If distance between T1 and OEM is long then it will affect return logistics cost heavily, also if the volume of packaging consumption per day is minimum, then it will affect return logistics cost directly as either we have to move packaging in LTL partial load transportation or we need extra packaging in the system to consolidate enough packaging for FTL (full truck load) movement to reduce per packaging return transportation cost.

Capex required for project

Whether management is ready to invest in returnable packaging proposal for a specific project or not, the product's life and the project's life, the estimated time period of return on investment, cycle days of the project from T1 supply to consumption of parts at OEMs- these points collectively decide the feasibility of capital investment in packaging.

Packaging asset tracking

If we can't track our packaging assets in the system, then we should not get into the returnable model. Proper and precise visibility of packaging asset quantity and location is the most important in automotive supply chain to avoid loss and missing of packaging from system or else we will keep on adding new packaging in the system to maintain a minimum required quantity of packaging pool to run smooth supply. This tracking can be done by packaging equipment management portal or RFID system.

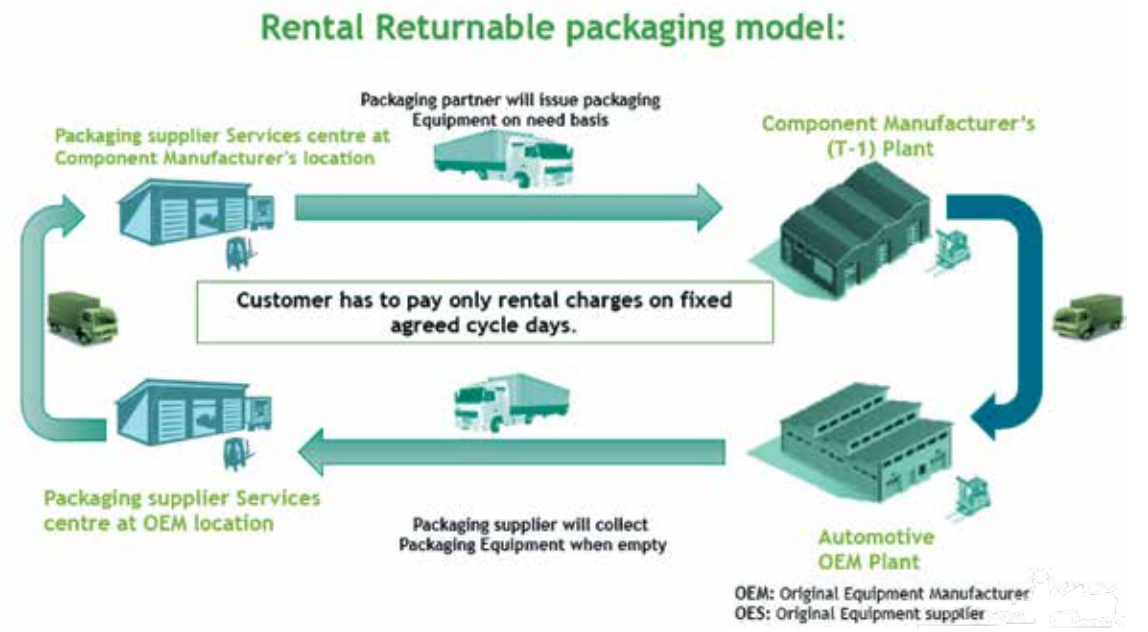
Alternate option with T1 and OEM's for returnable packaging

Nowadays, rental returnable packaging solutions by 3rd party, like any packaging company, is widely acceptable by T1 and OEMs. This rental returnable packaging model relieved T1 and OEMs from putting their capital investment into returnable packaging and taking burden off return logistics and operation.

In this model, the rental packaging solution provider will do a complete project study and invest their capex into returnable packaging and manage the same for T1 or OEMs. As a service charge, T1 and OEMs have to pay on per-trip basis just like expendable packaging. This model also helps automotive industries to achieve packaging footprints standardization and optimization. Few commonly used rental packaging footprints are 1200x1000 mm, 1200 x 800mm and 600x400 mm.

How to select any Rental Packaging service provider?

Unlike expendable packaging, in any rental returnable business, you can't just negotiate with any rental packaging service provider based on per-part or per-box packaging cost. By doing this, you may get direct cost benefits by attractive cost but it may lead to a big failure in the supply chain if the third-party packaging supplier fails to manage the project operation smoothly. It's not like if you can invest in packaging then you will run the model. In this rental returnable model, other than Capex investment, any packaging service provider should be ready with below capabilities:



a. **Subject Matter Expert:** The rental packaging service provider should have an efficient team with proper experience, expertise and knowledge background in returnable packaging and operations to manage the flow without any failure.
b. **Packaging Equipment tracking system:** The rental packaging service provider should have dedicated real-time packaging equipment tracking system to control flows and avoid packaging equipment loss. Without any proper tracking system in place, it's difficult to manage returnable packaging smoothly.
c. **Financially strong:** The rental Packaging service provider should strong enough financially to manage investment as per committed volume for smooth project operation. It's not advisable to work with multiple small rental packaging players, if you are looking for optimized returnable operation to reduce total cost and to have a win-win situation. Working with two players will provide them operational optimization benefits, which can be passed onto the end customer.
d. **Sustainable company:** As in this model, the packaging service provider has to put their capital investment into packaging asset, the customer should first check service provider background to make sure of the sustainable tie-up.
e. **Local presence and logistics partner:** The rental packaging service provider has to be present at the packaging issue location (near T1) and collection location (near OEMs) with their warehouse and logistics arrangement. Any returnable packaging success depends on its return logistics partner. Hence, before approving any rental packaging service provider, the customer should meet and understand return logistics partner of specific packaging service provider to get an insight into their capability.
f. **Visibility in agreement:** Before awarding rental packaging business to any service provider, make sure of cycles days commitments, packaging pool size, local warehousing, packaging repairing capability, packaging sourcing and manufacturing capability check, etc.

Packaging waste Management

If you are unclear about the volume of packaging waste your business produces, you may need to contact a Packaging /logistics / stores team to carry out a packaging audit of your inbound supply chain to understand exact amount and source of packaging waste. In automotive industry:

- Track all palletized packaging kit-set coming to inbound plant with parts with model details.
- Segregate all incoming packaging with respect to type of materials (eg: wood, plastic, paper, metal etc.).
- Classify all segregated incoming packaging material with respect to recyclable, reusable, returnable, expendable, etc.
- Identify and create a timeline to enforce 3Rs (REDUCE, REPLACE, REUSE) to optimize the volume of expendable packaging material consumption.
- Track all packaging wastes going out from organization as scrap (weight/volume wise).
- Compare data – Identify opportunities – Improve existing – sustain the improvements of the waste reduction process.

Implementation of any returnable packaging solution after a thorough study will help T1 and OEMs to eliminate packaging waste generation of wood and corrugated and support environment with sustainable environment-friendly packaging solution.

Performance Evaluation of Transport Packaging

Product preservation and market aesthetic are the primary responsibilities of the consumer packs, facilitating redistribution in the network, which happens through the secondary/intermediate packs and the transport pack is necessarily the protective medium from the distribution hazards. Appropriate coding and marking on the transport pack should help in their better handling and storage with the attendant benefit of reduced levels of abuses, shares PV Narayanan, Chairman, SIES School of Packaging.

PV Narayanan is a post-graduate in Chemistry, Plastics Technology and has done a Diploma in Marketing Management. He is awarded the F Inst. Packaging, UK. He has behind him two years of experience as a graduate lecturer and two years in production and R&D. Since 1967, Narayanan is fully associated with the field of packaging. He is the founder Chair Professor and Director of SIES School of Packaging/Packaging Technology centre and was the prime instrument in setting up the centre. He has been a panelist/expert of UNIDO ITC, EU and CFTC and has completed international assignments in Turkey, South Korea, Bangladesh, Malaysia and India, covering the setting up of packaging centre, testing, training, packaging/storage, analysis and package development.

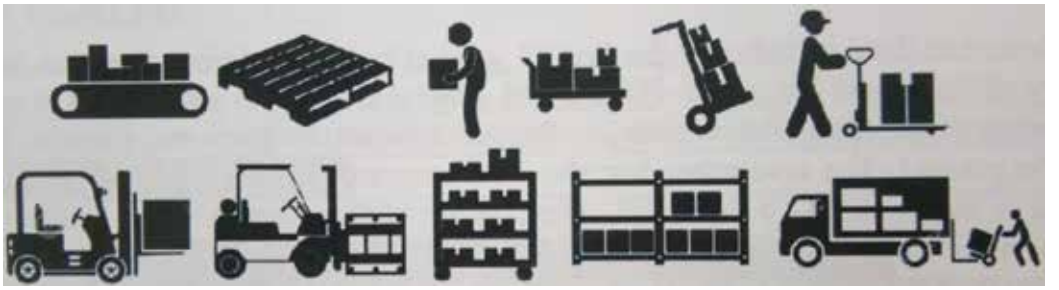
THE subject of supply chain has assumed greater significance over the years and is gaining more grounds with the introduction of more and more products. The product mix in width and depth will continue to be expanded both to keep the market identity of a company and be competitive. Higher the nature of the product is with respect to mass consumer products, longer will be the distribution network and higher will be the multiplicity of handing, transshipments with varying storage conditions. It is obvious that they are also subjected to varying climatic conditions, which could be extreme in a tropical country like India and such vagaries can severely affect the product and even lead to a situation of both product and package damages.

The abuses the package encountered in the total supply chain system could be at the in-house storage of finished goods, in-plant handling, loading into the transport system – lorries, wagons, tempos, containers and even hand carts. Actual transport system which could be in isolation/individualistic viz., road, rail, sea and air or combinations of these, unloading/loading at transship point as well as during distribution network like delivery centres, warehouses and godowns and at the end of retail or consumers' ends. Such abuses could vary in nature, intensity as well as repeated. These are generally classified as physical/mechanical hazards and climatic and environmental hazards. The former would include vertical drops, horizontal impacts, vibrations, compressions, rolling besides the tension, torsion, tear, etc.

As for the latter, they include snow and sleets, rain/liquid water, salt spray, sand and dust, high and low humidity and temperatures (including sub-zero conditions). A package would experience all of these or combinations of these and at varying intensities. The transport pack – tertiary pack or shipper is envisaged to withstand such hazards and ensure the safety of the inner packages and products. For product distribution, a large variety of packaging is deployed selection being governed by product nature, market needs and mode of supply chain as elaborated earlier.

Products could be moved directly from the manufacturing site, normally referred to as those for OEM sector or through a large chain of distribution system, as is true for most commonly

consumed/used products like processed foods, pharmaceuticals, electrical fittings, etc. Such a distribution system also influences the mode of packaging designs and materials. They could be classified as primary/consumer packs, secondary/intermediate packages and transport tertiary packages/shippers. Each of them has a significant role to play. Product preservation and market/POP aesthetic would be the primary responsibility of the consumer packs, facilitating redistribution in the network probably is through the secondary/intermediate packs and the transport pack (shipper) is necessarily the protective medium from the distribution hazards. Appropriate coding and marking on the transport pack should help in their better handling and storage with the added benefit of reduced levels of abuses.



Typical Storage and Handling Activities

A clear understanding of all the storage and handling activities in the supply chain, both qualitative and quantitative data, is necessary for the development of an appropriate package for a product for the given distribution. Whereas commercial full-scale trails are the best to acknowledge the adequacy or otherwise of a packaging system, this would consume time and expenditure and probably a large constraint in the exercise. To overcome such constraint and establish a near acceptable specification and design, the best practice is to carry out simulated sequential transport-worthiness tests in the laboratory. The data generated should be reasonably good enough to learn the capability of the package and decide on the modifications needed and at the other extreme even to consider further cost optimization. Well established laboratory performance evaluation tests are defined with details of equipment and method of testing. Whereas these are guidelines in the laboratory test programme would have to be clearly written out, and the sequence and intensity decided as these would vary from case to case of the product and distribution system. The transport-worthiness tests are performed:

- Against a given standard
- Against a specific requirement
- To access the maximum capability
- To compare performance against a standard one or between two or more designs.

The test data would help to conclude:

- Overall durability of a package
- Design and cost optimization
- Design improvement
- Reduce transit damage
- Adequacy of inner packages/materials/ fitments.

As elaborated in the foregoing paragraphs, the test sequence and intensity could best be written down based on the distribution practice and past field performance data in terms of package/product damage data.

A typical data developed appears below:

The above data generated specifically to mechanical/physical hazard a package could encounter. As could be seen, the vertical impact and compression stack load are the major causative factors, resulting in damages. Some major features related to each of the hazards and tests are briefed below:

Sustainable checks

In respect of environmental/climate hazards, test standards are evolved and could be followed for laboratory evaluation. In as much as any of the packages in the container/lorry could experience the hazards, the performance tests would lead to overall assessment and for corrective action. While simulating the tests, the physical hazard tests should ensure that the pack undergoes all the sequential tests in a rotational manner to obtain the requisite inputs with

	Drop Vertical	Drop Impact Horizontal	Vibration	Compression Stack	Rolling	Others
FACTORY	+			+	+	+
STORAGE	++			+++	+	+
TRANSPORT	+++	++	+++	++	++	++
WAREHOUSE	++			+++	+	+
RETAIL	+			+		
CONSUMER	+					

respect to the type of hazard and its impact on the package and product. To illustrate a cast iron product might be more prone to drop- vertical/ horizontal impacts and vibrations might have reduced relevance. Similarly, a free-flowing low-density product would settle down inside a carton due to vibration and subsequently the carton with more free space on top could easily get crushed due to compressive loads.

TEST	PARAMETERS	FINDINGS
Drop (Vertical Impact)	Drop Intensity-volume/ size of pack/Gross weight Mode of handling	Effects-Breakage, displacement, loosening etc.
Vibration	Test Intensity-Nature of Product, fragility, amplitude And vibrations	Effects-structural failure, scuffing, abrasion, loosening of components and malfunctioning
Horizontal Impact	Test intensity-speed and extend of impact, and surface of impact	Similar to drop
Compression	Relevance-Package size/ Dimension, product/inner pack Orientation, fitment, style and Height of stack	Effects-shipper damage, inner pack, structural failure, poor aesthetics, failure in subsequent tests
Rolling	Relevance-package size and Shape, type of handling-manual/ Mechanical	Effects-damage to container, deshaping, spillage and leakage of Products
Salt Spray	Storage at seashores, sea voyage	Effect-corrosion
Sand and Dust	Relevance-exposure to sand and Dust atmosphere, Desert areas with velocity variation	Effect-abrasion, scratches, smudging, defacing, settling of particles.
Rain/liquid water	Relevance-delamination, weight Gain, microbial growth, insect Infestation, structural weakness	Effect-Reduce performance, affects overall performance, increases gross weight Vs freight cost

A metal container would be able to withstand vibrations but more sensitive to corrosion due to salt spray, high humidity and acidic atmosphere. The design of tests and their sequences thus assumes greater significance. It is thus equally important to develop complete data on the behaviour of not only the shipper, but also intermediate & primary packs and the product as well. The design and test sequence would also change depending on the final shipper module.

A metal container would be able to withstand vibrations but would be more sensitive to corrosion due to salt spray, high humidity and acidic atmosphere. The design of tests and their sequences thus assumes greater significance. It is thus equally important to develop complete data on the behavior of not only the shipper, but also intermediate and primary packs and the product as well. The design and test sequence would also change depending on the final shipper module viz., what is true for a normal shipper like a wooden box, corrugated board box, or drum might not be true for palletized cargo. The other significant aspects that need to be considered is the handling practices like manual, semi-automatic, mechanical or automatic.

Evaluating past data to gain insights

While any available standards, though periodically updated, could at best be a guide to know and understand the case-to-case method and procedure and the final test schedule need to be designed. It is therefore of utmost importance for a company to create historical data on actual basis which over the years would help to design the test schedule with test intensity for future assessment, as well as new products, new routes of movement. The data generation should address potential hazards, chronic problems, handling practices, loading/unloading, storage system, atmospheric conditions, etc.

Systematically designed and tested inputs should provide reasonably good inferences, though not an exact replica, of the performance of the packaging system with considerable savings in time, and commercials. Such performance evaluation also enables to finalize a package design for new products and in the exercise of material changes and changes in the pack design. In a country like India, it is probably time to conduct an organized study on the packaging systems currently in vogue for a cross-section of products and varying climatic and distribution systems in order to generate adequate data to develop tests with intensities to duplicate in laboratory simulated performance evaluation programme.

Tips & Trends to Drive Performance of Packaging

PIC COURTESY: NILKAMAL

Decoding the list of ways efficient packaging can help you and your business grow and maintain that growth...

A professional brand manager, plant or production manager would have the bottom line occupying their primary focus. Innovative companies are ensuring they keep this in mind when they design new-age packaging materials. Packaging is sure to affect multiple aspects of a product line and this puts the growth of business on the line as well. Company revenue and cost control can be directly tied with the way products are shipped and packaged. The standards of quality and safety that are set for materials and processes must be adhered to in order to run an efficient business. The level of efficiency that one can bring in to the business is vital to its success. Packaging costs can amount to about 40% of product cost and freight costs can be as high as 15%. Certain predictions by industry experts indicate losses amounting to roughly $140 Bn by the year 2020, which makes investing in sustainable packaging imperative.

Packaging that is optimally sized

According to Mihir Parekh, Vice President, Nilkamal Ltd., Packaging can account for up to 40% of product cost and freight can account for an additional 15%. According to McKinsey, losses caused by inefficient logistics has cost India $45 Bn in 2007 and will increase to $140 Bn by 2020. This makes investment in packaging and efficient logistics a crucial deciding factor to boost profitability.

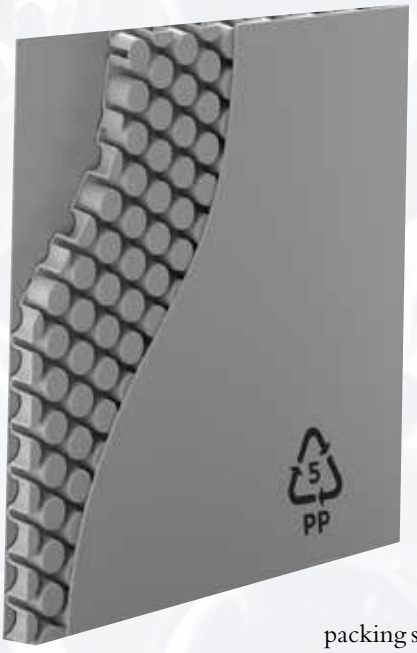
Optimizing packaging as per size matters. Using smaller, custom-designed boxes can have a multitude of advantages. It can help cut down costs by using smaller amounts of corrugated cardboard, lessen the need for unsustainable void fillers and improve the overall shipping efficiency. In the industry today, nearly 40% of boxes being shipped are nothing but air, a Packsize International study. Seeking out an on-demand packaging service provider may help a business circumvent the one-size-fits-all routine and find sizes that are better optimized

for improving shipping and storage efficiencies.

Achieving optimal packaging for freight helps not just reduce freight cost but also provides merchandise protection. Nilkamal has introduced BubbleGUARD, specifically to achieve optimal packaging and freight. The combination of lightweight plastic and the air-lock structure results in reduced weight whereas custom fabricated solutions use less packing material compared to conventional material like paper and wood without compromising on protection.

Going green with packages

With the advancements in packaging technologies and the development of innovative products like polyolefin materials, it is now possible to customize the packaging with styled cuts, dyes, prints, and custom designs, and still end up with a better result than corrugated and glass packaging while maintaining the intent of sustainability. These films are lightweight, long lasting and are recyclable. Additionally, they can significantly reduce shipping costs as compared to the alternative materials. The high customizability also proves handy in optimal shelf placement, saving space and adding to the overall efficiency.



Storing and transporting fragile items may be a challenge as they need additional cushioning for transport. The use of Styrofoam or EPS is not uncommon, but these materials are non-biodegradable and non-recyclable. Instead, manufacturers may choose to invest in an industrial shredder, which would enable them to use their own shredded paper package fillers for cushioning, which would be an eco-friendly alternative to Styrofoam.

According to Mihir Parekh, Reusability is a growing trend in industrial packaging with increasing focus on managing the carbon-footprint. Most industries are geographically concentrated, making them ideal to have infrastructure to facilitate return and reverse logistics. Despite its negative perception, plastic consumes 25% less energy to produce and has lower CO2 emissions compared to alternatives like glass or aluminium. It can be easily recycled resulting in a smaller environmental footprint – the key is ensuring correct disposal and collection. BubbleGUARD solutions are designed to be re-used for multiple cycles. 100% polypropylene ensures BubbleGUARD is 100% recyclable so the material can be savaged and repurposed after full use.

Training your team to align them with packaging goals

Reducing packaging waste is always an important task in business. Turning it into a team effort can further this intent by involving your team members and receiving active participation. Ensuring your staff is aware of your goals and explaining the importance of recycling and waste management goes a long way in ensuring the path to sustainable efficiency.

- Sizing the packaging right, fitting your product correctly. Using specifically designed containers for fragile items.
- Using two-inch-wide packaging tapes to reinforce the bottom of packing boxes.
- Careful wrapping of the product with paper or recyclable bubble wrap
- Inserting your packing slips or recycling instructions if possible
- Sealing the box and attaching the shipping information

Getting into the intricacies

Many times, businesses make the mistake of leaving certain packaging decisions until the very end. This may lead to large or clunky packaging designs that may prove inefficient in the long run. It becomes especially cumbersome when the deadlines approach and designing the packaging may prove more expensive than intended. Start with a list of design requirements based on the product size and quantity, consider the overall cost, the space that the package may occupy on the shelf and how much space can be allotted. Have a clear plan to convey your message to your audience and only then go for

the production of packaging, keeping in mind every intricate detail.

Other details that manufacturers may get into are transit-damage related issues that one may face while transporting products to remote locations without proper road or rail infrastructure. Planning ahead and using fortified packaging that provides high impact resistance may do the trick to ensure the package arrive with its integrity intact throughout the journey. For such occasions, using a sturdy material that is bacteria proof, weather-proof and UV resistant may be the perfect choice.

Using lesser labels

Switching to printed packaging is a sure way of reducing costs when it comes to adding a message on the packaging material. Proactive designing and printing saves the cost of purchasing labels and also may prove sustainable in the long term. Additionally, printing the label on the package cuts out an entire process of purchase and pasting of the label on the packaging. Additionally, it can also positively impact the production time. More than that, it proves aesthetically more pleasing and hence aids marketing efforts. Packaging trend is evolving to minimalism and simplicity as well, to influence the consumer's purchase decision.

Collecting and analyzing data

Paying attention to price fluctuations in the materials that are used for packaging may prove vital. The prices of materials like cardstock and polyolefin may vary based on month-to-month usage, and keeping a watch on the required volume may prove to have a significant impact on the packaging spend. The best way to manage your packaging cost should be is to buy in bulk when possible to get the best possible prices. The best scenario however, would be to partner up with a supplier who can keep an eye on such details so that you can focus on the packaging intricacies inside the plant.

Harnessing automation

Stretch films are known to provide excellent protection for products throughout their lifecycles. The material is formulated to strong and handle large, palletized loads in transit while still keeping the structural integrity of the product intact. They are also highly compatible with automation solutions that can provide great cost reduction opportunities that businesses can benefit from greatly.

Regular auditing and maintenance

Employing machinery for automating the packaging process has huge benefits in terms of cost savings and optimizations. But sometimes, problems may arise from the process within the packaging line, where the machines that are used for packaging your products seem to dip their performances. Regularly keeping the machinery in check and ensuring full-efficiency has huge benefits in the long term to ensure speedy and cost-effective functionality. Ensuring checks and investing in improvements may not only ensure speed, but may also cut down labour costs and lower product damage, contributing to the overall efficiency. Hence, investing in newer technologies and hiring an expert to ensure maintenance of the same is the way to go when it comes to ensuring full-scale efficiency.

Keeping track of the products

Serial numbers can be used to assign to products throughout the cycle, especially in the food and pharmaceutical industries. These serial numbers can be linked to a database and tracked individually, right from the place of packaging to consumption. The serial number can be used by customers for checking authenticity and also to track the usage trends on a broader scale. To provide a further use, the serial numbers can be used to link the security features with the product to avoid pilferage and other similar issues. On an average, 0.5% of total shipments are lost due to inadequate packaging or unmarked containers. This can be avoided by the efficient use of serial numbers and can provide additional benefits to the consumers. Consumer can also track security related details by using their smartphones to scan the barcodes and ensure the right product is consumed at the right time.

The time is now

The impact that packaging has on the overall business is important to be recognized so that timely actions can be taken to counter any possible issues that may arise. The longer a packaging issue is put off, the larger the impact.

Newer technologies that are linked to the IoT advancements are coming up in the market, that ensure great package design and repair, while connecting professionals to assist the manufacturers in maximizing productivity. Making the most of the changes, and making

them now can ensure absolute efficiency- a term that should be an operative phrase in every business.

An ideal package always protects what is inside and promotes the brand on the outside. The package, with its unique shape, design and opening method helps the brand become easily recognizable and can influence the buyer's decision. Apart from appeal and marketing opportunities, a good package also ensures excellent cost-effectiveness and furthers your intent of sustainability.

Experts in the packaging industry predict many opportunities for innovation to show up in the near future, as a vast number of sustainable and cost-effective options are making themselves known, with the world moving more and more towards environment-friendliness. A huge amount of value-creating and disruption are foreseen in the packaging industry that may affect online shopping, last-mile delivery, product security and safety measures.

The packaging industry is continuously morphing and keeping pace with the fast-evolving packaging industry is going to be critical for businesses to stay ahead of the game. New technologies that are influenced by digital developments in the industry ensure the further evolution of packaging by integrating sensors for a multitude of uses and the stimulation of demand to boost sales and make valuable projections. The ever-evolving e-commerce industry has brought many new topics in the industry such as product visibility, last-mile delivery and consumer experience that are driven by technology and the reigning consumer sentiment in this highly customer-centric market. The industry is also dealing with the increasing pressures surrounding the costs, resource conservation and sustainability in its pursuit for sustainable options to switch to, declaring ambitious 5-year and 10-year goals for an environment-friendly future.

The opportunity to make a distinct impression and create value through cost saving and sustainability has never been greater in the industry of packaging. Many packaging companies around the globe are moving closer to brand owners and the end users to stay relevant in the market- modifying their offering to suit the requirements and customising and improving continuously.

10 key packaging trends in the industry

- Reduction in packaging materials – thinner, stronger design, lighter, simpler
- Packaging closer to manufacture – less empty cartons carried in lorries
- Smart packaging – rapid print, aligned with real-time campaigns and offers; more use of RFID technology for electronic tagging, tracking of stock, as cost of RFID tags falls
- Better recycling – easier recycling of packaging, higher percentage recycled materials in new packaging
- Biodegradable packaging – eg plastics made from starch, more use of cardboard
- Space-saving packaging – eg growth of square cartons for drinks
- Customer Returns packaging – improvement in re-seal pouches to keep pace with huge growth of online ordering of eg clothes where customers often order several sizes to try on, returning most goods ordered
- Better ways to print branding / marketing on plastics eg bottles
- Less use of solvent-based inks for printing
- Consolidation of packaging industry – economies of scale with larger machines, faster turnarounds, next-generation technology.

Patrick Dixon
Founder & Chairman
Global Change

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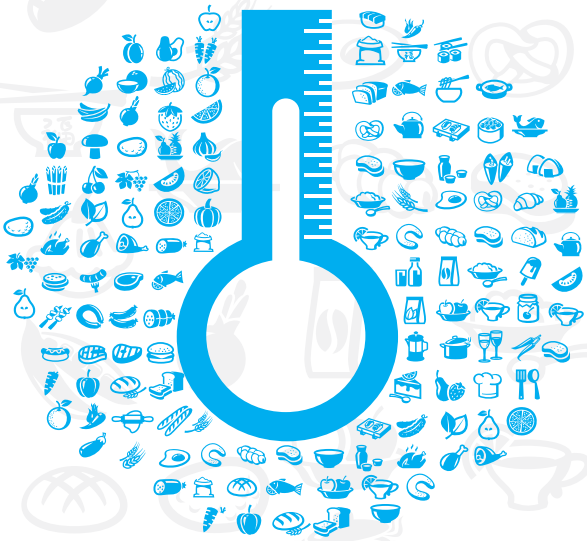

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