



Mindtree

Welcome to possible

WHITE PAPER

Under the skin of the package



Summary

Globalization and urbanization have spurred a tremendous growth in the packaging industry. Booming global trade, urban lifestyles and consumers' constant quest for convenience have taken the industry to a new realm. Increased self service and evolving consumer lifestyles have made marketers view packaging as a tool of sales promotion – a stimulator for impulse buying. Packaging performs an important role in marketing communications, especially in the point of sale. It is one of the most important factors influencing the consumer's purchase decision.

Here we discuss the nuances of packaging, the changing dynamics of the industry and its impact on the CPG industry. We look at some of the tectonic shifts taking place in packaging – from the point of not only the packaging firm but also the CPG firm. Most importantly, it captures the evolving consumer's view pertaining to this.

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Packaging – what it is all about

Variables of packaging

Packaging can be broken down into six broad variables. These variables are: form, size, color, text, material and brand or label.

Together, these variables form a unique composition that adds value to the product. Researches have shown that these variables influence the consumer's purchase decisions. This depends on the type of variable and other parameters discussed in the subsequent parts of the report.

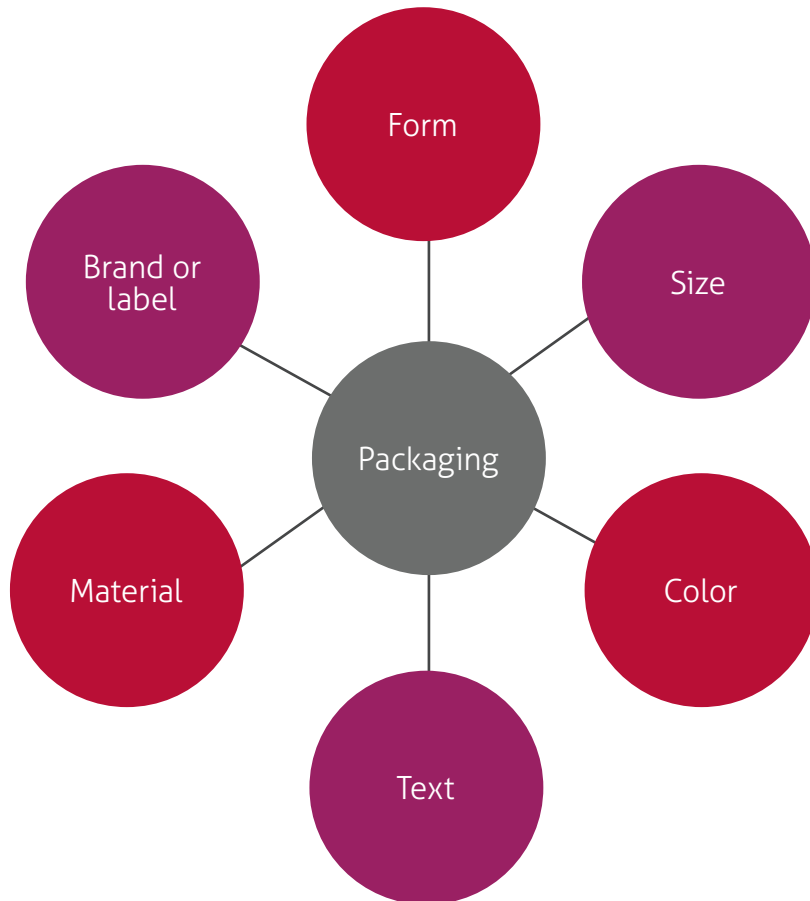


Figure 1: Variables of packaging

Lockhart's famous packaging matrix is shown in figure 2. It summarizes the concept of packaging. Famous innovations in the packaging industry include the aseptic processed

packs from Tetra Pak or the hour-glass shaped bottles from Coca Cola. These innovations of the packaging industry have the intersections in the above matrix perfectly in place.

| | | Packaging functions | | |
|-------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | Protection | Utility | Communication |
| Environment | Human | <ul style="list-style-type: none"> ▪ Tamper evident features ▪ Child resistance features ▪ Designs that do not require scissors or knives to open | <ul style="list-style-type: none"> ▪ Reclosable designs ▪ Easy to open designs ▪ Pre-measured units ▪ Compliance packaging (packaging that, by nature of its design, helps people comply with medication regimens) ▪ Talking packages material ▪ Shape configuration texture | <ul style="list-style-type: none"> ▪ Brand name ▪ Warnings ▪ Directions ▪ Expiration dates ▪ Storage information ▪ Graphics ▪ Material ▪ Shape ▪ Color ▪ Configuration ▪ Texture ▪ Photographs ▪ Text |
| | Biospheric | <ul style="list-style-type: none"> ▪ Amber color to protect from UV damage ▪ UV absorbers to protect from UV damage ▪ Water vapor barriers ▪ Oxygen barriers to protect from oxidation ▪ Oxygen absorbers to protect from oxidation ▪ Antimicrobial films to retard microbial degradation ▪ Water vapor barrier to protect from moisture loss or gain ▪ Wet strength corrugated | <ul style="list-style-type: none"> ▪ Controlled atmosphere packaging ▪ Modified atmosphere packaging ▪ Edible films ▪ Wet strength corrugated | <ul style="list-style-type: none"> ▪ Time and temperature ▪ Indicators ▪ Pictorials |
| | Physical (distribution channels) | <ul style="list-style-type: none"> ▪ Cushioning ▪ Shipping containers ▪ Corner posts ▪ Air bags ▪ Materials with adequate compression strength to withstand stacking | <ul style="list-style-type: none"> ▪ Stretch wrap ▪ Shrink wrap ▪ Self-heating packages ▪ Self-cooling packages ▪ Freezer to oven capable ▪ Handles for carrying ▪ Appropriately sized cases | <ul style="list-style-type: none"> ▪ 'This side up' ▪ 'Fragile' ▪ Bar codes ▪ Radio frequency identification ▪ 'Handle with care' ▪ 'Temperature not to exceed 70 degrees Fahrenheit' ▪ Pictorials |

Figure 2: Lockhart's packaging matrix

Categories in packaging

Metal packaging

Metal containers used for aerosol packaging include deodorants, insect repellents, air fresheners, among others. They also comprise beverage cans such as soft drinks, health drinks and beer, to name a few. These are widely used for Consumer Packaged Goods (CPG) and come with attractive design and high quality printing.

Rigid plastic packaging

The rigid plastic category includes products such as tubes, bottles, cups, cans, pots and closures. It is used in all packaging-related applications. This category is replacing traditional packaging materials such as metal cans, glass bottles, aluminum collapsible tubes and metal caps. CPG enterprises have been trying to leverage on the flexibility they get by using plastic as the packaging material.

Liquid cartons

Liquid cartons are used in packaging categories such as oil, milk, yoghurt, soya-based liquids and alcoholic beverages (wine). Liquid cartons do not need refrigeration to keep the contents fresh, unlike rigid plastic bottles. This is the main reason why this type of packaging attracts food enterprises

that have low shelf lives. They provide cheaper alternatives to metal cans. They are also easier and lighter to transport than glass bottles.

Flexible packaging

Flexible packaging is used in products such as hot drinks, beauty and personal care products and home care products. The packaging cost is low. Innovations have been done in smaller pack sizes and the consumers appreciate the mini and micro packs in these categories. The products comprise bags, sachets, envelopes and pillow packs. They contain a wide variety of personal care products such as shampoos, tooth paste, face creams and more.

Glass packaging

The primary customer of glass packaging has been the soft drinks and alcoholic beverages industry. Pharmaceutical applications of glass continue to reduce as the traditional glass packaged products continue to shift to rigid plastics. Beverage enterprises have been trying to introduce rigid plastic bottles and paper packaging. These are meant for wines and beer, but consumer adoption of such alternative packaging has been limited.



Figure 3: Lifecycle of packaging

A typical packaging lifecycle starts with the product conception by a focus group. They strategize on the innovation and design best suited for the product. After a thorough round of discussion, a package goes through a cycle of conception, creation, rejection and modification. The final package is designed and goes for production. Mass production of the package is carried out and it is finally

launched. The package goes through the distribution and supply chain. It is then purchased and consumed. Once the product is consumed, the package loses its basic utility and is treated as waste. The end-of-life alternative of the package varies from product to product. Depending upon the alternatives, they are reused or recycled, only to be a part of the new packaging lifecycle.

TYPICAL PACKAGE DEVELOPMENT PROCESS

| | |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Make preliminary designs | <ul style="list-style-type: none"> ▪ Identify and introduce all possible designs ▪ Packaging design criteria, concepts, performance parameters and scenarios ▪ Feasibility analysis and intellectual property options |
| Screen design options | <ul style="list-style-type: none"> ▪ Screen based on target consumer, customer, technical, financial and environmental parameters ▪ Include IP, shelf life, performance, manufacturing requirements and sustainability |
| Refine prototypes | <ul style="list-style-type: none"> ▪ Refine prototypes, material & performance specifications and product / package stability ▪ Identify packages and recommend keeping all the criteria in mind |
| Finalize package | <ul style="list-style-type: none"> ▪ Identify project definition requirements and conduct preliminary shipping tests ▪ Complete material, quality and performance specifications ▪ Finalize the packaging and transportation costs |
| Scale up / launch | <ul style="list-style-type: none"> ▪ Scale up and startup of first line to identify it to analyze the bigger picture ▪ Conduct final shipping test and finalize all the formalities for supply chain |

Figure 4: Packaging development process

Package design and development are an integral part of the new product development process. Alternatively, development of a package (or component) can be a separate process, but it is linked closely with the product to be packaged. The design starts with the identification of all the requirements. This includes structural design, shelf life, quality assurance, marketing, legal, regulatory, graphic design, logistics, end-use, environmental and more. The design criteria, performance (specified by package testing), completion time targets, resources and cost constraints are

established and finalized. Package design processes employ rapid prototyping, computer-aided designing, computer-aided manufacturing and document automation. The appearance of any packaging solution is driven by a variety of factors. The most significant of these have a direct impact on the safety and usability of a product. In addition, commercial motivations are taken into account. Hence, the final design strikes a balance between a surprisingly wide range of factors.

PACKAGING INDUSTRY AT A GLANCE

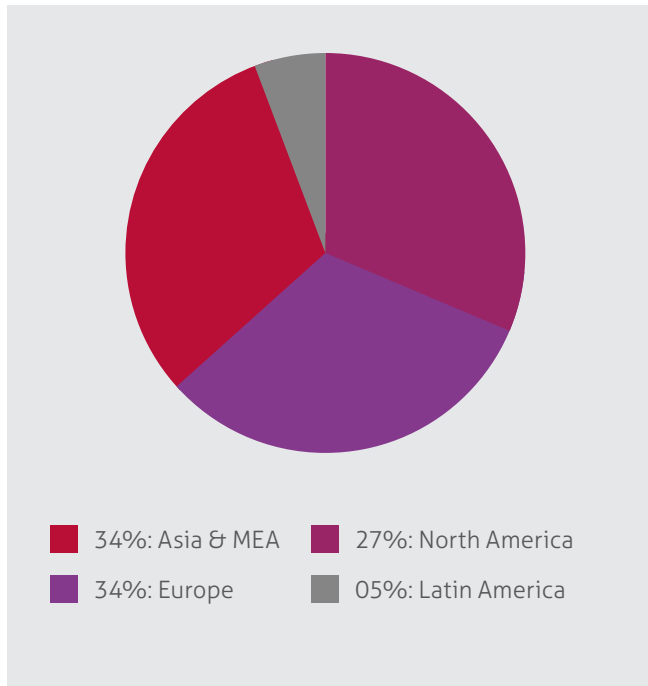


Figure 5: Global packaging by geography, 2012. Total market size USD 400 billion.

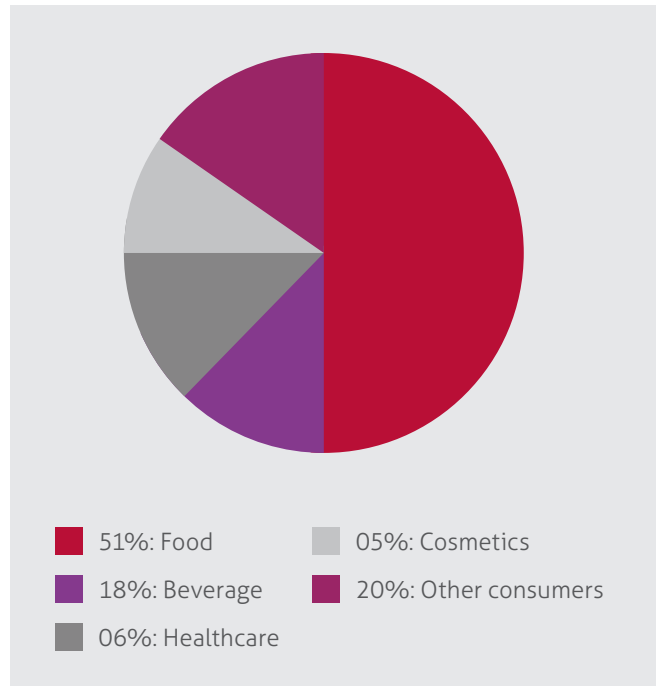


Figure 6: Global packaging by end market, 2012. Total market size USD 400 billion.

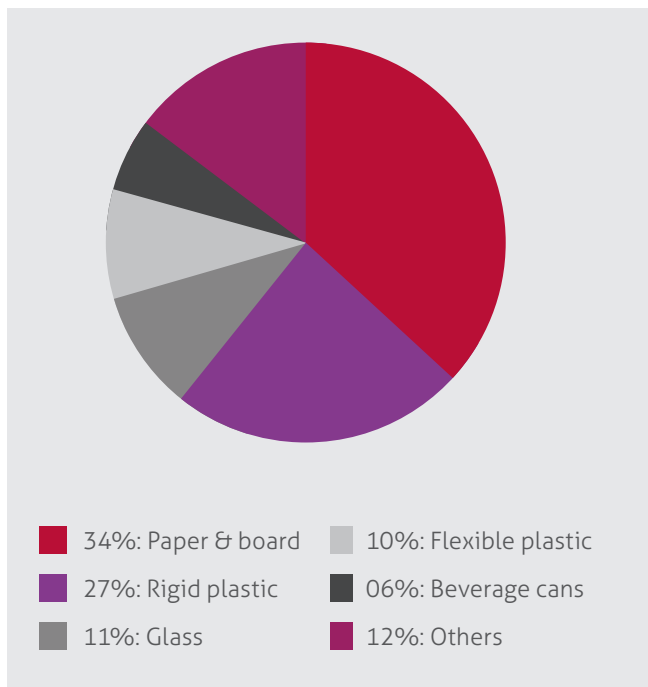


Figure 7: Global packaging by type, 2012. Total market size USD 400 billion.

Source: EY Analysis

USA and Europe, although being the biggest markets, are giving saturated growth results.

Emerging markets of Asia, led by China and South America forge the growth opportunity for the packaging industry.

Packaging evolution – from wrapping to adding value

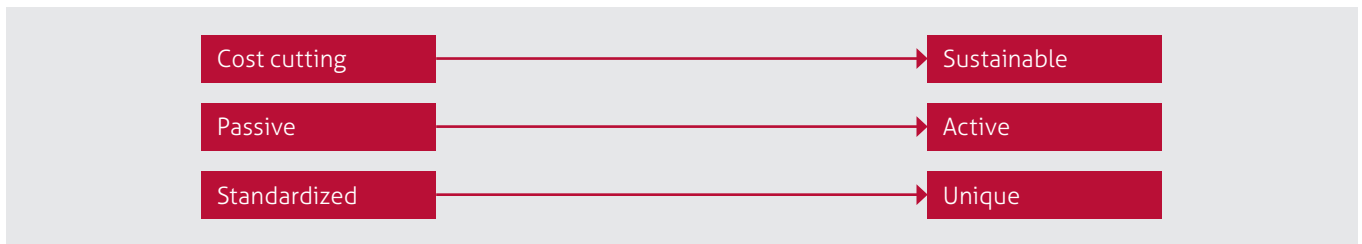


Figure 8: Evolution of packaging

The packaging industry has been moving towards a point where it has a direct impact on the consumer. It has progressed from being just a means to protect a product to enhancing its features.

Packaging is now a century-old practice. It started in the early twentieth century with technological breakthroughs that helped to retain the freshness of the food for an elongated period. The earlier innovations in packaging focused on low cost, passive and standardized products. The package was perceived as an increased cost to the product. Due to this, the focus was to reduce the cost of packaging to a maximum. The packages provided the wrapping around the product that would enable it to be transported. This was a passive approach as there were no efforts to use packaging to add any value to the product. The number of Stock Keeping Units (SKUs) was less and the industry was focused on mass and standardized productions of packaging units.

The trends have changed and packaging today is seen as an integral part of the product. Efforts have been made towards making it sustainable for the environment. The use of non-degradable or hazardous materials has been replaced with bio-degradable and eco-friendly ones. Packaging now also helps in enhancing the duration and usability of a product. Active ingredients such as inert gases or antimicrobials are put in the packages to help make the product more suitable for use. The increased complexity and number of SKUs demand unique packaging for the products. Manufacturers also come up with unique packages for the same SKUs, to showcase the advancements in packaging technologies.

The future looks certain for packaging that adds value to the products or to the environment. Producers have been continuously innovating to keep in pace with evolving customer demands.

Maintaining the buyer-supplier relationship

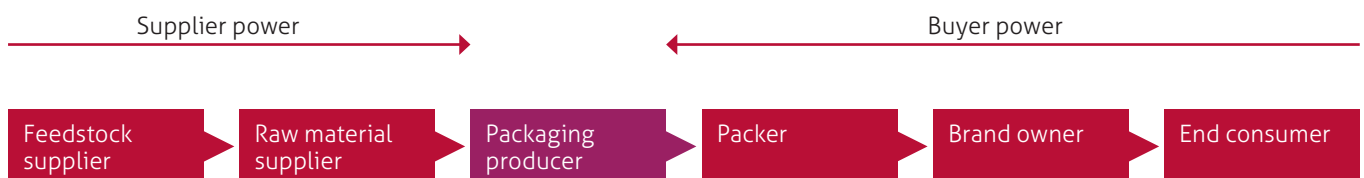


Figure 9: Value chain of packaging

As the chart in figure 9 suggests, packaging enterprises feature right between their suppliers and buyers. Their position puts them in a potentially vulnerable position in the value chain. This is because they do not possess the negotiation power when it comes to pricing. The suppliers are large global players who produce the feedstock. They have the power to pass the price fluctuation to the packaging producer when the supply is tight. This in turn, increases the cost of input for the packagers. On the other side, are the customers. They are the large and powerful consumer goods enterprises. They do not pass price increases to end consumers and threaten the packagers of switching to keep their suppliers in line.

The stability of input prices is very important for the packaging enterprises. This is because they do not have the leeway to pass on the price fluctuations to their customers.

The packaging manufacturers have to maintain the balance between security of supply and low pricing volatility. The procurement strategy should have a room for 'spot purchases' when the supply price is low. This, however, needs flexibility in the balance sheet of the enterprise.

Key strategies to achieve bottom line sustainability are:

- Have a long-term contract with the raw material suppliers on the input prices.
- Leverage the option to have more than one supplier as a part of the contingency program.

On the customer side, the ideal arrangement is to have a raw material inflation pass-through mechanism in place. The inflation puts pressure on the bottom line of the packaging manufacturer. If they can negotiate with their customers, the inflation can be handled mutually by the stakeholders. The time lag in negotiation has a heavy impact on the operating cash flow of the enterprise. It is therefore vital for the enterprise to keep the supplier and buyer in sync, when it comes to price fluctuations.

Packaging is a relatively low value item, with a limited radius that can generate profit for the enterprise.

Choosing an optimal mix of transport costs, number of plants, plant capacity utilization and inventory is crucial to achieve bottom line targets of the enterprise.

The right mix varies with the type of packaging (rigid, flexible, paper and metal) and the end-market served (consumer food, industrial, cosmetics, healthcare and more).

Maintaining the buyer-supplier relationship

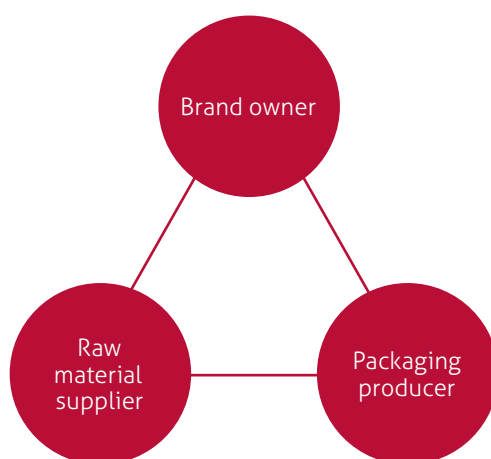


Figure 10: The relationship triangle

Brand owners are the ones that own the brand and the product. They are the CPG, food and beverage enterprises, or the pharmaceutical ones that manufacture the product. These enterprises decide on the packaging aspects of their goods based on the inputs from their teams and from the competitors' analysis. Based on the inputs, the brand owner finalizes the packaging of their product. They may

decide to have in-house packaging or may opt for packaging producers.

A brand owner either procures raw materials from the suppliers or outsources the packaging to a packaging producer. The packaging producer will get the raw materials from the suppliers in the latter case.

Every CPG enterprise, be it big or small, has its own packaging requirements. A multinational enterprise such as Unilever, purchases over 2 million tonnes of packaging a year. The industry thrives on their branding legend. It is necessary for them to have a particularly top-class, complex packaging. Exposure to a variety of end-markets and the technical nature of the product has increased the number

of stock keeping units (SKUs). This increases manufacturing complexity and the risk of obsolete inventory.

The location of the packaging varies from product to product. Few categories of products such as chocolates are packaged in the packaging facilities. Others such as beverages, are packaged in the bottling plants that are mostly owned by the manufacturer or its subsidiary.

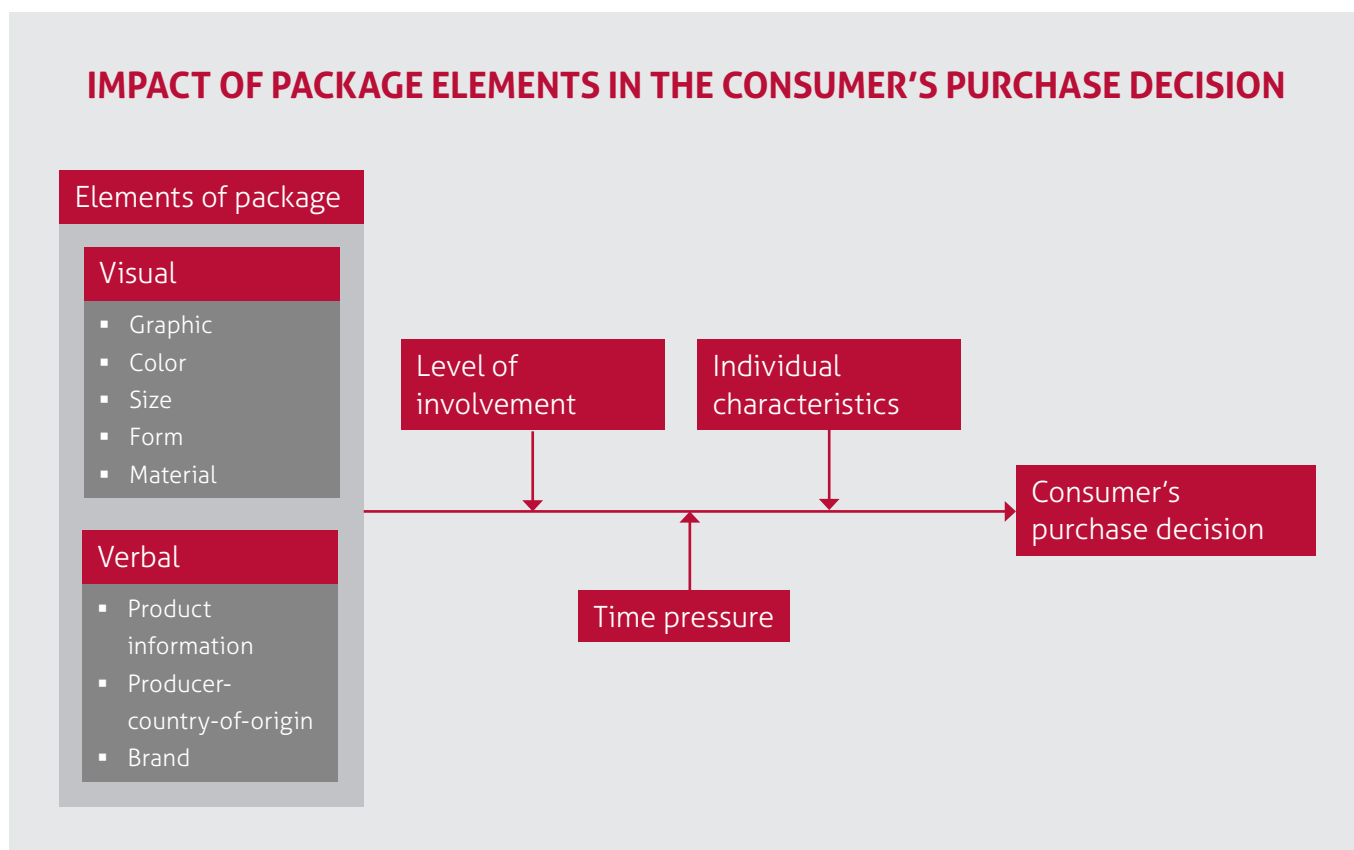


Figure 11: Impact of package element in the consumer's purchase decision

Research reveals that the impact of package elements on consumers' purchase decisions can be strong or weak. This depends on their level of involvement, time pressure on him / her or individual characteristics.

It is confirmed that visual elements of package affect the consumers strongly, when they are in a state of low involvement. This is in contrast to when they are in a state of high involvement. Conversely, the other category of variables, i.e. the verbal elements of package has a stronger effect on those in the high-involvement state. In the latter situation, consumers show more interest in the product and its package. They take into consideration

product information, expressing loyalty to a particular brand and more.

Time pressure is another important parameter which influences the consumer's buying decision. The influence of visual elements of packaging is stronger when consumers are under time pressure. Conversely, verbal elements of packaging have a stronger influence when they are not under it.

The individual characteristic of the buyer also plays an important role. The gender, age, education, occupation and income level of consumers govern the purchase decision-making, based on the variables of packaging.

Global packaging trends

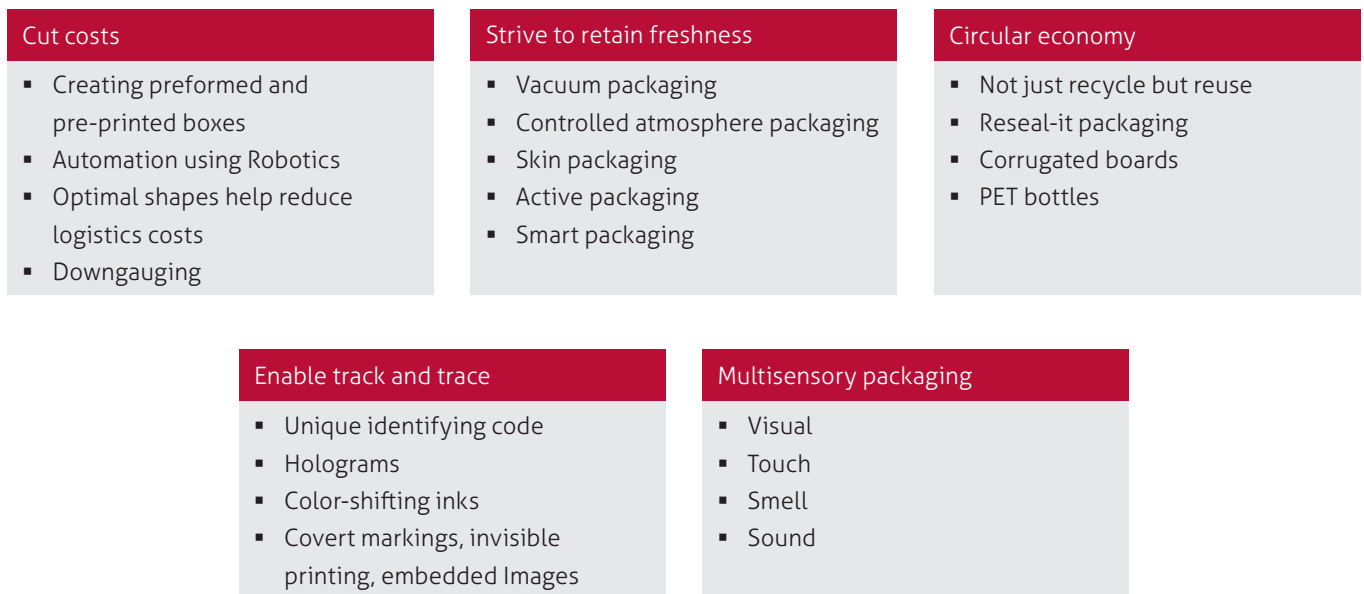


Figure 12: Packaging trends

The packaging trends show that the industry is moving towards a point where it becomes more relevant to the product, to the environment and to the consumers. Lowering the costs has always been a challenge for the industry. Packaging has been an expensive overhead for the CPG manufacturers. They pass the cost to the customers. With the changing market landscape after the Great Recession of 2008, customers demand more value for the money they spend. Cost cutting has become important for the industry. 'Downgauging' is the term for light weighting the packaging material without compromising on its capacity or other features. New technologies and techniques enable the industry to reduce the spending on packaging, within reasonable limits.

Food and pharmaceutical enterprises strive to keep the ingredients fresh and usable for long periods of time. Key developments in this regard are as follows:

- Active and smart packaging.
- Active packaging removes excessive moisture or microbes.
- Smart packaging manipulates the atmospheric composition inside the package.
- Modified Atmospheric Packaging (MAP) increases the shelf life of perishable products. These include dairy, meat (both cooked as well as raw), fruit and vegetables.

The industry has adopted the principles of circular economy. This means once the products are used, they are returned to the manufacturing process again. The useful ingredients are then extracted from them for the new cycle. The mantra here is: 'Not just recycle, but reuse.' The package life has been extending with reusability features being added to the product. The materials to be used for packaging are meticulously chosen, keeping in mind their impact on the environment. Biodegradable and renewable materials are given priority over their counterparts.

Tracking and tracing features are always desirable in the packages. Fighting against counterfeits is important as it affects the profitability of all the stakeholders. Part of the tracking and tracing initiatives in packaging are: unique identifying code, holograms, color-shifting inks and covert markings. These include invisible printing and embedded images.

The variables of packaging are:

- Visual features such as form, size, color, text and more, are predominant aspects.
- Enhanced features such as smell, sound and touch of the customer. These enable the CPG manufacturers to address the other equally important senses of the customer that draw him / her to the product.

The consumer's point of view

Mindtree carefully studied the consumers' engagement with packaging. Various perspectives emerged about what they seek and how they view packaging. The common belief among the consumers is that 'all packaging is bad.' The key findings of the study are listed below:

- A billion new consumers have been added to the list of the CPG industry. This is due to new markets opening up and the emergence of the middle class. They offer new opportunities and challenges to the industry.
- Consumers see the packaging and its content as a single unit. Quality of packaging often represents the quality of content.
- Consumers are forging ahead with the go-green drive. They do this by valuing features such as perceived 'greenness' of the materials, recyclability and reusability.
- Consumers around the world want reassurance that the products they buy are ethically sourced and protect the earth's natural resources.
- The rise of digital consumers gives the packaging industry a new landscape to deliver goods directly to the consumer.
- Health and wellness concerns drive consumers to make informed purchase decisions.

Sustainability – the emerging trend

According to a survey by Packaging World magazine and DuPont Packaging & Industrial Polymers, sustainability concerns will dominate the packaging industry in the next decade. This pertains to Europe and North America. The survey was conducted on nearly 500 industry professionals, predominantly in Europe and North America. They work for consumer goods manufacturers and converters, in marketing and packaging development roles. Their key findings are as follows:

- Sustainability concerns will dominate the packaging industry in the next 10 years, in Europe and North America.
- Today's emphasis on 'right-sizing' will give way to strategies to use renewable materials, recyclable materials and smart packaging.
- Consumers will have increased value for recyclability and perceived 'greenness' of packaging.
- Packages will be light-weight, biodegradable, close to nature and have a small carbon footprint. They can be reused, refilled and will come with label information on corporate values.

Sustainability in the packaging products is crucial to thrive in the industry. Substitutes for petroleum-based products such as dairy-based or soybeans-based should be encouraged, without compromising on their performance. End-of-life alternatives are being considered for the packages, after product consumption. The packaging enterprises are making attempts to reduce the emission of Green House gases and carbon footprints. This is through continuous R&D and innovations.

The retailers have their own sustainability goals. The packagers, along with the brand owners, can collaborate with the retailers to have a common goal along the value chain.

The CPG opportunity – packaging for differentiation

CPG manufacturers, package converters and retailers should scrutinize the consumer's opinion on the packaging and the product. Some consumers voice it directly, while others are indirect. It is imperative for the players of the industry to track and monitor these dialogues between the consumers.

CPG manufacturers and packaging converters do reach out to consumers to ascertain what they feel about their products. A set of predesigned themes is required for the CPG manufacturers and packaging converters to study consumer perception. Following are the suggested theme questions to help enterprises get answers from their consumers:

- How do consumers perceive different sustainability initiatives by the packaging converters?
- What is the consumer perception towards materials that are used in packaging: reusable, biodegradable, recyclable and eco-friendly?
- Do consumers look at downgauging or light weighting of materials? Do they relate them with sustainability measures?
- Do consumers demand for proof of sustainability claims? If yes, then what kind of proof will answer their queries?
- Does the millennial generation prefer convenience of use over other features such as aesthetics of the packaging?
- Is replacement of glass and metals with plastic and rigid structures taken positively by consumers?

- How is the consumer sentiment towards sustainability campaigns by CPG enterprises? Which campaigns produce more response?
- Are consumers willing to pay from their pockets for sustainable packaging? If yes, to what extent?
- Would a customer be willing to buy a product if he / she thinks that the packaging idea is sustainable?

The enterprises that manage to get answers to the above are bound to make their investments in the right direction. It will give them a competitive edge. This is because the environmental concerns will not come down from the current level. A bigger consumer base will add to the environment-friendly category. The demand for eco-

friendly products from the manufacturers will increase. The consumers prefer the products that they perceive will not harm the environment. The enterprises that succeed in tracking the above themes will be the ones standing out amongst their competitors!

Social media websites such as Twitter, Facebook and YouTube help to keep track of the dialogues between the consumers. With our proprietary analytic tools on social listening as well as by doing primary research, Mindtree pushes the envelope on packaging. We keep track of these conversations between the consumers and draw meaningful insights. This is of immense help to both CPG manufacturers and package converters.

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About Mindtree

Mindtree is a global information technology solutions company with revenues of over USD 430 million. Our team of 12,000+ experts engineer meaningful technology solutions to help businesses and societies flourish. We enable our customers to achieve competitive advantage through flexible and global delivery models, agile methodologies and expert frameworks.