

Defining Interactive Packaging

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Abstract

Off late it has been observed that we tend to issue fancy names and terminologies without much thought about the impact it would create. One such name (which is also the topic of this paper) is Interactive Packaging. In this paper we look to identify and define the true meaning of Interactive Packaging. Extensive study has gone into this paper which includes everything from literature review to speaking to experts in packaging from India and abroad. In this paper, we attempt to bring out a clear definition of interactive packaging. We also want to throw light on other terms like Intelligent or smart packaging and determine if and how they differ from Interactive packaging.

Introduction

According to Soroka, a book published in 2002 -Fundamentals of Packaging Technology, the major purposes of packaging are containing, protecting, preserving, transporting, informing and selling and selling its contents.

Clearly, packaging deals with all the processes that a product undergoes from production to sale and often beyond that.

Packaging has evolved over the years and needless to say it was completely different in the past from how it is today. This difference not only included the materials but also the complete design and structure

Below is a time line which shows the evolution of packaging over the years in terms of the materials used.

1.Glass

Glass is believed to be one of the earliest used materials for packaging. There is evidence of Egyptians using glass cups that were made by pressing into molds dating back to 1200 BC.



Egyptian glass containers

2. Metals

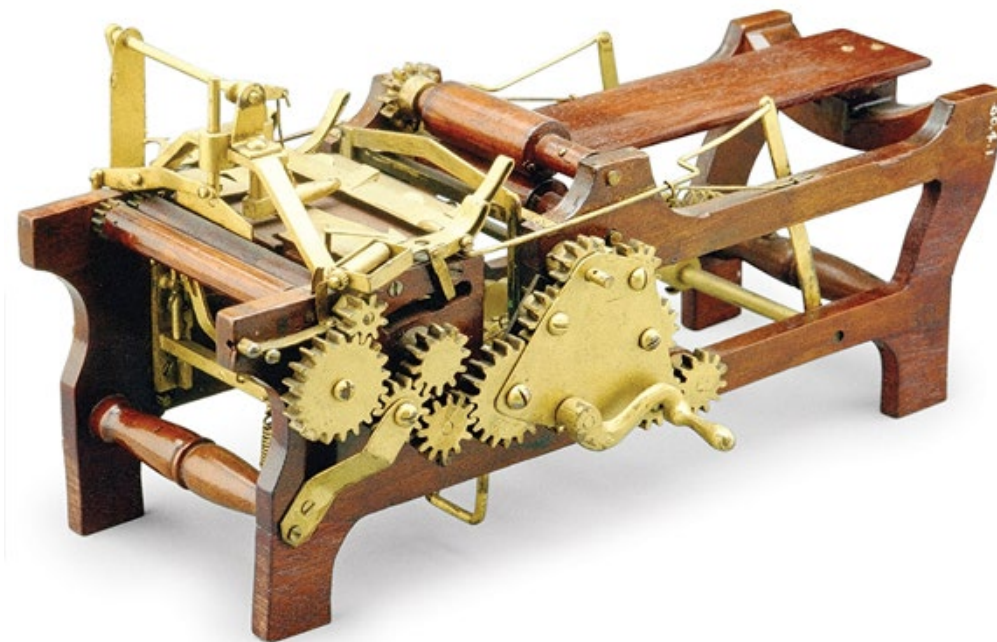
In 1200 A.D. the process of tin plating was invented in Bohemia. Tin was the first metal that economically allowed the use of metals in packaging and was soon used to make tin cans and foils. In the early 1800s, Nicholas Appert (father of canning), found that food sealed in tin containers and sterilized by boiling could be preserved for long periods. Over a period of time, this established metal as a food grade packaging material.



Tin canning for pickle

3. Paper

In 1690, first paper mill in the U.S. was built near Philadelphia. At that time paper was hand-made out of parchment and rags, both of which were expensive and limited in supply. In 1796, Lithography was invented by Alois Senfelder in Munich. This enabled printing of black-and-white illustrations on printed labels. One-color lithographed or letterpress labels were widely used on glass bottles, metal boxes and early paperboard boxes. Color printing or chromolithography was invented in 1837 and became popular soon after manufacturers realized its potential. The first paper making cylinder machine was installed in 1817 by Thomas Gilpin in Delaware used to make paperboards and other forms of paper used in packaging. This gave birth to 'flexible packaging'. Mechanization made paper plentiful but cost limited its use until paper could be made commercially from wooden pulp in 1850s. The invention of the paper bag making machine by Francis Wolle in 1852 further pushed the use of paper in packaging.



Paper making machine

As time went by, along with materials it was also the functions of packaging that changed. Apart from storage, transportation and protection other functions such as communication and education and came into play. As we move towards industrialization packaging became an integral part of the product and we could soon see development in both at the same pace. Today packaging is the first line of interaction between the customer and the product. Getting the packaging right has become of utmost necessity in this saturated, competitive and consumer dictated market. As a result, companies are pushing their employees (designers) to come up with new ideas for packaging design such that, apart from performing its legacy functions it is also capable enough to add value to its contents. All this in an effort to gain an upper hand in this competitive era.

While most packaging is designed such that it results in the least addition of cost while performing the designated functions, there are also some products which use exquisite packaging as an indication of an upmarket and exclusive product. Most times these products offer a so called unique unboxing experience which further results in creating a brand value and also customer loyalty. Hence packaging also performs these fine roles involving the tapping of the consumer's subconscious minds so as to gain leverage in sales thus attempting to outgrow its competitors. As the evolution of packaging continues the need for people with the potential of creative thinking and generating out of the box ideas have increased. The fact that packaging design is offered as a full fledged course in itself is a testimony to our claims of the ever growing need of good packaging design.

Modern day packaging

With increasing production capabilities, companies are now forced to look for customers out of their immediate vicinity their target customer can be in a different city, different country or in a different part of the world altogether. As a result it is quintessential to ensure that the product reaches the customer no matter where he is located as per its original intended form. This, becomes all the more challenging when we consider perishable goods such as food and beverages, medicines and some other fast moving consumer goods (FMCG). As a result packaging designers have come up with ingenious solutions involving more than one type of materials performing multiple roles, all in an effort to protect their products and maintain customer satisfaction. It comes as no surprise that the shelf life of products have increased even when companies claim of a reduction in preservatives. It is testimony to advanced packaging design that has ensured packaged food such as fruit juices can be consumed by people living in the most arid locations of the planet.

What is interactive packaging?

Understanding intelligent packaging and active packaging

On our visit to the PDIT conference held in Mumbai we came across these three terminologies which were being used quite frequently by the speakers. These terms were active packaging, intelligent packaging and smart packaging. These according to the speakers are packaging systems mainly used with foods, pharmaceuticals. Apart from extending the shelf life, Wikipedia says they also monitor freshness, display information on quality thereby improving safety and ultimately, convenience. The same article also says that these packages perform more functions beyond the inert passive containment and protection of the product. These involve the ability to sense or measure attributes like the inner atmosphere of the package or the shipping environment of the product. Programmable matter (organic) or man-made can be employed in these packages. More often than not these terms make use of advanced technological systems like microelectronics and nanotechnology with supportive computer applications. However there also do exist some basic active packaging systems like desiccants and vaporised corrosion inhibitors, metal chelating active compounds, oxygen scavengers etc. The packaging systems have been used since quite some time and perform their roles in an efficient manner.

It is also important to keep in mind that there are also some types of packaging that may not be using these smart systems or compounds. Whether these can be labeled as Intelligent Packs is a matter of debate, but if intelligence means creating interest, then these packages certainly do the trick. Some of the common examples include catalogue envelopes, disposable coffee cups with changing expressions etc. These packs react to the input of the user. In fact, if a can that heats up its contents upon opening can be termed as intelligent (since it reacts to the user's action : opening) then a coffee cup that shows the mood by simply rotating the outer sleeve can also be termed the same (since here also, the cup reacts to the user's action : twisting the sleeve). So we safely conclude, with sustainable evidence, that an intelligent pack reacts to the users action. Now, one can argue that the same is the case for all packs. For example, you tear open a pack of chips and so the shape of the pack is changed so as to let you access the chips inside. Without the change in shape there would be no way to get to the contents inside. So then it can be argued that any pack, which needs to be altered to get to the contents is intelligent.

However, this is not the case. You see, the difference between the pack of chips and opening a can of military rations is the absence of the obvious and the emergence of something new. It is not everyday that you open a can to find out that you doing so actually heated or cooled the contents inside. It is the ability to do something beyond the obvious and that is the reason why all packages cannot be labelled as intelligent or smart. It is also a reason that many a times the packaging itself is the Unique Selling Proposition (USP) of the product because it is being something other than the obvious. With this, in our own terms we define Intelligent or Smart Packaging as follows :

“A type of packaging which provides an experience which for the user is different from the obvious. The experience can be anything like educative, informative, product enhancing, product protecting, changing the customer’s mood, or aiding greater customer involvement. This experience can be brought out by using biological, chemical, organic, man-made or any other aids as long as the outcome is not obvious. It may involve a single or multiple tasks or in some cases be completely independent of these in terms of getting to the product. Intelligent packaging is an evolving practice because the obvious always keeps changing. Also it is a very subjective experience varying with age, gender, demographic and era of the customer.“

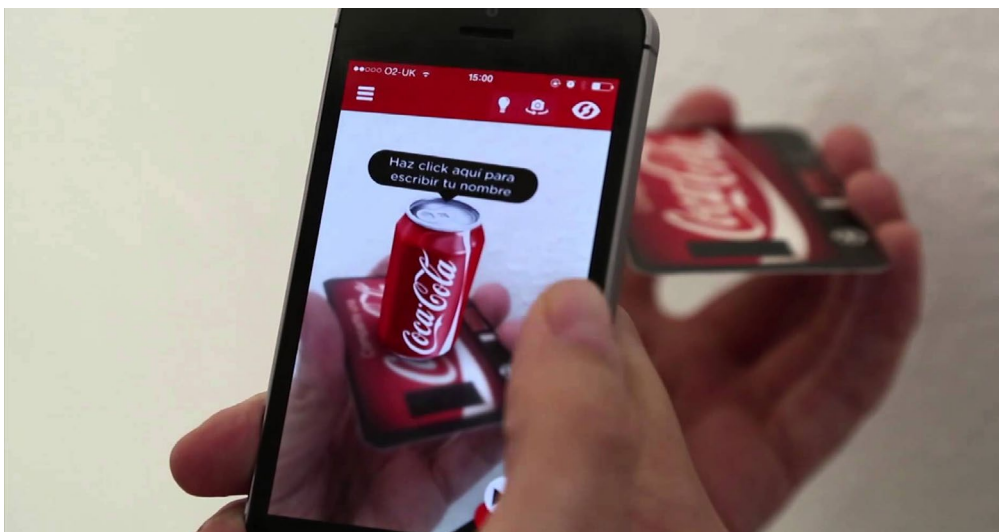
Since we have now defined what intelligent or smart packaging is we now have to get to the business end of this paper and define what interactive packaging is.

An interaction is a two way process. Conversations are interactive. A letter is not interactive, at least not until you get a reply. For an interaction to take place, there need to be at least two participants who can speak and understand a common language. The ability to speak and understand a language requires intelligence. And the level of intelligence needs to match the expectations of both the subjects in the conversation else it becomes frustrating conversation and soon ceases to be interactive.

Current trends in interactive packaging

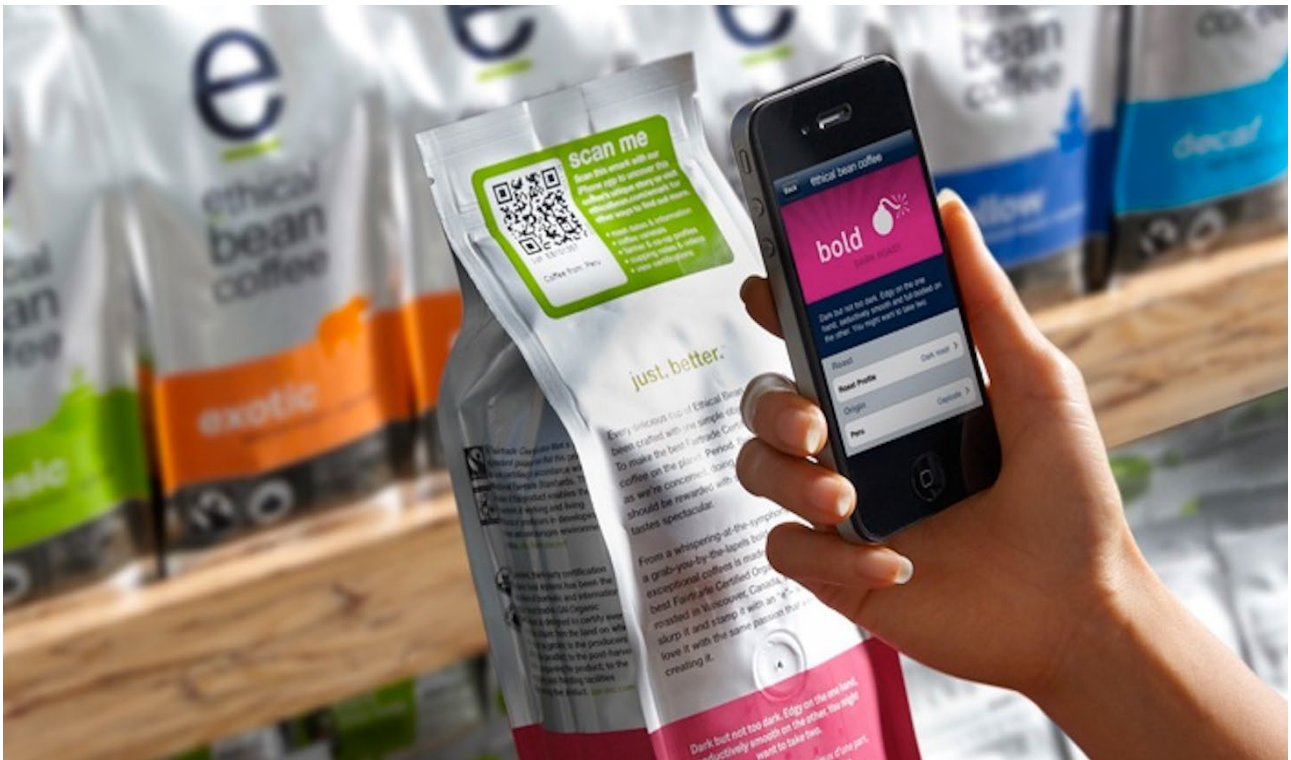
Augmented reality

As our phones get smarter day by day, it is now possible to communicate substantial amount of information regarding any product in a much efficient ways than ever before



QR code

QR code/Barcode is scanned to reveal interesting facts or information regarding the product



High end technologies are not always required to make packaging interactive. Most often it is just the touch of creativity which does the trick.



Current trends in smart packaging

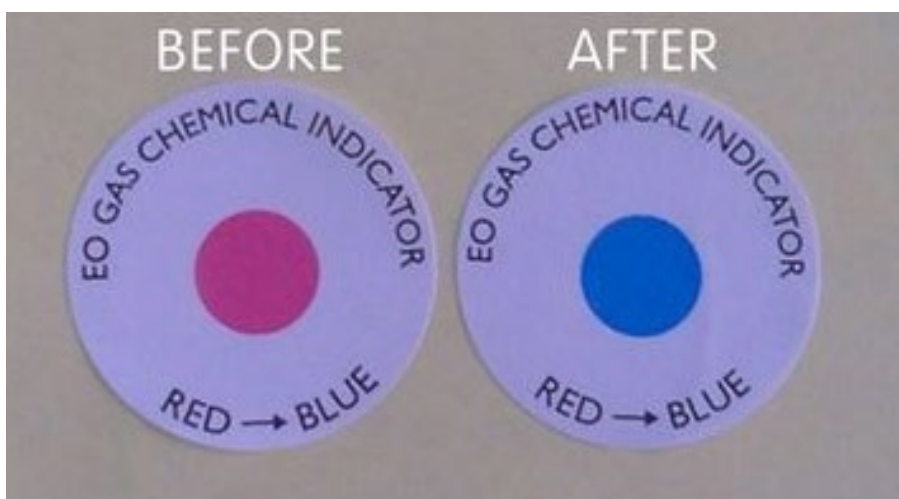
1. Time, temperature indicator

Indicates if at any point of time, the food was subjected to temperatures greater or less than its designated range.



2. Gas indicators

Gas indicators are chemicals that react/oxidises in presence or exposure to air. Modified atmosphere packaging (MAP) , is a process in which the atmosphere within the food package is flushed with an inert gas like nitrogen and O₂ level is reduced (0.5-2%). This allows user to ensure proper sealing or transport of material without contamination and loss of quality.



3. Thermochromic inks

Thermochromic inks change colour with change in temperature which indicates whether the packaged food item is subjected to temperatures above or below the optimum range.

Thermochromic Ink



4. RFID technology

Radio Frequency Identification (RFID) gives security and information of various packaged items



Current trends in smart interactive packaging



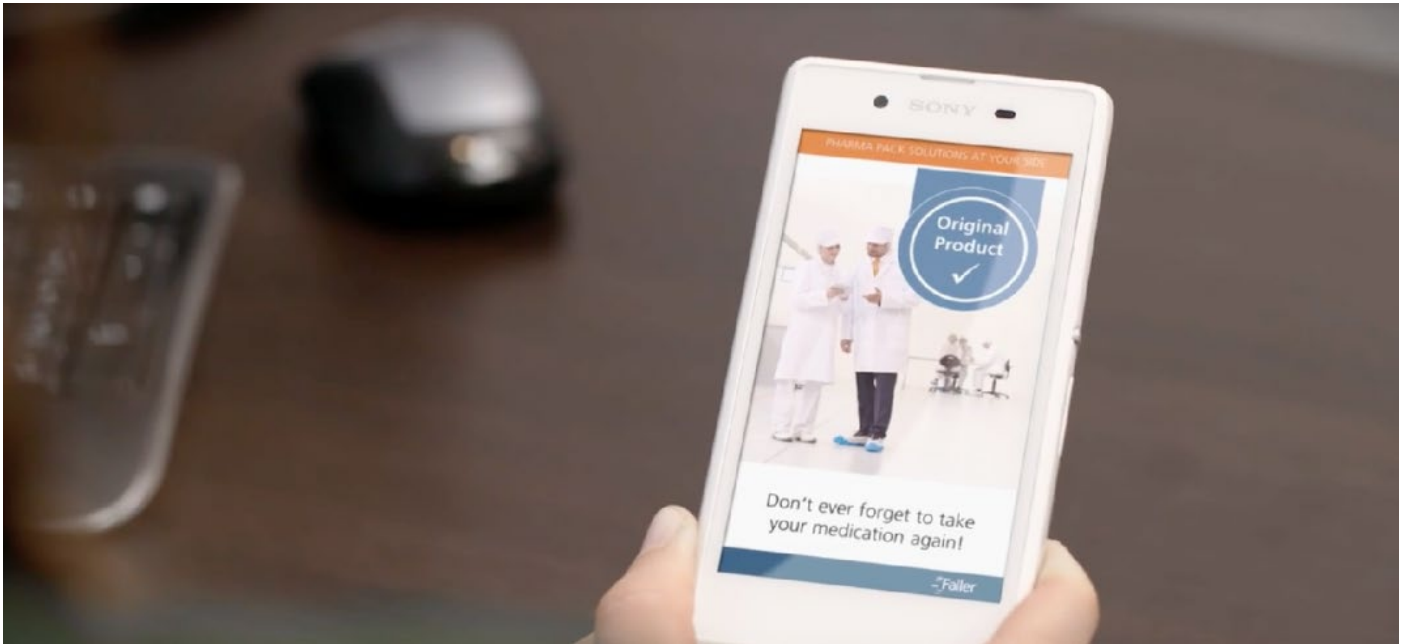
Audio feedback for the blind

Packaging can be designed to overcome disabilities. It can provide a range of new experience to a disabled person. Here in this example, the small speaker that comes along with the packaging gives instruction to the patient about the medicine and intake. The speaker is activated by the press of a button or just by unpacking action.



Visual feedback for deaf

For a deaf person, visual feedback is very important. This example shows packaging of a medicine kit that comes with a display and teaches a diabetic patient how to administer medicine



NFC(near field communication)

As markets keep getting competitive, consumers want a richer experience. They want a deeper connection with brands and their needs are constantly evolving. In order to cope up with these, brands keep themselves updated about latest technology and try to exploit them effectively. Above example shows data transfer to the mobile device using NFC technology just by touching the device on the product which has a NFC tag attached

What we think is interactive packaging is.

A packaging can be termed interactive if it induces greater consumer involvement which results not only in conversion (sale) but may also be useful post purchase. Packaging can be termed interactive with or without the use of smart technology like QR codes, NFC sensors etc. It is essential for an interactive packaging to have a two way conversation not only with the potential customer but also with other product(s) which may or may not be similar to itself. The two way communication is what distinguishes interactive packaging from active or intelligent packaging.

All interactive packaging is active and intelligent but all active and intelligent packaging are not interactive packaging.

References

<https://i.ytimg.com/vi/ob1NY8rcS3g/maxresdefault.jpg>
https://ichef.bbci.co.uk/news/660/media/images/67105000/jpg/_67105958_wisbech-cropped.jpg
<http://cms.ukintpress.com/UserFiles/Ethical-Bean-Coffee.jpg>
<https://s-media-cache-ak0.pinimg.com/originals/f9/2f/d9/f92fd98deffd6b958bdf6ffc8501f293.jpg>
<http://cdn.trendhunterstatic.com/thumbs/examples-of-interactive-packaging.jpeg>
http://freshpoint-tti.com.keam.co.il/_userfiles/images/1.jpg
<http://p.globalsources.com/IMAGES/PDT/BIG/568/B1124461568.jpg>
<https://image.slidesharecdn.com/packaginginnovationdesignllcdeck-081315-150916174703-lva1-a-pp6892/95/packaging-innovation-design-llc-16-638.jpg?cb=1442425741>
http://www.bakeryandsnacks.com/var/plain_site/storage/images/publications/food-beverage-nutrition/foodproductiondaily.com/packaging/food-packaging-technology-evolving-rapidly/9219035-1-eng-GB/Food-packaging-technology-evolving-rapidly_strict_xxl.jpg