The Connected Package:
Dynamic, Updated, Customized Packaging Communication

Goliardo Butti*
BeeGraphic Srl

ABSTRACT

Current packaging identifications are based on barcode, Ean/GTIN, QR code. These systems offered great advantages but with some limitations: bad impact, duplicability and they are unreadable. Printed package, today, is simply a container, a static product. Printed packaging communication is already obsolete when products arrive on the shelf, while Consumers ask to be key player: They need information, interactivity, customization.

“The connected package” represents the next generation in packaging communication. StealthCode® is based on Digimarc® technology, a unique watermark enhanced into the file design. It adds traditional GTIN barcode and URL information over the entire surface of the package without compromising design because it is imperceptible to the human eye.

StealthCode® platform technology system is composed by a free app (iOS/Android) for customer experience & dynamic communication and a powerful BackOffice for big data collection: StealthCode® system represents the most advanced example of dynamic communication. It is useful for brands and products promotion (Brand Loyalty & Customer Engagement), keeping track of each single watermark (readings, location, URL), collecting big data to adopt customized marketing strategies and to enrich the customer experience: Simply scanning the product using the free App StealthCode®, users enjoy the contents, strategic for marketing and communication (product information, receipts, advises).

*Goliardo Butti
Corresponding Author
goliardo.butti@beegraphic.it
**THE PROBLEM**

During the past 20 years, barcodes got an important role in retail sector: fast check out, pricing and on time stock checking.

Current packaging identification is based on interactive print like barcode, Ean/GTIN and QR code.

These systems offer great advantages but with some lack and limitations: they have bad design impact and positioning, they are duplicable, unreadable etc.

Barcodes are not able to guarantee the products: they are duplicable, they need precious space and they could become unreadable.

Figure 1 shows some examples of codes currently used.

![Figure 1 Examples of codes currently used](image1)

Barcode easily has problems because of printing technology; miss registration, wrong 4 colors used and bad print cause reading problem.

Examples of print limitations in currently used codes are shown in Figure 2.

![Avoid These Colors](image2)

Avoid These Colors
If the background and bar colors are both too light or too dark, the scanner won’t be able to read the barcode label.

![Figure 2 Examples of print limitations in currently used codes](image2)

Brand owners make huge investments in marketing and advertisement but, today, the printed package is just considered to attract customers. It is a static product. It is simply a container.

On the other side, consumers ask to be key player: They need information, interactivity, customization.

Printed package communication, today, is already obsolete when products arrive on the shelf.

**FROM AN IDEA TO THE SOLUTION**

**THE IDEA**

We are living in the social media era. Millennials, Gen X and Gen Z are always connected: communication must be smart and updated.

We need to move markets from static to dynamic but does TV, radio or printing advertising models still have a valid answer for Brand or Retail? Traditional product printed communication is static and obsolete: you cannot change what printed, so you cannot change the customer’s relationship approach.

Dynamic communication is the winning solution.
THE SOLUTION

“The connected package” represents the next generation in packaging.

The idea is to convert printing products from a simply container into an updated relationship tool.

StealthCode® is the real answer: dynamic, updated, customized communication.

“StealthCode®” solution, based on Digimarc patented technology, is used to record a unique data on the surface of the printed product but is imperceptible to human eye and does not use precious space that remains available for your design.

It is dynamic and alive

Figure 3 shows the structure of application.

The code setting is made by an inclusive technology that allows no duplication, no reproduction, live update, live tracking, big data mgt. etc

The system does not require special printing process, special technologies (RFID, NFC, barcode, holograms, eyelet, varnish, special codes etc) or special inks and it preserve precious space

It is the best and reliable solution for any kind of printed product.

The code itself is readable in any single channel enhanced we use

Comparison between packaging invasive spaces are shown in Figure 4

The code setting is made by an inclusive technology that allows no duplication, no reproduction, live update, live tracking, big data mgt. etc

The system does not require special printing process, special technologies (RFID, NFC, barcode, holograms, eyelet, varnish, special codes etc) or special inks and it preserve precious space

It is the best and reliable solution for any kind of printed product.

The code itself is readable in any single channel enhanced we use

Comparison between packaging invasive spaces are shown in Figure 4

Figure 3 One imperceptible watermark both for marketing and for retails

Figure 4 Comparison between invasive QR/Barcode and all-in imperceptible watermark solution. Barcodes out to be visible black color has to be add
BeeGraphic, Digimarc certified partner, with StealthCode® replaces older marks that intruded on the pack design. More importantly, it provides an infrastructure that lets brands open new channels to consumers.

Every single mm of packaging space is precious. It is no easy to find place to put all information that you must give or you would like to give.

Is it better to have 2, 3….6 visible barcodes or hundreds invisible?

Comparison between graphic impacts are shown in Figure 5

Figure 5 on the left examples of bad graphic impact in packaging with six visible barcodes - on the right nice graphic impact with hundreds of imperceptible codes

The use is very simple and intuitive. Scanning the product by a smartphone or a tablet, using the free app StealthCode®, customers get immediately fresh info related to that product.

APPLICATION EXAMPLES AND BENEFITS

PROTECTION AGAINST ITALIAN SOUNding PRODUCTS:

If the imperceptible watermark, scanned by the app, drives you to the target: the product is “GENUINE”

If there is no result no feedback or a warning message: the product is “FAKE”

Figure 6 shows the application for product protection.

Figure 6 if you get a result: the product is “GENUINE”

BRAND LOYALTY - CUSTOMER ENGAGEMENT:

StealthCode® allows to define a specific URL(s), driving the end users (using the app) to the contents that the brand or producer defines as strategic for marketing and communication (product information, recipes, suggestions, advises, coupons, discounts, campaign etc.)

Brand loyalty: It is very simple for the brand to manage and update contents and messages increasing the fidelity of customer, customizing communication and actions without printing the packaging again but simply updating the contents of the URL. Customer engagement: engage with consumers and collect important customer preferences data like never before, building and getting stronger fidelity. Managing big data: thanks to the powerful BackOffice, developed by BeeGraphic, information about any single product (as UUID,
geographic coverage, device, geo-localization and much more) can be supplied in real time for immediate action & correction…..

**StealthCode® FOR BRAND**

Changes the communication from static to dynamic. Gives back printed communicative space deleting non-attractive barcode. Allows scanning the whole packaging surface without any impact: it’s imperceptible. Manages big data.

Examples of big data collection are shown in Figure 7 – 8.

**StealthCode® FOR RETAIL**

Faster checkout: the imperceptible codes work with POS scanners enabled by reading technology and they contain the same GTIN data currently carried in product UPC\EAN symbols. Imperceptibility at human eye is repeated multiple times over the entire package. Checkout clerks and shoppers using self-checkout can scan items faster. No need to find and position the UPC\EAN symbol toward the scanner. Shorter lines for customer. Improved margins for retailers.

Table 1 shows the scan improvement with Digimarc Barcode

<table>
<thead>
<tr>
<th>Test Subject</th>
<th>Average of UPC</th>
<th>Average of Digimarc Barcode</th>
<th>Percent Improvement in Average Scan Time for Digimarc Barcode over UPC</th>
<th>Percent Improvement in Average Items per Minute for Digimarc Barcode over UPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checker faster</td>
<td>22.44</td>
<td>54</td>
<td>19.98</td>
<td>60</td>
</tr>
<tr>
<td>Checker slower</td>
<td>44.71</td>
<td>27</td>
<td>23.63</td>
<td>53</td>
</tr>
<tr>
<td>Media Total</td>
<td>34.59</td>
<td>36</td>
<td>23.08</td>
<td>54</td>
</tr>
</tbody>
</table>

Figure 7 Example of geo-localization data

Figure 8 Example of time slot data
The data obtained from scanning the UPC and Digimarc Barcode groups for all twenty-six subjects. The first run for each group was considered a training run and has been removed from the data analysis. The table lists the average scan time and the average IPM for runs 2-9 of both UPCs and Digimarc Barcodes for faster and slower of the 26 test subjects. Each run is a scan of 20 items. The table also lists the average percent improvement in time and IPM for each test subject. The overall percentage improvement in average time and IPM for all test subjects are 31.41% and 53.18% respectively. These results clearly show that the Digimarc Barcode has a significant advantage over traditional UPCs. The average of 54 IPM obtained in this experiment was slightly lower than, but consistent with, the 62 IPM achieved at the Guinness World Record challenge. The difference may be due to lack of practice of the test subjects, as for many of them this was their first experience at checking.

Other benefits include item level traceability, freed real-estate on packaging and improved package aesthetics.

Improves In-store shopping experience: deeper in-store engagement opportunities for retailers and brands with mobile shoppers. In packaging, print and audio connect shoppers with additional product information, special offers, recommendations, reviews, social networks, and more. Boost brand authentication and help defeat barcode swapping.

Improves engagement elsewhere in the shopper’s journey: Consumers can scan enabled packaging to get instant access to helpful information in store, at home and everywhere while retailers and brands can engage with shoppers and collect important customer data. Barcodes can also be embedded in audio material, enabling television ads, radio ads, and in-store audio.

CONCLUSION

BAR CODES TO DISAPPEAR FROM SUPERMARKET GOODS WITHIN FIVE YEARS, EXPERTS PREDICT*

“New “invisible” bar codes printed over the entire surface area of packs are replacing traditional black straight line bar codes in the US, and are set to make their way to the UK. A number of multinational retailers with UK stores are in talks to introduce the technology, it told the Daily Telegraph.

Once in place the new bar codes will drastically reduce queue times for self-service checkouts by making items much easier to scan. Instead of searching for a bar code and lining it up with the scanner, shoppers will be able to place any edge of the item near the scanner at any angle for it to be successfully read. This is because the invisible bar code is spread across the entire packet.

At present traditional bar codes can fail to scan if they are placed on a damaged or creased surface, badly printed, or if they are partially covered in frost because the item has been in a freezer. When codes fail to scan it can be very frustrating for shoppers, who must then wait for a human attendant to manually enter a number code on the pack, slowing down the process and creating longer queues for other shoppers”.

* K. Morley “Bar codes to disappear from supermarket goods within five years, experts predict” The Telegraph, February, 2nd, 2018

Katie Morley is the Consumer Affairs Editor at Telegraph Media Group. Katie was named the Young Journalist of the Year 2013 by the Harold Wincott Foundation for business, economic and financial journalism.