The Deployment of Tracking Technologies In Digital Inkjet Corrugated Production Using Printed Marks for Brand Supply Chain Management

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Abstract

Inkjet printed corrugated applications are poised for continued growth. The ability of variable data programs to drive inkjet presses provides the means to print a unique code on each-and-every corrugated box that is printed. The researchers focused on how the deployment of printed mark tracking technology in digital inkjet corrugated production could enhance customer interaction and benefit the supply chain management of brand owners.

Brand owners seek the desired outcomes with consumers through the application of unique printed marks in corrugated: Encourage and establish customer dialogue/participation; Build customer profiles; Build customer communities; Generate reminders for customers to use and re-order products; Generate interest for customers to purchase additional types of items; Provide customers with rich educational content about products.

Brand owners identified the following four applications of unique printed marks in corrugated as having strong potential in helping them reach their desired outcomes: Access to product-specific rich content; Community group registration; Customer feedback; Individual/Organizational support for charity campaigns. Brand owners identified the following three applications of unique printed marks in corrugated as having moderate potential in helping them reach their desired outcomes: Proof of purchase; Authenticating the product is genuine; Contest facilitation.

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Introduction

The potential for growth of supply chain tracking technology is particularly strong in the packaging field. Industry experts state that it would be wise for executives involved in operations and marketing, packaged goods, retail and packaging to pay attention. Smart packaging, however, is still, however, in its embryonic stage and that no industrial application is anywhere near maturity [1].

The potential benefits of smart packaging for brand managers have been noted. According to Michael Elias, at the AIPIA Summit in Shanghai, China, "Regardless of the media used to attract customers and market sales, maintaining a direct, active and online channel of communication with the consumer must be an effort to be conquered through the packaging itself. You can't ignore the power of packaging since it's already in the hands of the consumer [2]."

One particular print packaging area poised for growth is supply chain tracking technology that has evolved in the inkjet corrugated market segment. The digitally driven inkjet process is particularly well suited for printed mark tracking technology (overt/covert). Together, digital inkjet and printed mark technology have the capability to give each-and-every printed corrugated box a unique identity. Fueling this market growth potential are the technological advances in inkjet corrugated, which in recent years have been revolutionary. Both pre-print liner (web) and direct print (post-print) corrugated have experienced tremendous inkjet press developments in terms of output, quality, and customization [3].

Flat-bed inkjet printers print directly on high-end corrugated board. These digital direct (post-print) presses are designed for maximum flexibility. The presses can print a wide variety of board to customer specifications. They have the capacity to support short runs of corrugated boxes efficiently. And, flat-bed inkjet presses with speeds of up to 246 linear feet per minute are currently on the market [3].

Digital pre-print liner (web) inkjet presses are designed for maximum efficiency. They represent relatively new ground for digital printing. The objective is to transform digitally printed corrugated from a high cost/high value niche to a disruptive technology with the potential to change the dynamics of the corrugated box market. Presses up to 110" with print speeds of up to 1000 feet per minute at 1200 dpi are currently on the market [3].

The break-even point (run length) in each product application area is expected to continue to move higher with higher speed inkjet presses entering the market. Many advantages with respect to customer flexibility (new market applications), cost of operation efficiencies (shorter runs possible/short-term creative campaigns) and print quality (digitalization, customization, coated board) can be realized [4].

Variable data printing - programs (VDP-P) exploit the capability of digital printing to customize printed products for small market segments (e.g., customers served by a single grocery store). The smallest possible market segment consists of a single individual, and VDP-Ps make it possible to target individuals by preparing a personalized package for each recipient. Unique product codes (overt/covert) are an appropriate example. Overt codes include; QR, Bar, and, Alphanumeric. Covert codes include: Glyph (embedded code in a halftone), UV Ink, and, Scratch off [4].

The potential for digitally driven "unique identity" packaging applications fits three categories: "1. Supply chain transformation – traceability, agility (optimization), and sustainability (reducing the environmental footprint); 2. Product integrity – authenticity, security, and quality and safety; and 3. Customer experience – building brands by engaging customers, stimulating two-way customer interaction [5]."

The researchers focused on the third category, specifically, on how brand managers could build customer experience/engagement, using "unique identity" packaging applications in inkjet corrugated applications.

Problem Statement

How can the deployment of printed mark tracking technology in digital inkjet corrugated production benefit the supply chain management of brand owners?

Methodology

Secondary research was conducted to identify current applications in digital inkjet corrugated to provide a starting point in identifying the desired outcomes of brand managers in the literature. Based on this data, the researchers developed a semi-structured, open-ended qualitative questionnaire as a test instrument for the study.

A panel of experts tested for validity and reliability of the instrument. The panel included a leading product brand manager, a marketing director, and a University Professor. Purposive sampling was utilized to identify "lead-user" brand managers and marketing directors involved with inkjet corrugated print packaging product [6].

A pilot test was conducted followed by one-on-one in depth interviews with ten leading product brand managers and marketing directors.

The researchers employed the 'deep insight method' of qualitative interviewing to provide the participants an opportunity to think and elaborate on how the applications of printed mark tracking technology can be incorporated into digital inkjet corrugated print packaging to their advantage [7].

The findings were analyzed and results were generated using a thematic analysis of the secondary and primary data [8].

Data Analysis

Desired outcomes of brand managers for unique coding on corrugated applications included:
- Encourage and establish customer dialogue/participation
- Build customer profiles
- Build customer communities
- Generate reminders for customers to use and re-order products
- Generate interest for customers to purchase additional types of items
- Provide customers with rich educational content about products

Seven potential applications using unique tracking codes in corrugated to meet these desired outcomes were identified and divided into two categories. The first category lists four applications with major potential. The second category includes three applications with moderate potential. An explanation of each potential application area, with selected interviewee comments, follows.

The four applications with "major potential" included:

Access to Product-Specific Rich Content – Customers can sign in with a unique code and gain access to in-depth guidance and optimum product usage. Selected comments included:

"This would be a strong enticement for customers…;"
"It represents a golden opportunity for brand managers to build trust…"
"…will provide deep-rooted value in the consumer's mind and will foster long-term bonds."

Community Group Registration – Customers can sign-in to join a product-owner community of individuals with shared interests connected to the product. Selected comments included:

"This would allow brand managers to build marketing lifecycle initiatives based on recurring purchases from members of the community."
"Depending on the product, this could be a nice additional method for marketing."
"Brand loyalty is alive and well –upsell, resell, and build on referrals…"

Customer Feedback – Customers can provide direct feedback (positive or negative) related to their product experience, product condition, retail outlet experience or delivery experience. Customer feedback can be linked to a unique code indicating specific distribution chains, storage facilities, retail outlets, and delivery services. Selected comments included:

"This is great… gives customers the ability to have their voices heard."
"Consumers can have a real voice."
"In addition to learning who are customers are, we'll gain valuable information with respect to our supply chain operations."
"It represents an opportunity to foster close bonds with consumers…"

Individual/Organizational Support for Charity Campaigns – A customer can donate the corrugated boxed product to a charity (e.g., food bank, hurricane relief). The customer's name (or organization) can be imprinted on a designated number of cartons to make the recipients aware of their benefactors. Product brand can remain in forefront as driver of campaign. Selected comments included:
"Gives loyal customers a chance to step forward and shine…"
"This is social entrepreneurship at its best…"
"Good feelings all around will increase brand awareness…"

The three applications in the "moderate potential" category included:

Proof of Purchase – Customers can register the unique code to receive discounts on future purchases (possibly qualifying for a free item with proof of specified number of purchases). Selected comments included:
"This is the modern coupon…"
"Might be too much trouble, like QR codes…"

Authenticating the Product is Genuine – Customers can use their unique code to verify the authenticity of product. Selected comments included:
"The box might be too far removed from the actual product ... may be more effective if the box was an actual component of the product."
"This would provide an opportunity for product validation in terms of the security of knowing that this is the 'real product' and not a fake with respect to 'cloud –purchasing'…"
"Might be more powerful if combined with other factors…"
"I've only seen this is pharma, and very seldom…"

Contest Facilitation – Customers use their unique code to enter a brand-sponsored lottery and receive possible monetary or item rewards. Selected comments included:
"I have concerns about costs and logistics…somewhat cumbersome."
"The idea has potential but would need careful development…"

Summary/Conclusions

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inkjet corrugated production could enhance customer interaction and benefit the supply chain management of brand owners.

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Future research should further explore the "major potential" applications for unique printed marks in corrugate packaging. Pilot programs can be run for each of the four applications and results can be measured to gauge the perceived benefits for both brand owners and consumers.

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