

SMART PACKAGING

STATE OF THE INDUSTRY REPORT

PRODUCED BY



BRAND EXPERIENCE



Connected Packaging: Delivering Brand Value

Inside:

Capturing Brand Value
From the Smart Packaging
Revolution, produced by
Deloitte in conjunction with
AIPIA and BXP *page A4*

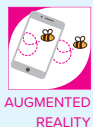
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HOW SMART PACKAGING DELIVERS BRAND VALUE

WORLD'S INFORMATION SOURCE FOR BRANDS AND THEIR SUPPLY CHAIN ON ACTIVE & INTELLIGENT PACKAGING

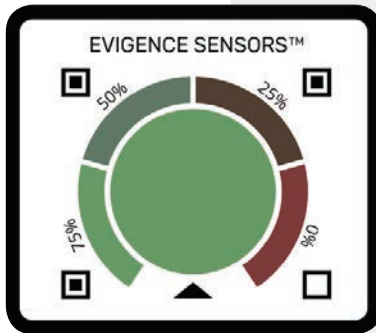
SMART PACKAGING IN THE SUPPLY CHAIN





Food waste in supermarkets is nearly double the profit from food sales.

How Evigence Sensors™ allow handlers across the logistical journey to monitor food freshness



Food waste has reached epic proportions. Approximately a trillion dollars' worth of food is thrown out annually from farm to fork. In the U.S. alone, 40% of food gets tossed each year, amounting to \$162 billion in waste.

Until now, waste was a direct consequence of being

in the dark on product freshness. Monitoring the real-time state of perishable food throughout its logistical journey was simply an imprecise science.

EVIGENCE SENSORS™ ARE CHANGING ALL THAT

Welcome to the age of Unit-Level Cold Chain Management — a new paradigm based on low cost, temperature-sensitive Visual Freshness Sensors that are transforming the fight against waste reduction. It's a simple, effective method that enables handlers across the ecosystem to literally see the state of freshness of every box that comes off a truck, gets stored in a warehouse and hits the supermarket shelves.

FRESHNESS AT A GLANCE

Evigence's Time Temperature sensors are designed to change color and present the

true shelf life of the product they are monitoring. They can be calibrated to suit all food and beverage types and are readable by both the naked eye and by smartphones.

ABOUT EVIGENCE SENSORS™

We're an enabler of the smart consumption era, producing small sensors that are empowering a big change in monitoring the shelf life of perishable products. The company's low cost Visual Freshness Sensors offer brands, retailers and consumers a new way to monitor freshness in real time.

For more information contact: info@evigence.com and/or visit the website: www.evigence.com



ARE YOUR PRODUCTS SMART ENOUGH?

Over two thirds of shoppers prefer to check their smartphones for product research in store rather than talking to a sales person. The smart product revolution is here, are your products part of it yet?



The smartphone is the go to device for consumers to get things done. Personal, powerful and convenient, it is no wonder that consumers turn to their smartphone to access facts, figures and crowdsourced trust about products and brands they are interested in. This creates an incredible opportunity to build a direct relationship with customers by delivering exceptional brand experiences and personalised value added services through your Smart unique products.

MAKE YOUR PRODUCTS POWERFUL – transform your products by giving them a unique profile (through item based serialisation), provide a gateway for your customers by making them smartphone compatible with Smart labelling (NFC or QR Code).



MAKE YOUR PRODUCTS PERSONAL – deliver your best brand experience by directing customers based on their personal customer journey and provide real time item history for products they interact with.

MAKE YOUR SERVICES CONVENIENT – customers expect everything to be on demand. With smart unique products your customers can access item information and services ON DEMAND no matter where they are!

CONTACT US TODAY – our Label Intelligence Solutions package is an end to end solution, combined with consultancy to help you capture the most value from the Smart Packaging Revolution!

Contact us: LIS@all4labels.com





RESEARCH METHODOLOGY This report is partly based on the findings of a survey conducted by Deloitte between November 2017 and February 2018. Survey respondents included 425 North American business executives from 12 industries. More than 70% of respondents represented companies with revenues of more than US\$1 billion. Almost 90% were in senior management roles. The margin of error for the entire data set is plus or minus 5 to 6 percentage points.

CAPTURING BRAND VALUE FROM THE SMART PACKAGING REVOLUTION

By Mike Armstrong, Francesco Fazio, Daniel Herrmann and Carli Hetland

INTRODUCTION

A SHIPMENT OF HIGH-END skin care products leaves its offshore production facility, and an embedded multi-function sensor in the pallet tracks the location of the product as it moves through multiple transport modes, letting the consumer packaged goods (CPG) company alert retail partners to the expected time of arrival. The products arrive at the retail store where the packaging informs shoppers of the product's intended use and correct functionality through a QR code scan. At home, a sensor in the cap monitors the consumer's usage and uploads the data to a smart home hub, which reorders the product automatically as it runs low. Finally, a connected augmented reality app helps users understand their skin type and find new products best suited for their personal care needs.

This vignette, although not a real-world example, is a compilation of individual smart packaging functionalities already in the market (or under development) and underscores the potential of smart packaging to transform customer experience. Smart packaging will have impact across a range of business functions, but will have a particularly strong impact on branded goods and CPG companies. As a result, senior executives would be well-advised to take notice.

Somewhere between U.S.\$5 trillion and \$10 trillion worth of consumables are sold globally each year and the vast majority of them are packaged in some way, generating a packaging market of US\$424 billion in 2016, according to data reported by MarketsandMarkets in 2018. Yet packaging remains a secondary consideration for many manufacturers, brands,

▶ **FIGURE 1****Nine applications of smart packaging across three broad business issues****USER EXPERIENCE****Interaction and satisfaction**

Communication with the customer to entertain, instruct, or inform and encourages deeper interaction with the physical product and/or digital brand presence

Usage

Makes product use easier from delivery, preparation and usage, to disposal, and can help form intimate understanding of customer usage behaviors with connected technologies

Access

Makes user ordering, replenishing and returning more seamless and enhanced

**PRODUCT INTEGRITY****Authenticity**

Ensures the customer knows the product is exactly what was promised, from where and from whom it was promised

Security

Defends against product theft or unauthorized product access to control product exposure, use and distribution

Quality and safety

Monitors or controls the product environment to protect customers from anything but the optimal product experience, i.e., cold chain

**INVENTORY AND LIFECYCLE MANAGEMENT****Traceability**

Realtime ability to track and trace exact product location in production and distribution cycles

Agility

Optimizes supply chain processes including predictive planning and inventory management

Sustainability

Reduces environmental footprint throughout the product life cycle and ensures more sustainable disposal or reuse

Source: Deloitte analysis

and retailers alike. Packaging with enhanced functionality, by way of new technologies, new materials, and thoughtful design—smart packaging—has enormous potential not only to create value, but also to disrupt traditional business models.

Smart packaging (SP) systems are of various types including design-led, active packaging and connected packaging solutions. Design-led packaging focuses on improving form and function, supports the value perception of the product, and enhances the user experience. Active packaging uses advanced materials or chemistry to improve functionality or appearance, e.g., moisture retention or temperature control.

Arguably, the most transformative type and the focus of this paper is connected packaging, which contains technology, e.g., sensors, codes and tags capable of generating data that can be captured, treated, analyzed and communicated to people or machines to change behavior in the physical world.

Smithers Pira in its *The Future of Active and Intelligent*

Packaging to 2023 estimated the market to be worth approximately US\$6 billion and is forecasted to grow nearly 6% (CAGR) within the next five years. This growth rate represents a weighted average; there are pockets of activity with much more rapid growth, e.g., applications centered on security and theft.

Results of our survey of more than 400 business leaders revealed that smart packaging—and in particular, connected packaging—is indeed on the radar of senior executives, and is attracting significant investment across the value chain as companies seek to exploit the opportunity.

Of the three categories of applications, user experience is the most novel.

Market leaders from several industries are embracing innovative smart packaging applications primarily to address three types of business issues: inventory and life cycle management; product integrity; and user experience.

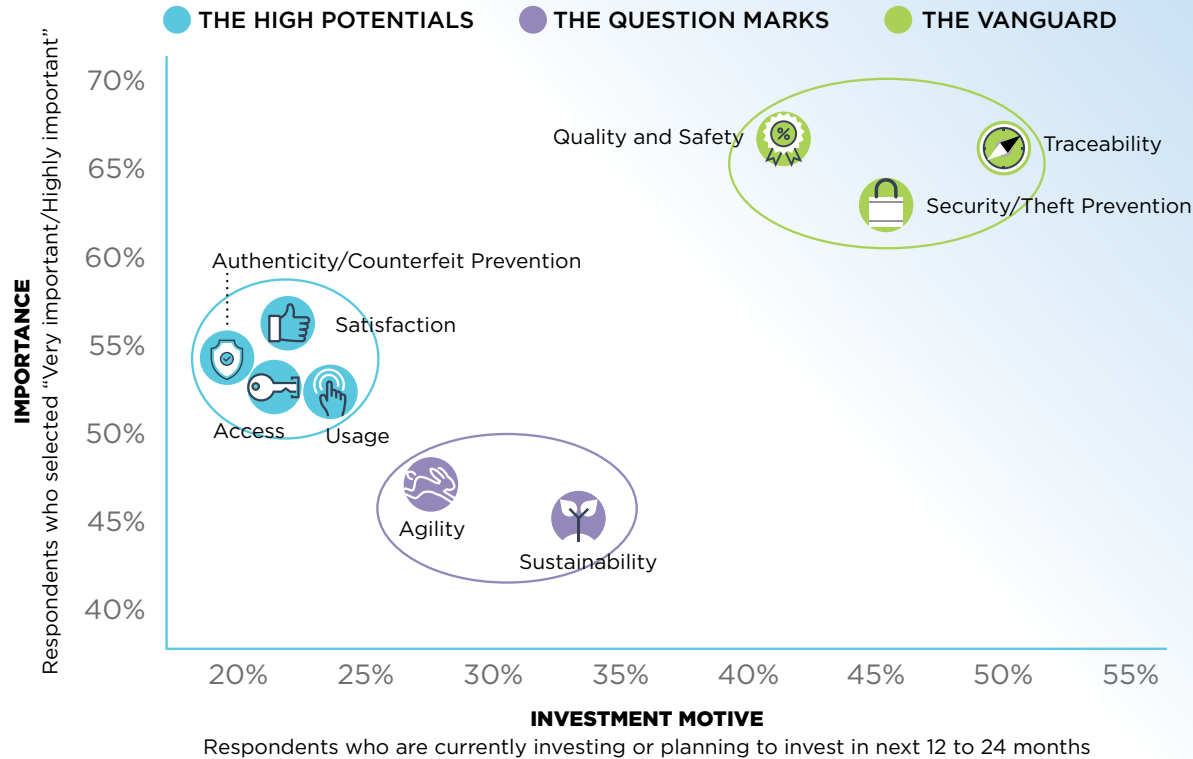
▶ **FIGURE 2**

Market perception of smart packaging opportunities

Majority of respondents seek to enhance product safety, sourcing transparency and security

Question A: In which of these smart packaging areas is your company currently investing or planning to invest in the next 12 to 24 months? (Select all that apply.)

Question B: Please rate the importance of the [given] smart packaging applications for your company. (Rate on a scale of 1 = “Not important” to 4 = “Highly important.”)



Source: Deloitte analysis

Inventory and lifecycle management applications can provide solutions to common supply chain problems, including sourcing raw materials from suppliers, managing the supply chain, and delivering products to the final customer. Product integrity applications serve as a valuable layer of defense against internal and external threats and help maintain the trust of customers. While inventory and life cycle management and product integrity are certainly important areas, the focus of this report will be on user experience applications.

Packaging can enhance user satisfaction by making the actual product-use occasion more engaging, efficient or informative, as well as by providing valuable consumer insights to brand owners and retailers.

There are three applications that enhance user experience: access, usage, interaction and satisfaction. For example:

Access: Amazon is improving access through its Dash Replenishment Services (DRS), which allows connected devices to leverage Amazon’s retail platform to offer automatic reordering.

Usage: Pillsy—a combination of a smart bottle and mobile application—tracks when consumers take medication and sends a signal when to take the next dose, enabling patients and doctors to track medication adherence and enhance usage.

Interaction and Satisfaction: Heinz has introduced an augmented reality app to allow their users to unlock a secret recipe book by holding their smartphones over the packaging labels.

Bombay Sapphire uses AR-based technology—in conjunction with the Shazam application—that allows buyers to scan the

bottleneck tag and view an AR visual around the bottle; view exclusive video content; and review gin-based drink recipes.

Until now, we've seen the vast majority of smart packaging solutions being used on higher-value products; however, as the cost of technology drops, we are seeing an increasing number of packaging solutions deployed in lower-ticket items.

Smart packaging is arriving in waves —user experience is an untapped opportunity

Our analysis of the smart packaging space suggests that different applications are arriving in waves, as certain appli-

cations gain broader and earlier traction than others. Figure 2 maps the perceived strategic importance of nine smart packaging applications against the intention to invest in each in the coming years. This figure reveals several applications (the “Vanguard”) as the most important and receiving the highest investment, addressing track-and-trace and product integrity concerns.

Although user experience applications are not the highest ranked in terms of planned investment, well over half of industries surveyed indicated user experience applications to be very important (Figure 3).

►FIGURE 3

User experience applications are most important for retail and manufacturing industries

Top three most important application areas for each industry by number of responses (% Very Important/Highly Important)

	Computers/ Consumer Electronics	Consumer Goods/ Food and Beverage	Retail/ Distribution	Healthcare/ Pharmaceuticals	Manufacturing/ Industrial Products/ Packaging or Printing	Technology/ Analytics/ Information Solutions	Other: Transportation, Logistics, Financial Services	Overall
Traceability	57%	66%	75%	68%	77%	69%	38%	66%
Agility	48%	46%	53%	53%	51%	56%	26%	48%
Sustainability	52%	44%	42%	42%	55%	56%	26%	45%
Authenticity	76%	61%	48%	70%	51%	61%	29%	54%
Security	81%	66%	63%	75%	58%	70%	42%	62%
Quality & Safety	76%	73%	58%	73%	74%	73%	41%	66%
Satisfaction & Interaction	67%	44%	57%	60%	62%	59%	32%	54%
Usage	62%	46%	50%	63%	63%	60%	23%	52%
Access	52%	46%	58%	62%	60%	54%	32%	53%

Source: Deloitte analysis.



These applications are considered “High Potentials,” given the gap between perceived importance and planned investment, revealing an area ripe for opportunity.

There is some indication of forward momentum in select industries. For example, the consumer electronics and health-care sectors rate user experience applications quite highly in terms of importance, and both retail and manufacturing rank user experience applications in their top three (Figure 3).

Winning in Smart Packaging

Smart packaging, particularly, for user experience applications, has great potential but reaching that potential will require tackling certain challenges.

This section not only frames the nature of these challenges but offers suggestions on how players might mitigate (or even solve) them and win in the smart packaging space.

For more perspective on the challenges (and opportunities) facing the evolution of the smart packaging revolution, please refer to our paper “Capturing value from the smart packaging revolution.”

GO TO MARKET

Challenges with monetization and prohibitive costs are often cited as commercial issues that have impacted the growth of smart packaging.

While packaging firms provide the critical substrates and engineered materials for packages, they have generally not been value-added participants in data-enabled packaging and have struggled with monetization and sharing in the upside.

To capture this opportunity, companies must first be able to identify their unique, differentiated contribution to the solution.

This contribution gives them a stronger claim to getting access to data generated by the smart solution, which is key to new revenue streams and premium pricing. For packagers, this contribution could involve providing access to key customers, or as in one case, proprietary knowledge about food preservation chemistry critical to a smart anti-spoil packaging solution.

Second, companies should design a profit model that gives them a share of the newly created value. In many cases, this will require risk-sharing and co-investment until the value of the solution is demonstrated. Potential models include full investment in prototype development in return for sharing in incremental sales of the end-product and/or in any data generated by the solution.

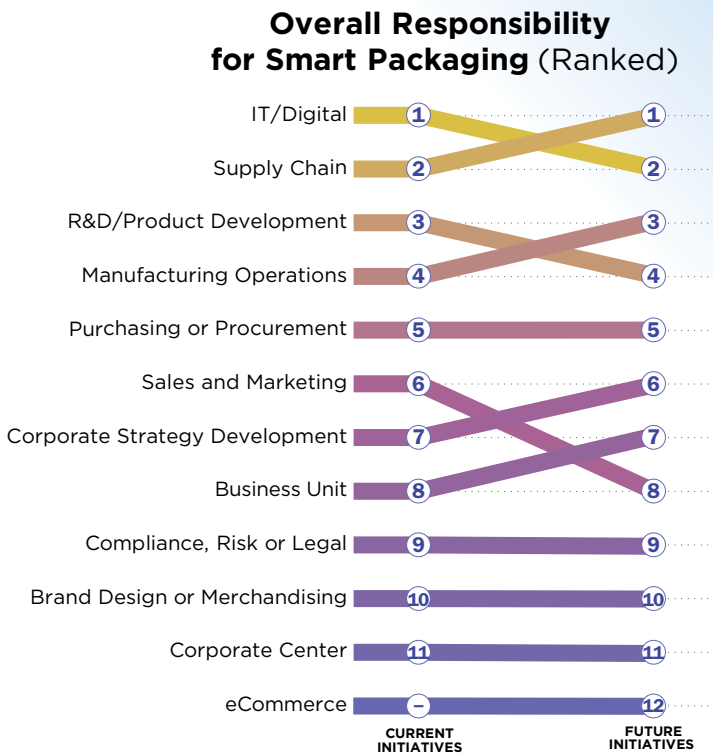
A second commercial challenge is prohibitive cost relative to value. More intelligent solutions that use active RFID, geo-locate, track temperature and shock, or interact with

► **Figure 4**
Accountability for Smart Packaging
(Current vs. Future)

Business functions identified as most responsible for Smart Packaging (1 = most resp., 12 = least resp.)

Question A: Where in your organization does the responsibility for smart packaging reside today?

Question B: Where in your organization should the responsibility for smart packaging reside in the future?



Source: Deloitte analysis

consumers, require sensor technologies that have generally been too expensive to use on the primary (single unit) package, making certain smart applications cost-prohibitive.

In fact, almost 30% of survey respondents listed business case economics as a key barrier to smart packaging. The good news is that the cost of these sensors is declining steadily and will be seen increasingly on everyday consumer goods.

LEGAL

Legal challenges include regulatory/privacy and/or data ownership concerns. Any context where information is

collected regarding third parties will risk butting up against privacy laws, and this includes smart packaging.

Smart solutions that collect consumer data may have to be engineered in the light of these emerging regulations, possibly utilizing such protective mechanisms as “opt-ins” or sanitizing, blinding and aggregating the data.

Depending on the interplay among multiple different stakeholders—the question of who owns the data that the packaging generates will need to be addressed. Some players, including packagers, have successfully laid claim to customer data in two ways—first by bringing some unique value contribution to the solution that allows them an ability to bargain for rights to the data, and second, by realizing that they do not need “ownership” of the data, so much as they need “access” to it. Ownership is, in fact, a bundle of rights over property, including the ability to use, improve, destroy, sell, and rent, among other things.

Therefore, to capture this opportunity and receive value from data, one often only needs one of these rights. The lesson is that one should not feel obliged to negotiate for ownership of data, so much as for the few specific rights needed to capture value.

TECHNOLOGY

Unified Internet of Things technology standards have yet to take root. Several IoT protocol areas, such as infrastructure, identification, transport and data protocols each have multiple standards vying for supremacy. The main challenge is the lack of a single standard around which all parties can build solutions, which prevents smart packaging from scaling rapidly. As a result, smart packaging players must take a chance by either spreading small technology bets across multiple “hands” or betting big on one potential winner.

At the same time, fragmentation of IoT technical standards creates an opportunity for key non-technology players such as retailers, brands and packagers to shape the IoT standards of the future.

ORGANIZATION

Internal organizational challenges have also slowed the adoption of smart packaging. First, there does not appear to be clear ownership over the smart packaging agenda: responsi-



bility is fragmented across various functions, which complicates the ability to drive it forward.

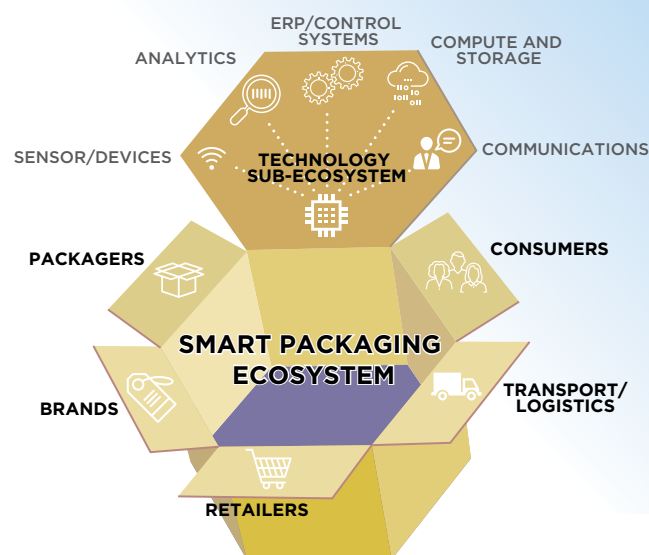
Secondly, stakeholders seen as responsible for user experience, e.g., brand design or merchandising or sales and marketing are also seen as some of the least responsible for smart packaging. Responsibility for smart packaging lies more often with the functions of IT/digital, supply chain, product development/R&D and manufacturing (Figure 4). As a domain, smart packaging does not appear to be within the direct purview of the C-suite, which may partially explain why it is not receiving greater attention.

To navigate these challenges, organizations need to assign clear responsibility, along with a clear governance system. Second, to secure the attention of the C-suite, organizations need to clearly demonstrate how smart packaging investment translates into hard dollars and drives brand value.

COLLABORATION

Smart packaging is a solution that requires collaboration amongst a number of organizations—consumer and industrial product manufacturers, material substrate providers, packagers, retailers, transporters, and a small universe of technology providers. Tellingly, more than one quarter of survey respondents cited “lack of relevant technology capabilities” as a major barrier to smart packaging success. Very few players have all the necessary components in house.

FIGURE 5
Winning in smart packaging requires an ecosystem of partners



Source: Deloitte analysis

Success therefore, relies on the creation and effective maintenance of an ecosystem of partners (see Figure 5). The upside is access to a new, asset-light business model. The challenge is the complexity of securing and managing a web of capabilities you don't own. To excel in smart packaging, companies must disproportionately invest in their partnering

capabilities, learning how to form various types of alliances to quickly add and drop critical assets and capabilities. Not only must smart packaging participants be nimble with their external assets, they need to be agile in configuring their internal innovation assets as well. Smart packaging will involve agile innovation techniques—developing ideas, rapidly forming teams, jury-rigging prototypes, market-testing them, seeing what works, and iterating.

IN SUMMARY

Not surprisingly, customer-facing solutions are highly complex and possess at least as many, if not more, challenges than supply chain solutions. However, once these challenges have been resolved, a boom in investment could be forthcoming and—when it does—this area could see exponential growth.

ABOUT THE AUTHORS



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ABOUT DELOITTE INSIGHTS

Deloitte Insights publishes original articles, reports and periodicals that provide insights for businesses, the public sector and NGOs. Its goal is to draw upon research and experience from throughout its professional services organization, and

There are a few emerging truths in the smart packaging arena. First, the upside potential is large, as smart packaging is poised to solve numerous weighty business issues from product spoilage to customer satisfaction and retention.

Second, smart packaging is organizing around a set of nine broad applications, which are arriving in waves; supply chain efficiency is leading the charge, followed closely by product integrity and user experience. Third, participants in the traditional packaging space ignore smart packaging at their peril since the downside of missing out could be disruption of their existing business model—and irrelevance. Lastly, to capture the rewards and avoid irrelevance, participants should be bold and creative, particularly with branded goods. Bold plays and new business models are a virtual certainty in the data-enabled world of smart packaging. ▾



Daniel Herrmann is a senior manager in Monitor Deloitte's customer strategy and applied design practice. He has more than 12 years of experience developing profitable growth strategies, particularly using the GrowthPath methodology. Over the last five years, he has focused on addressing sales, marketing and innovation challenges, and developing the supporting organizational capabilities to sustain them. Herrmann lives in Atlanta. He can be reached at dherrmann@deloitte.com



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that of coauthors in academia and business, to advance the conversation on a broad spectrum of topics of interest to executives and government leaders. Deloitte Insights is an imprint of Deloitte Development LLC.



In a global marketplace, solving complex engineering, manufacturing and distribution problems can be a challenge for innovative brand owners—unless they have an award-winning automation solutions provider on their side.

Pack-Smart Inc. is a leading global mechanical and industrial engineering solutions provider with over 1,500 installations worldwide and 20 years of experience playing a key role in over 80 new product launches of well-known brands.



For innovative package design ideas and disruptive technologies, the biggest challenges are automating processes efficiently and ensuring the product reaches the shelves on time.

“Customers come to us looking for an easy solution to a dilemma or opportunity related to reliability of information, efficiency concerns in manufacturing or supply chain control,” says Pack-Smart business lead Dom Adams. “This is where Pack-Smart’s modular technologies excel.”

FROM CONCEPT TO 100 MILLION SUBSCRIBERS IN 170 DAYS

In 2016, the second-largest company in India, Reliance Technologies, wanted over 100 million Telecom subscribers for its new Jio network.

Pack-Smart designed the Jio SIM packaging, built and deployed equipment, and participated in designing the IT infrastructure. Its software engineering



team developed and customized the data-handling platform to meet requirement of SAP integration, automating processes and allowing efficient on-demand activation of SIM cards at the point-of-purchase. Reliance Jio acquired over 100 million subscribers in just 170 days.

Reliance Vice President Alok Gupta says, “The investment in Pack-Smart machines was the game changer, giving us higher degrees of automation in a very small space. Unlike other SIM-card packs today, the packs looked premium—so that was a big plus.”

MAJOR BRAND GOES FROM RX TO OTC AVOIDING CATEGORY CONVENTIONS

Pack-Smart helped allergy brand Flonase move from a prescription drug to an over-the-counter consumer product. The new packaging design called for a mix of marketing and informational inserts.

“We provided an integrated production cell to deliver a unique package with engaging shelf presence. Our solution eliminated cross-contamination and material mix-ups, and was fully validated with minimal human intervention,” says Adams. “Selectively applying sensoromatic checkpoint labels based on a predefined algorithm allowed for validating and reporting of all package components, ensuring 100% compliance.”

Flonase achieved 11.3% market share; higher than the 7.3% target, and after its first 16 weeks on store shelves, it became the No.1 selling cough/cold/allergy liquid brand in the U.S.

REVITALIZING SHELF PRESENCE, BRAND EXPERIENCE AND CONSUMER ENGAGEMENT.

Legacy brand, Mr. Sketch needed a transformation for its scented markers product to appeal to today’s consumer. Pack-Smart worked with the design company to transition from paper to high-visibility packaging and optimize package design for high-speed fully automated production. Streamlined production allowed the manufacturer to divert 40 workers from the line, increasing uptime and production efficiency.

Pack-Smart’s end-to-end solution ensured complete packaging and validation of the products with the highest speed in market. Each uniform package has printed variable QR codes, delivering unforgettable brand experience.

THREE FUNDAMENTAL VALUES

Pack-Smart builds trust with brands by playing a key role in product launches, ensuring consistency in quality, operational efficiency and offering real-time reliable data of manufacturing processes.

Pack-Smart president and chief executive officer Derek Dlugosh-Ostap sums up: “Our automation solutions are designed and built in-house to ensure product security and to maintain our high standards of excellence. We fully-test all equipment and automation to ensure the customer receives accuracy, efficiency and quality throughout the life-span of each solution.”



ENGINEERING THE IMPOSSIBLE

To discover all advantages of Pack-Smart solutions and learn how it can benefit your business operations, visit packsmartinc.com

ACTIVE & INTELLIGENT PACKAGING AND TECHNOLOGIES



AUGMENTED REALITY APP

www.nofake.ud.it

ASA is a tool for helping the shoppers over the age of 55 with reading and understanding product information. ASA is designed to be user-friendly with simple instructions: Open the APP, frame the label and product information will appear in augmented reality. ASA can also be used as a marketing and communication tool for other markets, e.g., vegans and celiacs.



ACTIVE PACKAGING FOR ORAL, SOLID-DOSE MEDICINES

www.csptechnologies.com

Activ-Blister solutions control the internal atmosphere of individual blister cavities, improving product performance and enhancing shelf-life. Materials absorb customized amounts of water vapor, oxygen, and/or volatile compounds. The package can be produced in shapes and sizes to accommodate virtually any tablet and capsule size. Activ-Blister can be applied via heat-staking, without the use of adhesives.



MULTIMEDIA LABELS

www.soundpaper.com

Soundpaper is a very high-density barcode that allows brands to provide audio, HTML messages and more to their customers without any Web access—providing information quickly, reliably and privately. Soundpaper may also be part of an anti-counterfeiting solution as it can be serialized including a digital signature and certificate.



ASEPTIC, CONNECTED CARTON PACKAGING SOLUTION

www.sig.biz

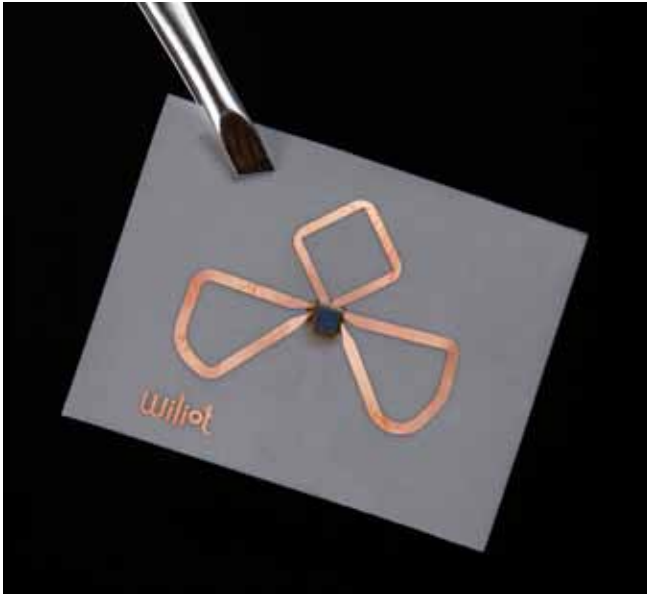
End-to-end traceability solution that SIG says can deliver 100% connectivity and traceability within every package. The carton packaging solution collects data throughout the product journey from raw material into consumer hand, generating a comprehensive database linked to a unique QR code on every produced package to create a connected pack.

BRAND PROTECTION AND CONSUMER ENGAGEMENT SOLUTION

thinfilmmfc.com

NFC-powered connected product solutions address consumer pain points to protect brands, engage consumers and deliver supply-chain insights. The fully integrated solution combines NFC tags with the CNECT cloud platform, which Thinfilm says enables the solution to fight counterfeiting, improve supply chain visibility and generate actionable consumer insights.





STICKER-SIZED, BATTERY-FREE BLUETOOTH TAG

www.wiliot.com

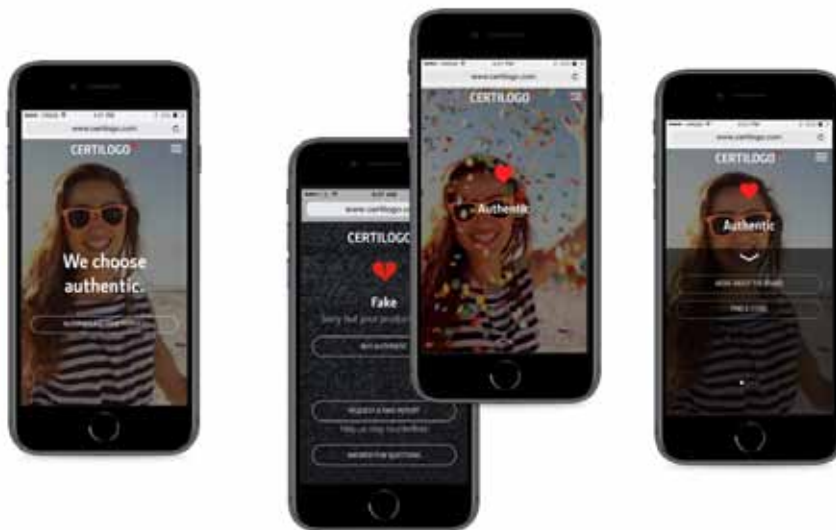
A sticker-sized, battery-free Bluetooth tag from Wiliot. The semiconductor company says, the tag's small form factor, embeddability, low cost and ubiquitous connectivity can be used to optimize nearly anything a person can wear, touch or use to deliver manufacturing, supply chain and inventory optimization.



AUTHENTICATION SOLUTION

raidatech.com

Bespoke next-generation solutions for customer engagement and authentication for healthcare, packaging, fintech and other markets using provisionally patented RAIDA (redundant array of independent detection agents) technology. RAIDatech says its solution has data-supremacy and is distributed and immutable like blockchain, yet is radically faster, securely unhackable, globally scalable, quantum-safe, totally private and eco-friendly.



SMART TAGGING FOR AUTHENTICATION & CONSUMER ENGAGEMENT

www.certilogo.com

Digital product authentication with Certilogo connects innovative fashion and luxury brands with high-spending consumers in 10 languages and 180 countries. Authentication collects permission-based consumer and event data for brand protection and marketing personalization in an omnichannel experience of excellence. The solution was a 2018 Awards AI winner for Best Use of Artificial Intelligence in Fashion.



A fashion statement starts with authenticity.

The Certilogo smart tag ushers in a new era for the connected brand.



The idea for a revolutionary digital platform came from a common misfortune. Michele Casucci was on his way home from a business trip to Jamaica. He decided to purchase a luxury watch from a duty-free store. Later, when he got home, something didn't feel right. He decided to check the product's authenticity. What he discovered was that there was no way to do so. He went to a store in his home city of Milan, and they directed him to the brand. Neither could answer the question — real or fake? Thus was born Certilogo, today the world's leading authentication platform and fashion's channel to the connected brand.

In a recent conversation with *BXP*, Certilogo CEO, Michele Casucci, shared how his brand grew from authentication to a rich channel of consumer communication.

How does Certilogo's smart tag technology work?

Our smart tag is an item-level identification code that can be in a human-read-

able form, with a QR code or an NFC tag. The codes are placed on the product's label and can be checked on any smartphone or desktop. To date, we've had 4 million consumer authentications from more than 180 countries. The information goes to our platform, where it is evaluated with artificial intelligence, and a real-time response is returned to the consumer. If the product is a knock-off, we issue a "Fake Report" which helps consumers get refunds from their credit card companies."

How do you know consumers value authenticity?

We did a survey of 1,500 consumers in Italy, China, France, the U.K and the U.S., asking them how important it is to be able to verify the authenticity of a product. The results were overwhelming. 87% answered that it is important or extremely important. The growth of Certilogo bears out those findings. We have 100% growth annually, serving more than 80 of the world's top fashion brands.

Beyond product authentication, what is the value of Certilogo?

Our own success coincides with the emergence of connected packaging. Authentication is only the first step. Our smart tags establish communication between the consumer and the brand. Once you've achieved a relationship of trust — that this product is the real deal — you earn the right to start a conversation. Our tag opens the door to offers, exclusive content, traceability

information, warranties, even the social responsibility efforts of the brand.

What do you see for the future of connected brands?

Firstly, we're past the age of fakes on the street. Anyone who buys one knows they're not getting the real thing. But when it comes to ordering online, it's a whole new game. Websites can be beautiful, sophisticated, and it's easy to be fooled. Certilogo is changing all that. Not only through our AI-driven platform, but through the ability we've given brands to build relationships with their consumers. You can't put a price on that. Or maybe you can. What we've seen is that authentication — formerly managed solely by brand protection people — is now more and more the preview of brand marketers.

To learn more about Certilogo's smart tag platform visit <https://www.certilogo.com>

CERTILOGO 



SMART PACKAGING & AUTHENTICITY SOLUTION

idlocate.co.nz

Internet of things' connected packaging solution that places unique IDs directly onto products, linking to brand, traceability, authenticity, supply-chain or market data. Being delivered directly off-pack, it links the product journey from source to consumer, which IDlocate says creates strong and emotional connections with consumers via increasing consumer trust and brand engagement.



NFC-ENABLED CARTON

www.jonespackaging.com

Jones developed a Thinfilm NFC-enabled carton for YUNI Beauty to address the need for extended content delivery to consumers. The connected packaging won Best in Show–Innovation at the 2019 PAC leadership awards.



BLOCKCHAIN-BASED ANTI-COUNTERFEITING APP

www.theverifyapp.com

A blockchain-based anti-counterfeiting app using unique multi-frequency stickers that empower consumers to use their smartphones (or long distance RFID readers) to verify products, report fakes in the market and earn incentives for reports that lead to seizures. The Verify App also contains enhanced marketing and engagement features in addition to product tracking history and analytics.



SECONDARY CLINICAL LABEL

www.ccllabel.com

Electronic label (e-label) was engineered to improve clinical studies by increasing compliance, streamline work flows for patients, clinicians and health organizations. Accurate real-time, un-editable data helps ensure the studies' integrity, along with live reporting with visibility through the entire patient and product lifecycle and lowered cost outlay, with the aim of delivering shorter trials with improved results and ROI.

CONNECTED PACKAGING FOR BEVERAGES

www.zappar.com

Zappar have teamed up with iconic whisky crafters Shackleton to transform its bottles into a portal to interactive digital content. Using Zappar's augmented reality scanning technology in the Shazam app, discerning drinkers can explore Shackleton's Antarctic brand story, complete with a 3-D animated vessel, via their smartphone camera.



HUMIDITY INDICATOR CARD

www.clariant.com/desiccants

Clariant says its new Humitector Type 2 is the only halogen and cobalt dichloride-free humidity indicator card to combine multiple, reversible color humidity indicators with an industry first: a patent-pending, non-reversible 60% humidity indicator.



Advanced Barcode Promises to Improve Plastic Sorting for Recyclers



Consumer goods brands, retailers and manufacturers of plastic are under increasing pressure to use more recycled content in their products. This will help support a “Circular Economy,” while reducing plastic waste in our oceans and landfills. However, current technologies are unable to meet government mandates and fulfill commitments by manufacturers for recycled content.

To learn more about the need, we sat down with Larry Logan, Chief Evangelist, Digimarc, whose company’s Digimarc Barcode provides a unique, scannable 3D identity when applied in plastic substrates.

What are some of the specific challenges facing the recycling sector that make it difficult to remedy the issue?

Current near-infrared camera systems can’t discern many important characteristics of plastic objects, resulting in discarded waste that could otherwise be recycled. Some of the challenges include: identifying food versus non-food containers; multi-layer plastics and percentages of composites; carbon-black, opaque, and difficult-to-recycle objects; and the color or type of plastic hidden by the shrink sleeve.

There has been a real buzz in the consumer goods industry surrounding the Pioneer Project HolyGrail. What is it and how is that initiative shaping the future of consumer product packaging?

Pioneer Project HolyGrail was a three-year initiative and full-value chain collaboration project led by Procter & Gamble with 29 participating partners, including consumer brands L’Oreal, Danone, Nestlé, PepsiCo, Henkel and retailer Carrefour, plus leading sorting equipment manufacturers and global waste recovery operators. The HolyGrail’s published test results show that Digimarc Barcode, by adding a digital identify to plastic containers, could accomplish sorting techniques that have been impossible for the industry to achieve.

How will Digimarc Barcode help improve the reliability and efficiency of sorting plastic waste?

Currently, near-infrared cameras in Material Recovery Facilities attempt to make a determination of the type of plastic object by examining spectral characteristics. This approach is only accurate for a narrow range of objects. Digimarc, in contrast, adds an imperceptible and absolute identity into the object by molding “microtopological variations” into the plastic itself. In

addition, we can similarly create identities in shrink sleeves and other labels, which adds redundancy to improve scan rates and communicates data about the plastic underlying the label, which might be covered by a 100% shrink sleeve. With Digimarc Barcode, we turn the scanning process around, with the barcode telling the system exactly what it is, and what characteristics it has. In essence, Digimarc Barcode creates a “recycling passport” for the object.

What will be the benefits to consumer goods companies and manufacturers?

The most critical capability missing today is the ability to detect whether a container previously held food or not. Today, this is nearly impossible to determine, with the consequence being that many plastic items must be downcycled into items such as park benches or pallets. Our ability to separate these objects is considered game-changing. Among other benefits, manufacturers may be able to continue using their current trade dress, such as with carbon-black plastic, which is invisible to near-infrared systems. Shrink sleeves block the scanning systems from detecting the underlying plastic. As a result, recyclers want manufacturers to leave clear openings of 30% to 40%, eliminating precious real estate for marketing messages. Again we can mark those sleeves with details about the plastic type, without having to remove branded-artwork from the package. We believe Digimarc Barcode can benefit all the players in the recycling ecosystem, by delivering higher quality and quantity of recyclables to create new, recycled products.

Consumer goods brands and retailers can add Digimarc Barcode to their packaging today, go to www.digimarc.com/package to get started. Find out more about Digimarc Barcode and recycling by visiting www.digimarc.com/recycling



DIGIMARC



ULTRA-LOW COST FLEXIBLE INTEGRATED CIRCUITS

www.pragmatic.tech

PragmatIC's unique technology platform delivers ultra-low cost flexible integrated circuits (FlexICs) that are thinner than a human hair and can be easily embedded into packaging. The technology opens up opportunities for introducing intelligence, digital traceability and interactivity into mass market products across diverse sectors, including consumer goods, games and pharmaceuticals.



LABEL AND DATE CODE VERIFICATION SOLUTION

connected.oalgroup.com

April Eye is a fully automated AI-based label and date-code verification vision system that processes more than 300 packages per minute. OAL says this first-of-its-kind technology removes operators from the process, reducing the risk of product recalls and EPWs caused by human error.

NOT PICTURED SUPPLY CHAIN TECHNOLOGY PLATFORM

www.parsl.co

Parsl is a supply-chain technology platform that predominantly uses NFC technology connected to a blockchain-based digital platform. This empowers products to become virtual storytellers and enables those stories to be told securely, transparently and via a personalized communication channel.

CONNECTED PACKAGING PLATFORM

www.talkinthings.com

A complete internet-of-things eco-system for connected products to enable digital transformation. The company offers unique solutions and mass production implementation techniques.

PRODUCT AUTHENTICATION SOLUTION

systechone.com

UniSecure is an anti-counterfeiting, diversion and product authentication solution that works with existing barcodes and packaging. Systech International says UniSecure is a cost-effective solution that uses a simple smartphone app to facilitate verification anytime, anywhere across the supply chain.

NFC FOR ALL PACKAGING TYPES

www.authenticornot.com

Authentic Or Not is a patented storytelling technology that enables any packaging to talk and engage with customers. The digital stories and experiences on packages can be controlled by brands in real-time. No app is required; customers simply hover a phone over packaging and instantly see a story, authenticity, videos and more.

END-TO-END PRODUCT DATA SOLUTION

www.packsmartinc.com

A secure, scalable suite of hardware and software applications enabling brand owners and value stream companies to create, manage, embed, track and connect personalized product and packaging data. Pack-Smart Inc. says the field-proven system opens new opportunities to improve brand experience and gain valuable insights, without negatively impacting manufacturing operational efficiencies. ▾



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Spoiled? Who's to blame?

If you're looking to blame someone for spoiled food, it's usually the brand or the manufacturer who takes it on the chin. What if freshness could be a shared responsibility, such as a nearby lake or a favorite public park; a resource rather than a burden? Suppose measuring freshness could be something you want to use often because its benefits are so great? Imagine knowing who, and how, and when spoilage happens, and not just a proximate, somewhat arbitrary "sell by" or "use by" date, but a real indication of what, and when, and for how long?

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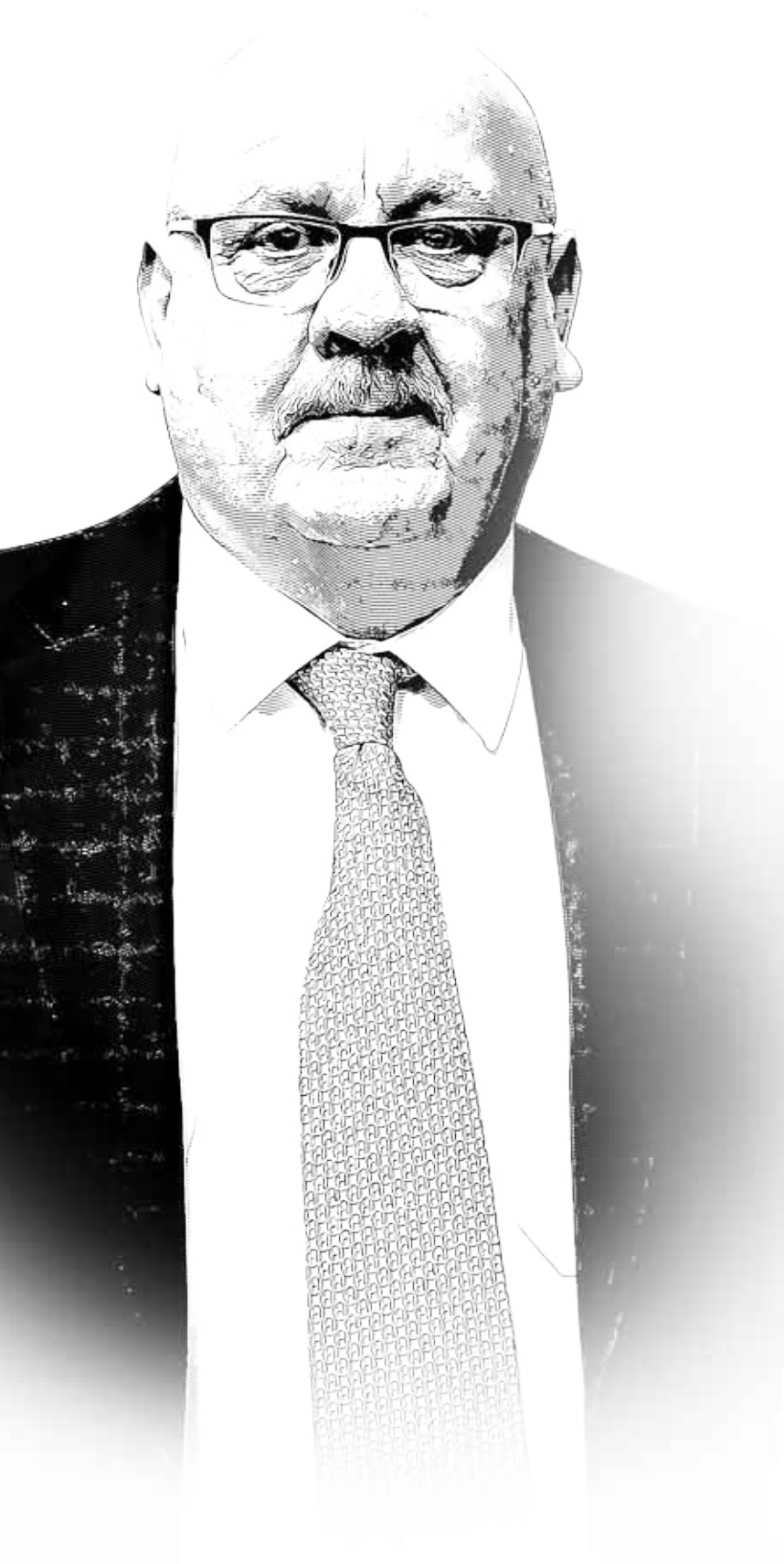
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THE LAST WORD

An interview with Andrew Manly, communications director of the Active & Intelligent Packaging Industry Association

WHAT DO YOU SEE AS THE KEY LANDMARKS ON THE ACTIVE & INTELLIGENT PACKAGING JOURNEY SO FAR?

We have come a long way from the QR codes that appeared on packs in Japan in the early 21st century. There has been such rapid development of the various technologies that it is difficult to identify one single event. But the recognition that the active and intelligent packaging (A&IP) developers had to achieve certain thresholds was critical. For example, we now strive not to develop “bits” of technology in isolation so more than one A&IP idea could be molded into a solution. Another milestone was to be able to produce elements at scale, e.g., printed electronics (PE), tags and smart labels. Yet another is to meet necessary performance levels to make it an indispensable part of the landscape. We see this with RFID in the apparel sector as it's seen as essential these days.

In addition, the focus on food waste and security has put the spotlight on technologies, including nano, which can have a positive impact on this highly environmentally damaging and highly political issue.

One of the most significant landmarks was the appearance of AIPIA on the scene in 2011, which helped the disparate bits of technology to be recognized as a distinct sector and gave many companies new to the packaging sector an anchor and reference point. This also helped with establishing a network and communication platform for both internal and external use.

But of greatest importance is that brand owners started to take the whole A&IP proposition seriously about six years ago. This was an absolute breakthrough moment, as until then it had been a rather piecemeal expansion, quicker in apparel and some beverages, but not so impactful in food, snacks and pharmaceuticals as we would have wanted. Now that is all changing rapidly!

WHICH PRODUCTS STAND OUT AS KEY DRIVERS OF A&IP DEVELOPMENT?

Several pioneering products stand out, as do the companies that have invested so heavily in their developments. Companies such as Avery Dennison, Thin Film Electronics, Checkpoint, Evrythng, Zappar, Aptar (then CSP), American Thermal, Infratab and Jones Packaging have all put their money into developing serious A&IP products that have found real applications in the marketplace. They took the long view and believed in the technologies. It took a while for most packaging converters, brand owners and retailers to catch on.

Augmented reality and virtual reality seem to be increasingly popular with brands because of the huge impact they can have on consumer engagement.

RFID and NFC tags, for sure, smart labels, connected packaging and the associated Cloud platforms, and embedded QR codes are making big comebacks. Augmented reality (AR) and virtual reality (VR) seem to be increasingly popular with brands because of the huge impact they can have on consumer engagement.

And it's a much smaller world, so brands increasingly look at global markets, despite the current economic/political disputes. This presents its own set of problems—supply chain management, traceability, counterfeiting, authentication, condition monitoring and extending shelf life of foods and some pharmaceuticals) are all absolutely necessary. You cannot gloss over these if you want to sell internationally, or you do so at your peril. A&IP has solutions for all these issues. We see investments in these technologies save consumer facing brands money and improve bottom line performance sooner rather than later.

In the U.S., we also see compliance as a big issue. So many drugs are wasted or end up becoming ineffective due to poor supervision or management of the dose. A&IP related solutions will feature very strongly in pharmaceutical packaging of the future.

PRODUCT TRACEABILITY AND AUTHENTICATION, ANTI-COUNTERFEITING AND REDUCING FOOD WASTE ARE ALL OBVIOUS BENEFITS OF A&IP, BUT BRANDS SEEM TO BE FOCUSING MORE ON THE CONSUMER ENGAGEMENT ASPECTS. WHY?

In truth, this caught us out a bit, too, at first. When AIPIA went in to speak to brands, we were armed with all those very good reasons

to adopt A&IP technologies. But the conversation always turned quickly to how they could connect better with their customer base and develop that conversation.

It seems obvious now as the brands could see how quickly the retail landscape was changing and how traditional routes to the consumers were becoming less effective. Shopping and exploring a product's provenance online is now easy and a normal part of the daily consumer experience. So both big brand owners and retailers had to respond or lose market share to smaller, more agile brands.

The big brands could also see how smaller companies were competing very effectively via social media and e-commerce. These challenger brands get messages about their differentiated products, whether they are healthier, more sustainable, natural, fun and fashionable, etc., out to consumers in a highly effective way. Just look at the proliferation of craft gins or even the Fever-Tree tonic that goes with it.

Larger, more established brands needed to do the same and to do it better than these challengers. The explosion in AR and VR we are seeing is one consequence of that. So more and more brands are exploring the potential for A&IP to enhance their products' images and start intense and ongoing relationships with consumers.

And let's not forget, this is a two-way information exchange. The shopper gets a lot more assurance and information about the product. But the brand owners get a load of metrics about what motivates end-consumers to buy their products, including when, where and what

This is a two-way information exchange. The shopper gets a lot more assurance and information about the product. But the brand owners get a load of metrics about what motivates end-consumers to buy their products.



keeps shoppers coming back!

HOW DO A&IP PRODUCTS FIT INTO THE WIDER CONTEXT OF SUSTAINABILITY, RECYCLING AND REUSE?

Of course, adding a tag or antenna to a package can have implications for recycling and the wider issue of sustainability. A&IP is also not immune from the debates about single-use plastics and the whole environmental issue.

On the whole, the sector has responded positively to these challenges. Examples include the development of battery-free antennae, from Wiliot; 100% paper-based RFID tags from Stora Enso; and antimicrobial additives for plastics films that do not use silver and are 100% compostable, from Parx. While Fillgrade and Recycl2R are making a positive contribution to recycling by helping to identify different types of plastics for easier sorting.

Perhaps the strongest case for A&IP in this whole debate is that it helps to reduce product waste, particularly food, and this waste has far more impact on the environment than packaging.

That said, the A&IP sector is aware it has a responsibility, along with the whole of the packaging world, to keep working on a more sustainable future for packaging waste.

WHAT DO YOU SEE DRIVING A&IP GROWTH IN THE NORTH AMERICAN MARKETS, SPECIFICALLY?

The sheer size of U.S. markets for CPGs is a golden opportunity for A&IP technologies, and

U.S. consumers are probably the savviest on the planet. American consumers also want to know much more about what they are buying than a few years ago.

U.S. shoppers are much more aware about product issues such as safety, counterfeiting and allergens, so the conversation between the brand and customer can be quite complex. A&IP delivers that information easily and quickly via shoppers' smartphones.

For brands, themselves, the supply chain management, inventory control and condition monitoring are probably more complex in the U.S. than any other country, again because of the volume or goods, network of outlets and diversity of product offerings. It's remarkable how smoothly operations work already in the U.S. But A&IP can add certainty and probably help to streamline operations and improve marketing impact. That all affects the bottom line positively.

WHERE ARE SOME OF THE ROADBLOCKS TO DEVELOPING A&IP?

They are the same as they have always been—scalability, cost effectiveness and consumer awareness. The first two are really 90% solved in many respects. There are enough application successes out there to demonstrate the cost effectiveness, and this will only get better as production technologies, particularly for things such as printed electronics and RFID inlays, are improving almost weekly. Companies such as Jones, PragmatIC and Thinfilm, have shown scalability is possible. The Thinfilm facility in San Diego is state-of-the-art and producing tags R2R [roll-to-roll] in millions for pennies.



Blockchain is perhaps one of the most exciting developments for the immediate future. This is partly because it is so effective on a number of levels: It can authenticate, build consumer trust, offer security and accountability, etc.

Consumers in certain age groups, such as millennials and Generation Z, and certain regions of the world, particularly Asia, but also here in the U.S., do not need to be convinced of the ubiquity of their smartphone devices. But other consumer segments, particularly those in the 50-plus set, find old habits die hard. Best-before labels are a good example of a favored mean of communication that continues to have favor with these shoppers. Time and education are needed to show these resistant shopper segments how A&IP can add real value to their experiences. That, in turn, is the key to brands' and retailers' success with A&IP. The next steps on the A&IP journey could be critical to the success of some technologies.

WHERE ARE THE BIG A&IP OPPORTUNITIES AND DEVELOPMENTS IN THE NEAR FUTURE?

Blockchain is perhaps one of the most exciting developments for the immediate future. This is partly because it is so effective on a number of levels: It can authenticate, build consumer trust, offer security and accountability, etc.

But the most interesting aspect as of now, is how wedded retailers are already to the blockchain concept. Walmart is already rolling out blockchain on its fresh produce, and there are several other examples, both in the U.S. and beyond, where it is really catching hold.

Of course, we see more activity in areas such as AR, NFC tagging and QR code applications, too. Plus the fact that GSI [the global shopper insights program] is involved with traceability through A&IP is an important development. So there is more than one string to this A&IP bow. It's an exciting time to watch this space! ▀

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