

PreScouter

What companies are offering commercially available solutions in the smart packaging domain?

Research Support Service

July, 2018

Prepared by: **PreScouter**
Marija Jovic | Project Architect
Gopi Kuppuraj | Global Scholar
Vasambal Mannikam | Global Scholar

Question

Packaging is known to have four basic functions: protection, communication, containment and convenience. With the rise of advanced technologies used in everyday life, it is not strange to notice greater incorporation of these technologies into packaging as well, giving rise to so called “smart” packaging.

In principle, any packaging that incorporates advanced technologies to provide enhanced functionality compared to conventional packaging can be considered smart. Smart packaging can roughly be divided into two categories: active packaging, that provides functionality such as moisture and oxygen control, and intelligent packaging, that can communicate product changes and other information.

As smart packaging has the potential to disrupt the industry, this intelligence brief covers some examples of **companies that are already offering commercially available solutions in the domain of smart packaging**.

And as intelligent packaging is developing faster, with new technologies such as printed electronics and the Internet of Things being developed rapidly and helping in communication with consumers, the accent should be placed on intelligent packaging that can provide a communicative function on the pack, so as to assist consumers in making purchasing decisions.

Executive Summary

PreScouter identified 11 companies that are already offering commercially available solutions for smart packaging, aimed at interaction with the consumer (among other possibilities).

These smart packaging solutions are based on 4 main technologies:

1. **Barcodes / QR codes:** These companies base their technology mainly on printed barcodes, and QR codes. Examples covered include: Amcor, EVERYTHING, ScanTrust, Smartglyph, and MagicAdd.
2. **Sensors / Printed electronics:** This smart packaging solution uses RFID and NFC technologies embedded on sensors or printed electronics. Examples covered include: PragmatlC, Thinfilm, Water.IO.
3. **Augmented reality:** Some companies offer customizable “logos” that “come to life” when scanned with a smartphone and give access to recipes or games. One example covered is Blippar.

Executive Summary

4. **Smart indicators / pigments / ink:** A few companies use visual reminders of shelf life, service, tasks and maintenance schedules, through colored strips or by a range of smart pigments and inks that undergo changes under exposure to different types of gases and/or UV rays. Examples covered include: Timestrip and Insignia Technologies.

Some of these technologies also connect to an **IoT platform** that gives supply chain transparency by enabling full control of the logistics and distribution chain and generates intelligent analytics that can be further optimized & controlled as desired (EVERYTHNG, ScanTrust, MagicAdd, PragmatIC, Thinfilm, Water.IO).

Companies and technologies presented here typically combine several elements, like brand protection, safety, convenience, and conveying product information, thus making their offering a potentially powerful tool in the packaging industry. Worth noting is that the space for smart/intelligent packaging is rapidly growing, and that this report presents just one segment of it (i.e. technologies commercially available).

Executive Summary



INTELLIGENCE BRIEF SMART PACKAGING 2018

SMART
INDICATORS /
PIGMENTS / INKS

AUGMENTED
REALITY

BARCODES /
QR CODES




SENSORS /
PRINTED
ELECTRONICS

**11
COMPANIES**

offering commercially
available smart packaging
solutions

BAR CODES / QR CODES

Amcor

Amcor Limited	Company size: 10,000+
	Company address: Level 11, 60 City Road, Victoria, 3006 Southbank, Australia.
	Web address: https://www.amcor.com/
Company overview: Amcor develops and manufactures high-quality packaging for food, beverage, home, health- and personal-care products. Amcor works with leading companies to protect their products and differentiate brands, and improve supply chains, through a range of smart and flexible packaging, containers, cartons, closures and services.	
Example clients: None listed on website.	

Technology:

MaXQ is a digital packaging system in the form of barcodes, print and QR codes that enables and grows consumer engagement and loyalty. People can use their smartphones to interact with brands, discover special offers or learn new information. When consumers scan a MaXQ code printed on the product packaging, they will be able to learn new product features, detailed nutritional information and whether the product is legitimate.

Advantages:

For companies and brands, the codes help **establish trust** with shoppers and **prevent counterfeit products** in the supply chain hotspots, since each MaXQ code is unique and comes as a proof of purchase when it is scanned.





MaXQ digital system can enable consumers to **directly interact** with brands consumer care team to gain real-time product feedback, customer satisfaction and other measurable marketing insights. The system also delivers loyalty rewards, promotional and targeted messages to the consumers' smartphones as soon as they scan the code.

<https://www.amcor.com/maxq>

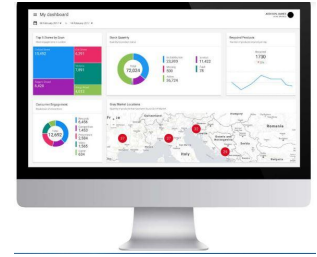
EVERYTHNG

EVERYTHNG	Company size: 51-200
	Company address: London office: Unit 4, 122 East Road, London N1 6FB, UK. New York office: 30 West 24th Street, New York, NY 10010.
	Web address: https://evrythng.com/
<p>Company overview: EVERYTHNG is an Internet of Things (IoT) company connecting consumer products to the Web and managing real-time data to drive applications and analytics throughout the product life cycle. EVERYTHNG transforms packaging into intelligent digital identities creating consumer engagement opportunities. Brands can track their products at all stages of the logistics and distribution channel, gain personalized marketing insights and post-purchase service experience for consumers.</p>	
<p>Example clients:</p> <div></div>	

EVERYTHING

EVERYTHING offers three broad products in smart packaging that operate under the IoT platform:

HALO: An anti-counterfeit and brand protection platform and analytics for luxury brands and their protection. It provides supply chain transparency and control at various stages of a product. Their IoT cloud tracks the smart product and generates intelligent analytics that can be further optimized & controlled as desired.



AMPLIFY: By digitizing products and making them smart, EVERYTHING creates a direct to consumer engagement opportunity. Consumers interact with these products via triggers to obtain product features, offers, loyalty rewards, and even personalized messages. For brands, it builds loyalty and real-time post-sales marketing insights on shoppers.

ACTIVATE: A large-scale product management suite that can create product information and identities for supply chain and B2C applications.

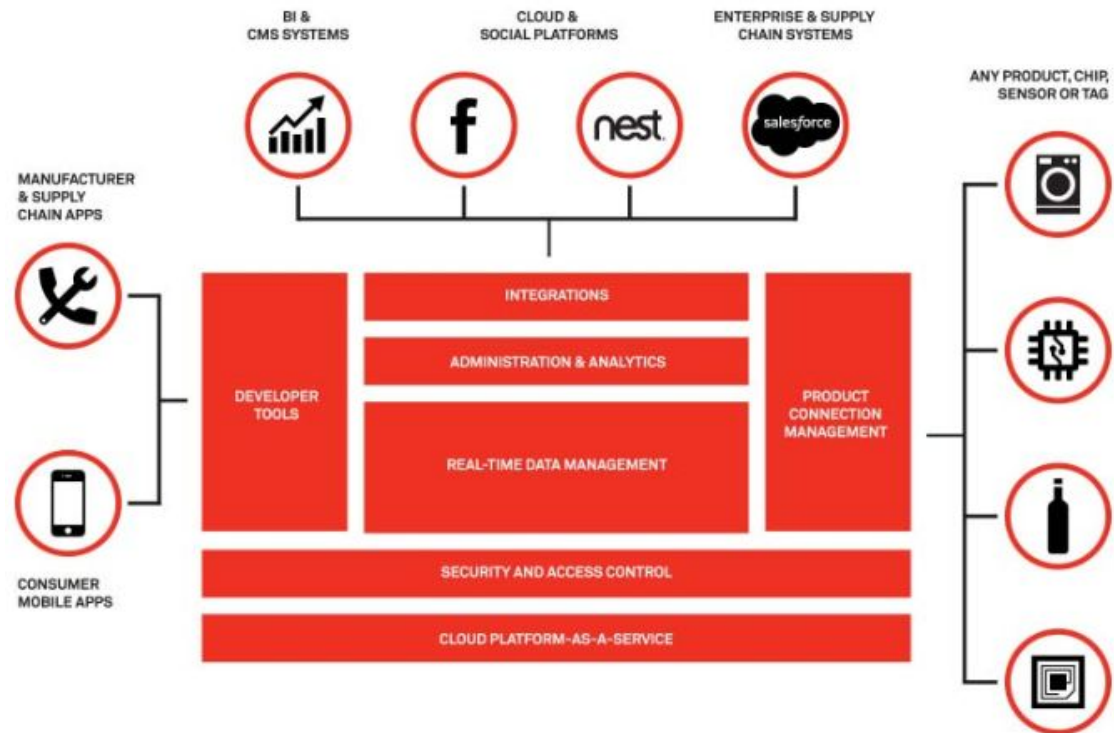


<https://evrythng.com/>

EVERYTHING






Technology:

Brands can connect their products to the web via EVERYTHING's platform. EVERYTHING gives a unique digital identity to any physical object, from apparel, food products, to bottles. This digital identity can be used to collect and manage smart product data throughout the entire product lifecycle. The platform can be integrated into the wider digital ecosystem.

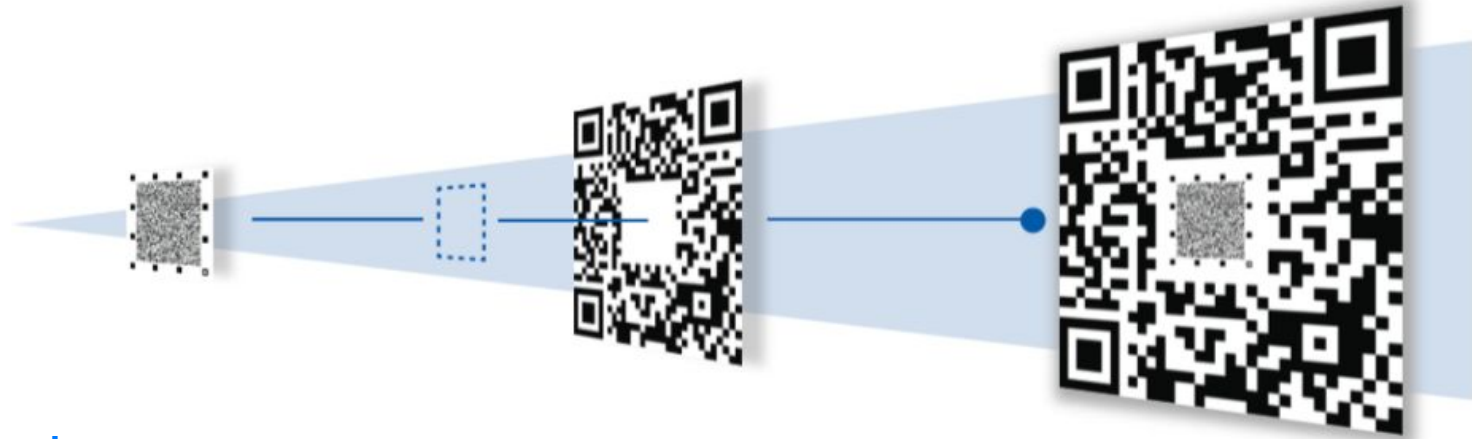


<https://evrythng.com/platform/>

ScanTrust

ScanTrust	Company size: 11-50
	Company address: EPFL, Innovation Park, PSE-D 1015, Lausanne, Switzerland.
	Web address: https://scantrust.com/
<p>Company overview: ScanTrust provides a secure cloud-based IoT platform for production authentication, smart packaging and supply chain solutions. By combining innovative, secure unit-level identifiers (QR and 2D barcodes) and an IoT platform, products can be authenticated and interacted with using a smartphone. The company helps brand owners use new mobile tools to protect against counterfeit goods, monitor unit-level traceability of products, and drive end-user engagement.</p>	
<p>Partners:</p> <div>     </div>	

ScanTrust



Technology:

ScanTrust prevents and protects physical goods from counterfeiting. ScanTrust's secure codes contain a unique identity verification that cannot be replicated. Authentication is made with a smartphone. The QR codes are directly printed on existing products, packaging, labels, cartons or documents.

ScanTrust's IoT-based program gives supply chain transparency by enabling full control of the logistics and distribution chain. By applying ScanTrust suite, companies can identify counterfeit spots in their distribution channel. This protects brands supply chain, monitors distributors and prevents inventory duplication. Brands also gain consumer behaviour information and other marketing metrics.

ScanTrust

The secure codes on products digitally interact with customers via their smartphones, helping companies and brands to understand the full picture of their consumer behaviour and gain actionable insights. The codes can keep shoppers engaged at the point of sale or post-sale across channels, devices, and platforms.



<https://www.scantrust.com/>

Smartglyph

Smartglyph	Company size: 11-50
 www.smartglyph.com	Company address: 7C King St, Knutsford, Cheshire WA16 6DX
	Web address: http://www.smartglyph.com/
<p>Company overview: Smartglyph is a privately held organisation that is collaborating closely with stakeholders, across various sectors (e.g. pharmaceuticals, FMCG, retail logistics, financial services, film/media and gaming) to look into innovating digital ways to connect, communicate and transact '<i>powerfully and securely</i>'. It provides solutions like smarter barcodes, smart login and smarter adherence. In terms of packaging, smarter barcodes are more relevant.</p>	
Partners:	 

Smartglyph

Smarter BarCodes:

The Smarter Barcodes are changing the ways of how products and the customers will be communicating in the future. It is allowing more interaction between products' brand and customers. This new patented technology, applicable to all barcodes and for all packaging, requires the use of a mobile phone with a camera to facilitate scanning of the barcodes on the products' packaging.

How it works:

Upon scanning a barcode using the smarcode reader designed by Smartglyph, it *'opens up an interactive 2-way communication channel'* to deliver real-time consumer data, such as when the product was made, and the location, amongst others. This channel is predicated on a 100% accurate identification. The channel is unique in many ways specifically it has a state engine which not only confirms where the asset is but also where it should be with each connection updating. The reader can either be downloaded or accessed through a brand's app. The app has reactive skin which makes anyone's access customized to the brand through a single app.



<http://www.smartglyph.com/resources/videos/>

+1.872.222.9225 • info@prescouter.com

Smartglyph

Benefits:

- No artwork on the packaging & no packaging changes
 - Cost effective
 - Requires no system integration or programming
 - Possible on even smallest packaging size
 - A 24 digit number serves as a pointer to a server and n data is held on the graphic.
 - Full real-time auditability
 - All campaigns can be dynamically changed with little effort
- **Smartglyph has begun implementing its smart packaging solution for the legal marijuana sector both in seed to sale tracking as well as brand marketing initiatives. They are also a secondary security tier for blockchain.**



<http://www.smartglyph.com/products/smarter-barcodes/>

MagicAdd

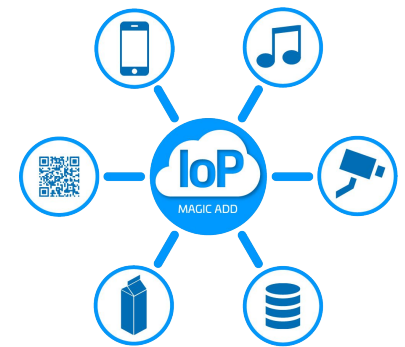
MagicAdd	Company size: 1-10
	Company address: Kalastajankatu 1, 20100 Turku, Finland 20 Farringdon Rd, London EC1M 3HE, UK
	Web address: http://www.magicadd.com/
Company overview: MagicAdd makes the internet of packaging possible by using intelligent back-end solutions to manage FMCG products along with entire supply chain. Magic Add launched its technology and product development in 2015. Partnered with international packaging manufacturers, its technology can be used for process optimization and product authentication to prevent product loss, waste and counterfeit goods.	
Partners: <div>   </div>	

MagicAdd

Technology:

Information about a particular product is updated in the cloud during its lifecycle; meaning that it is possible to track the product at any time-point among the supply chain. The platform uses blockchain to update and store code information securely on to the cloud. Companies get notified when & if packages within a shipment get misplaced/lost during the shipping journey.

Each product has a machine-readable identity due to its adaptation to multiple coding systems: QR, RFID, NFC, and data matrix. Different information can be presented to different users by the same product identifier.



Some advantages:

- Helps register customers' complaints, which can be accessed by the brand manager.
- Provides advertisers with an effective avenue to target and reach out to consumers via interactive digital images that are incorporated on a product's packaging materials.
- The service is cost-effective and reliable for high-volume products as there is no additional cost to the physical packaging.

<http://www.magicadd.com/technology.html>

Case studies:

1) Lottery campaign at Shell:

Shell launched a lottery campaign in Finland where thermochromic labels were put on single-use cups. The beauty of this innovation is that customers are allowed to play multiple times, in which they see new content. The software involved ensures that each code is used only once but with dynamic content changes each time they purchase a drink.








The “Monaco Cup” featuring a heat-sensitive dynamic QR code from Magic Add

2) Co-Branding campaign at ABC:

MagicAdd dynamic identifiers were added to single-use cups at the Finnish service station chain ABC. When customers purchased coffee at ABC service stations, they were offered a 2-month free trial of Rutuu+’s on-demand video streaming service. In comparison to Google Adwords, the conversion rate was **3x higher**.

AUGMENTED REALITY

Blippar

Company Name	Company size: 201-500
	Company address: 1 London Bridge, SE1 London, United Kingdom
	Web address: https://web.blippar.com/
Company overview: Founded in London in 2011, Blippar is a technology company that specializes in augmented reality and the mobile apps that it develops. It allows shoppers to check the quality and origins of their food by scanning an item with the Blippar app.	
Example clients:    	

Blippar

How it works:

Users have to simply download the free Blippar app on their smartphone or tablet, hold their smartphone or tablet lens over the blippable product or package and watch the branded contents.

Technology:

The Blippar app is a basic enabling technology, that uses image recognition to activate the specific interactive and digital experience on any mobile phone or tablet device. Blippar has already created various “blipps” for consumer packaged goods companies, such as General Mills, Pepsi and Heinz Ketchup. Customers can track down important information such as:

- Quality certificates
- Nutritional information
- Location details
- Images of farms

Case studies:

1) **Nesquik:** An interactive breakfast is offered to kids by the digital play.



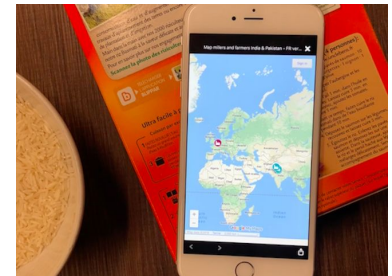
<http://www.packagingdigest.com/smart-packaging/blippar-and-packaging-the-reality-and-possibilities-of-digital-engagement141028>

Blippar

2) Magnum: With the Blippar app, Magnum lovers can design their ice cream, by selecting coatings, toppings and drizzles using the augmented reality. This is actually available in Singapore.



3) Uncle Ben's: Uncle Ben's partnered with Blippar to provide better service to its customers by providing information on the origins of the ingredients present on their products. Using AR, consumers can verify this information by simply scanning the barcode at the back of the packaging of their product.




4) Cracker Jack: The Blippar app will allow customers create their own baseball cards.



<https://www.blippar.com/case-studies>

SENSORS / PRINTED ELECTRONICS

PragmatIC

PragmatIC	Company size: 51-200
	Company address: 400 Cambridge Science Park, Milton Road, Cambridge CB4 0WH, UK.
	Web address: https://www.pragmatic.tech/
Company overview: PragmatIC develops ultra low cost flexible electronics for smart packaging applications. PragmatIC's flexible ICs ("FlexICs") can be embedded in everyday products, enabling the potential for trillions of smart objects that can engage with consumers and their environments. The company's new production facility has a billion-unit production capacity.	
Shareholders include: Cambridge Innovation Capital - Arm Holdings - Avery Dennison	

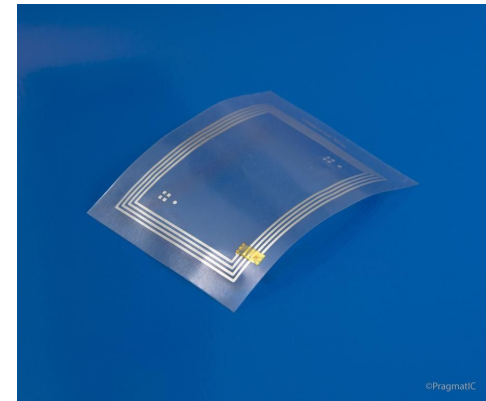
PragmatIC

Technology:

PragmatIC's patented technology platform delivers flexible integrated circuits (FlexICs) that can easily be embedded into everyday objects, making them interactive and intelligent. In comparison to silicon-based integrated circuits, FlexICs are more cost-effective and support both radio-frequency identification (RFID) and near field communication (NFC) functionalities. Their unique FlexLogIC™ fab-in-a-box system enables fast, cost-effective and scalable distributed production. This smart packaging solution can be applied across diverse markets including consumer goods, games, retail, pharmaceutical and security sectors.



©PragmatIC



©PragmatIC

<https://www.pragmatic.tech/products>

Patents: [Structures comprising planar electronic devices](#); [Electronic circuits including planar electronic devices](#)

PragmatIC









Brand loyalty: FlexICs turn any product into a smart object, allowing brands and consumers to connect with each other. With a simple tap, consumers can use their smartphones to access personalized content such as product information, purchase history and promotional offers before, during or after purchase. By converting packaging to digital interactive consumer engagement entities, companies can grow their brand loyalty and gain valuable insights.

Authentication: The embedded FlexIC tags enable shoppers to use their smartphones to instantly check the authenticity of a product. The low cost of the tags makes this possible for both everyday objects as well as luxury goods such as luxury fashion, cosmetics, jewellery, medical devices, and pharmaceuticals.

Item tracking: Embedding FlexICs into products like beverages, food, and medicine allows supply chain control and grey market prevention.

Thinfilm

Thinfilm	Company size: 51 - 200
	Company address: Corporate Headquarters: Henrik Ibsens Gate 100 PO Box 2911 Solli, 0255 Oslo, Norway
	Web address: https://www.thinfilmnfc.com/
Company overview: Thinfilm, a leading global Norwegian provider of near field communication (NFC) mobile marketing solutions, founded in 2005, is offering end-to-end solutions featuring label and packaging integration services and CNECT cloud-based software platform. Its aim is 'to bring brands alive using IoT'.	
Example clients: <div>      </div>	

Thinfilm



Technology:

The technology allows customers to tap a particular product with their smartphone and receive personalized contents of the product, including brand story, product news, ingredient information, video tutorials while delivering interactive content with the customers. It is transforming traditional packaging into a digital communication channel with customers.

Thinfilm

Thinfilm offers 2 near field communication (NFC)-based smart packaging technologies:

1. **OpenSense™ Technology:** A dual-ID tag integrated with a sensor that detects the sealed or opened status of a product which enables personalized, dynamic and contextual content. It also allows product authentication, refill fraud protection and pre- and post-sale engagement via any smartphone or tablet.



→ It is the first NFC solution supported by the World Customs Organization (WCO).

2. **NFC SpeedTap™ Tags:** A single-ID NFC tag that can be easily integrated into product labels and bottle caps. Tapping the tag with a smartphone enables instant consumer engagement as well as brand protection. Tag memory is encoded at the Thinfilm factory and cannot be electrically modified. This along with their TTF protocol makes the tags highly resistant to cloning.

<https://www.thinfilmnfc.com/solutions-nfc-solutions/#open-sense>
<https://www.thinfilmnfc.com/solutions-nfc-solutions/#speed-tap>

Water.IO

Water-IO	Company size: 2 -10
The Internet of Water.IO <small>By</small> <i>Water.IO</i>	Company address: Golda Me'ir St 5, Ness Ziona, Israel
	Web address: https://www.water-io.com/
Company overview: Water-IO is an IoT smart packaging company that was established in 2015. It is the only company which offers a commercially available disposable IoT smart-caps solution that can be used in various industries, such as pharmaceuticals, beauty, cleaning as well as other consumer products. Water.IO can transform any CPG or pharmaceutical package into a smart package – irrespective of what it contains; whether it is a liquid, powder, solid, or capsule.	
Example clients: None listed on website	

Water.IO

Technology:

The Water.IO platform allows any package to become smart by connecting it to an Internet of Packaging (IoP) platform that can be accessed through their brand analytics dashboard via an app. Their unique patented technology enables special sensors embedded into any package to retrieve information regarding the product without interfering with original packaging.



Some applications:

Product replenish: The technology allows the personalization of products for users. The smart caps are commercially available and disposable.

Medical adherence: The technology identifies medication type and measure amount in the



bottle without direct contact with the drug and production lines changes.

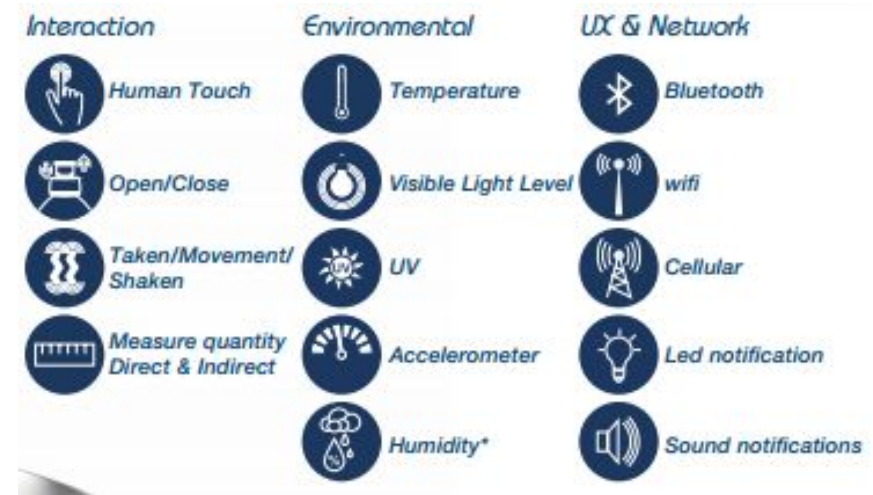
Cold chain: The solution provided involves the sensors records needed information along the shipment route and transmits its data through the simple smartphone's Bluetooth connection at control points. it saves and avoids checking each box.

Water.IO

Besides reminding consumers to hydrate and monitoring the amount of liquid consumed:

- Its sensor-enhanced caps and closures can now allow consumer packaged goods (CPG) and pharmaceutical brands to interact with the end consumer after an item is purchased.
- Various stakeholders can use this innovative idea to improve their products, branding loyalty of consumers, top, and bottom-lines.
- The technology enables direct delivery of products to consumers - eliminates the option of traditional and online retailers.
- It also has an environmental benefit as less material is required to refills and are lighter for transportation.

Water.IO IoP platform can receive these features:



<https://www.water-io.com>

+1.872.222.9225 • info@prescouter.com

SMART INDICATORS / PIGMENTS / INK

Timestrip

Timestrip	Company size: 11-50
	Company address: Sheraton House, Castle Park, Cambridge CB3 0AX, UK
	Web address: https://timestrip.com
<p>Company overview: Timestrip is an agile technology business that designs and manufactures time and temperature indicators for packaging, supply chain and consumer behaviour. Timestrip designs patented low-cost smart indicators that monitor elapsed time and/or temperature changes. The indicators monitor processes in food service, pharmaceutical and consumer products supply chain and logistics helping to reduce wastage, monitor component lifetimes, deliver quality assurances, improve sales and build brand share.</p>	
<p>Example clients:</p> <div></div>	

Timestrip



Timestrip indicators enable **visual reminders** of shelf life, service, tasks and maintenance schedules for foods, beverages, and medicines. The time and temperature indicators are patented, single-use strips that can be attached directly on a product or device. Each indicator measures a product's shelf life by acting as a visual reminder to replace an expired product. The strips can also be used to carry out a task, like maintaining a machine or checking results from a test. Indicators can range from 30 minutes up to 12 months and can be bespoke for any times in between. This technology is protected by two patents: [Time indicator and method of manufacturing same](#) & [Elapsed time indicator device](#).

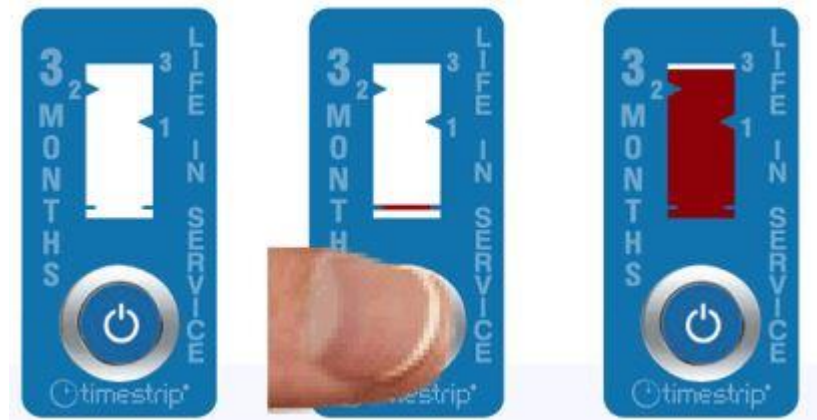
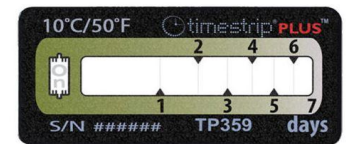
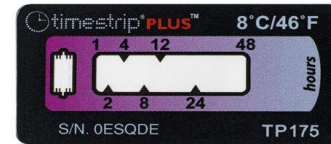
<https://timestrip.com/>

Timestrip

Technology:

A colored liquid gradually moves through a white viewing window at a pre-calibrated rate. Users can read how long the product has been active by seeing how far


the color has progressed along the time markers through the window. When the color reaches the end of the window, the full time has elapsed and this is the indication to carry out a required task or replace an expired product.



How to use:

To observe elapsed time, consumers need to activate the strip by fully squeezing the “Start” button with a finger. A line will appear on the window to show that the strip is activated. This line typically appears in a few seconds but can be up to a few minutes in indicators, which measure in months or years. Users can stick the timestrip indicator on or near the product or device they are monitoring and look at it so they can know when time is up.

Insignia Technologies

Insignia Technologies	Company size: 2-10
	Company address: BioCity Scotland, Bo'ness Road, Newhouse, Lanarkshire, ML1 5UH.
	Web address: https://www.insigniatechnologies.com/
Company overview: This Scottish innovative private enterprise focuses on the development and production of a range of smart pigments and inks that undergo changes under exposure to different types of gases and/or UV rays. Their target partners are the food packaging industry, where their main purpose is to alert when food has past its best.	
Example clients: None listed on website.	

Insignia Technologies

Technology:

The technology involved uses patented intelligent pigments and inks that change color in response to changes in temperature or CO₂ levels.

What can it do?

- Indicate the freshness of food when the packaging is opened
- Detect changes in CO₂ levels in the supply chain
- Confirm cold-chain integrity during shipping and distribution
- Reveal damage/tampering to the package



Insignia Technologies

How it works:

A color change is observed when exposed to gases or UV light. It offers food fresh indicators and CO₂ indicator pigments that remind users about how long items have been in their fridge and warn when food is past its best by undergoing a color change.



Fresh



Past Best

Once the packet is opened, the atmosphere conditions change around the label, which triggers a color change. The centre dot on the label will gradually change color from yellow to purple over “X number of days”, after which it is considered “past best”.



**TEMPERATURE
MONITORING**
for single journeys up
to 16hrs

**Dot changes colour
when sustained temperature
abuse occurs**

<https://www.insigniatechnologies.com/home.php?video=1>

About the Authors



Marija Jović

PreScouter

Professional Summary:

Marija has been a Project Architect with PreScouter since January 2015. She finished her Master's degree in Chemical Engineering from Belgrade University and completed her PhD in Organometallic Chemistry and Catalysis at the Swiss Federal Institute of Technology (ETH Zurich). Marija's academic research was focused on understanding reaction mechanisms in order to rationally design catalysts for polymerization and metathesis reactions. Prior to her PhD, Marija worked in chemical industry on synthesis of new textile dyes.

Research Background:

Polymer Chemistry and Engineering, Materials Science, Catalysis, Innovative Technologies

About the Authors



Gopi Kuppuraj

Academia Sinica (Taiwan)

Professional Summary:

Gopi Kuppuraj is a Global Scholar at PreScouter contributing to client engagements in market research, analyzing industry trends and technology landscape. He holds a PhD in Molecular Biophysics from Academia Sinica followed by postdoctoral research at MEXT Japan.

About the Authors



Vasambal Manikkam

Victoria University (Australia)

Professional Summary:

Vasambal is a PhD qualified Nutritional Food Scientist, committed to improving people's health through education, research and product development. She is currently a member of the Global Scholar Program at PreScouter.

Research Background:

Vasambal completed her PhD in Food Science and Technology at Victoria University. Her research described the novel work on endogenous enzymatic degradation of excess or wasted fish proteins from Australian fish species, to develop bioactive peptides, with specific antioxidant and metal-chelating properties.

About PreScouter

PreScouter provides customized research and analysis

PreScouter helps clients gain competitive advantage by providing customized global research. We act as an extension to your in-house research and business data teams in order to provide you with a holistic view of trends, technologies, and markets.

Our model leverages a network of 2,000+ advanced degree researchers at tier 1 institutions across the globe to tap into information from small businesses, national labs, markets, universities, patents, startups, and entrepreneurs.

Clients rely on us for:



Innovation Discovery

PreScouter provides clients with a constant flow of high-value opportunities and ideas by keeping you up to date on new and emerging technologies and businesses.



Privileged Information

PreScouter interviews innovators to uncover emerging trends and non-public information.



Customized Insights

PreScouter finds and makes sense of technology and market information in order to help you make informed decisions.