Harnessing the Power of Digital Transformation
The Ultimate Retail IT Therapy

March 2017
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About Digimarc

Digimarc Corporation (NASDAQ: DMRC) transforms the search for information and data into discovery by providing certainty through recognition technologies that deliver unmatched accuracy and speed. Digimarc solutions are based on its patented Intuitive Computing Platform (ICP™) concept, which aims to make technology innately easy to use and enables the reliable, efficient automatic identification of many common objects such as product packaging and virtually any media, including print, images, music and sounds. Digimarc is renowned for its more than 1,100 issued and pending patents globally for innovations including Digimarc Barcode, an advanced barcode as powerful as it is imperceptible, and Digimarc Discover® software for barcode scanning, image recognition and more. Based in Beaverton, Oregon, Digimarc technologies are broadly applicable and used by major retailers and consumer brands, global banks and state governments, film producers and professional sports franchises, and many other industries. Visit digimarc.com and learn about The Barcode of Everything™.
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Foreword

Customer expectations have evolved. Shoppers demand instant access to quality products, speedy service and competitive prices. The basic tenets of business – better, faster and cheaper – never changed; they were merely digitalized.

The proliferation of purchase options online provides more choice and convenience for consumers, and encroachment from e-commerce has eroded retail profits as a result. In response, many retailers are expected to apply new technologies and innovation that streamline the supply chain, create new efficiencies, and provide improved customer experiences for shoppers.

To gain a deeper understanding of the true impact of these changes on consumer behavior and retail spending strategies, Digimarc commissioned a Planet Retail survey of global retail executives. The data, shared for the first time in this exclusive research report, shows that retailers are finally modernizing their operations to reclaim a role in the omnichannel conversation and help reengage with today’s evolving shoppers. We discovered that retailers are not only retiring obsolete systems, but also retooling by investing in powerful technologies to give consumers more choice, control and a better overall shopping experience.

The research also indicates that technology improvements to streamline the supply chain, increase the accuracy of product inventory and improve component parts matching during manufacturing — particularly for retailers with Private Label house brands — can help contain costs.

At Digimarc, we believe businesses that embrace investment today and rapidly adopt technologies that support customer and supplier engagement and operational efficiency will emerge with more market share and increased revenue to show for it.

Inspired by the insights Planet Retail helped us reveal, we encourage retail leaders to embrace innovation and look for practical ways to invest in technology today before getting outsmarted by the competition or the next disruption. Let’s work together by better serving shoppers today and supporting the technologies they’ll expect to engage with throughout the shopping journeys of tomorrow.

Heidi Dethloff
Vice President, Marketing
Digimarc Corporation
Meeting demand, exceeding expectations

Retailers are no stranger to the benefits of technology-enabled automation. The ‘digitization’ of previously manually-based processes has enabled greater productivity, efficiency and scale. Yet the so-called ‘digitalization’ of the consumer shopping experience, and its subsequent disruptive impact on and restructuring of retail business models and operations has also brought with it unprecedented challenges.

As the means of digital engagement, interaction and transaction proliferate, so retailers have to compete on so many more fronts for differentiation against a backdrop of vastly fluctuating market conditions and political uncertainty that contribute downward pressure on labor costs and margins. So while, technology can enable moments of delight for the customer, with infinite choice, offers and delivery options, a failure to adopt similarly digitally-driven processes throughout product development, supply chain and customer-facing operations is, in fact, holding retailers back.

Key takeaways

1. Focus on omni-channel profitability. To date, the digitalization of the shopping experience has led retailers to focus front and center on the customer. It is unsurprising then that improving the ways of engaging with consumers in the various ways in which they want to shop (using traditional stores, e-commerce, and order or reserve and collect fulfillment options) emerged as one of the areas that will top the agenda of over 350 German, Japanese, US and UK executive and senior retail decision-makers during the coming year. Yet the research confirmed that frontline IT investment will likely be coupled with an increasing focus on the supply chain efficiency needed to support omni-channel commerce.

2. Long live the store. While e-commerce and mobile growth have dominated the headlines, there is a definite shift in strategic understanding of the role of the physical store as part of an omni-channel proposition on the part of retailers of all shapes and sizes. Therefore the operational and logistical infrastructure required to support such a proposition has risen up the agenda to now put pressure on retailers to match physical store and supply chain investment levels with those they must now also devote to non-store sales and engagement.

3. Harnessing true digital transformation. The research suggests that globally retailers today are looking for IT solutions that help them better meet demand, while at the same enabling them to exceed digitally-driven customer expectations. Moreover these solutions must also enhance, streamline and speed end-to-end processes that span product development, manufacturing and distribution right through to the checkout. Only through the digital modernization of their own automated systems will retailers truly be able to grow sales efficiently and enrich shopper engagement effectively at any and every physical and digital touch point.

Executive Summary

Meeting demand, exceeding expectations

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Top Five Strategic Retail Priorities

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<td>1</td>
<td>Having a real-time view of and control over inventory throughout the supply chain is essential</td>
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<td>2</td>
<td>Engaging consumers in the various ways in which they want to shop is challenging</td>
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<td>3</td>
<td>Ensuring a fast check out experience is important to gaining customer loyalty</td>
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<td>4</td>
<td>Investing in an effective digital &amp; mobile strategy to improve the customer experience is essential</td>
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<td>5</td>
<td>Improving data capture capabilities throughout the supply chain can enhance product flow and on-shelf availability</td>
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Figure 1: The top five strategic business-related statements that the retailer survey respondents ‘slightly’ or ‘strongly’ agreed with.

Looking ahead

Embracing the truly transformative power of digital throughout a retail business can both boost efficiency and enhance levels of customer engagement. Retailers should:

1. **Enrich the customer experience** (CX) by adopting more sophisticated track and trace data capture systems to enhance product information and traceability. Retailers can use the more accurate, real-time view of inventory gained to expose more attribute-driven information to suppliers in the development phase and buying process, as well as to customers and so support greater differentiation on price, value and convenience.

2. **Modernize supply chain systems** to cope with a proliferation of sourcing and fulfilment channels. There is no point in having a truly cutting-edge digital front end, where store and online blend seamlessly, if management of product through the supply chain leads a retailer to fail on its promise to deliver. Real-time supply chain visibility is becoming a prerequisite for the demand-sensing capabilities required to fulfil customer demand in the most profitable way at any given time.

3. **Overhaul brand strategies.** Outdated product development and management systems can no longer maximize back-office effectiveness or seamless customer engagement. Taken to its logical conclusion, those retailers invested in Private Label development should support end-to-end design, manufacturing, distribution and marketing activity with real-time, rich attribute and multimedia data access internally, among suppliers and for customers.
1. Enriching the customer experience

It is true that the advent of technology has heralded a faster rate of change with retail within the last 20 years than the previous 120 years before that. Yet, it reveals as much about the true nature of its users as it does in its ability to encourage them to adapt to new and more effective ways of working or means of interacting.

In the retail industry, the widespread adoption of technology hasn’t tangibly changed the things that matter to the average consumer today (Figure 2). The impact of the digitalization of the shopping process has radically changed their means of accessing whatever goods and services they want, as shopper sentiment reveals.

So, while the digitalization of shopping processes at the front of store have grabbed headlines, it is easy to see why today real-time inventory visibility and control rank even higher on the list of strategic retail priorities into 2017 than the challenges of consistent customer engagement (Figure 1). It is not enough to simply have an integrated store, website and/or app. Depending on the sector, in-store picking, drop shipping, dark stores, lockers, one-hour delivery and curb side pick-up, to name just a few examples, can all play a role in the increasingly complex offering that retailers must now support in order to compete.

<table>
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<th>Top Five Global Shopper Influencers in 2016</th>
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Figure 2: The top five most popular attributes that shoppers said would influence them to shop with a retailer.

Going beyond online

Understandably, IT spending has therefore focused on growing the online channel that today can make up to 15% of a retailer’s total annual sales, and where it also may seem a more attractive channel to adopt when the seemingly higher margins in comparison to physical stores with their labor and other operating overheads are considered. But this was more so the case in the early days of e-commerce, before mobile started to blur any distinction between online and offline in the minds of consumers.

When that started to happen, retailers realized they were, in some senses, having to duplicate operations across their distribution network in-store and vice versa when responding to demand driven by online. They must now cater to customers that expect to buy online and return in-store, buy in-store and have their purchases shipped to their home, or any other myriad of possible permutations. Thus, shoppers are also less likely to make allowances for any perceived disparities between the price, and levels of convenience, speed and service offered in retailer’s physical or virtual stores and those of its competitors.

A complete view of the impact of digitalization on retailers is now emerging. But, rather than be seen as a cost center, its benefits should be harnessed in the retail back office – as consumers have online and in stores – because, despite growth online, the influence of digital shopping tools and activities also drives sales in-store. Some estimates put the proportion of total retail sales influenced by some sort of digital media, engagement or other interaction (such as coupons or ratings and reviews) as high as 60%.

But 90% of all sales are still completed in a physical store (i.e. a transaction is completed or a product or service fulfilled). And, as a showroom, fulfillment hub and center for service excellence, the physical store still reigns supreme when it comes to delivering truly instant retail therapy.

58% of shoppers said they agreed that technology makes their shopping experiences better.
As retailers come to realize the true impact of the digital CX on every aspect of their operations, beyond just as an extension of virtual channel strategies and business models, so efficiency is rising back to the top of the agenda, alongside efforts to boost digital customer engagement. And this has led to a shift of focus firmly back on the physical store.

This focus may seem oddly nostalgic, especially when 40% of shoppers Planet Retail polled just over a year ago now said they would, if they could, do all their shopping online. But, in coming to terms with consumers’ new digitally-empowered expectations and the resulting changes in their shopping habits, retailers must face up to the fact that consumers feel brick-and-mortar store experiences fall far short.

The good news is that the retailers in the Digimarc-sponsored poll are putting in-store CX at the center of their strategic technology plans (Figure 3). The fact that online experiences rank second speaks as loudly as the fact that appealing to both the physical and virtual customer tops the next 12 month’s list of priorities.

With digital engagement ranked third, followed by channel expansion in fourth, it would appear the realization the most shopping journeys at some point still touch the store is encouraging retailers to make it as quick, easy and transparent to shop in-store as it is perceived to be online. Moreover, in trying to understand the complex interrelationship between online and offline for their customers, those supply chain improvements figure highly again, rounding out the top five strategic priorities cited in the retailer survey.
Right-sizing IT investments

It should be noted that 18% of retailers said none of the strategic options given were on their radar, or that a centralized, so called 360-degree view of customers – supporting a retailer’s understanding of cross-channel shopper preferences on which to base CX improvements – was seen as even less important than Private Label development. Even though putting the customer first remains paramount, perhaps a deeper understanding of the influence of digitally-connected physical store experiences is required before visibility of product and customer identities that span online and in-store becomes strategically important. The evidence does support retailers doubling down on what they know: the customer, and their stores and supply chains.

Therefore, retailers must hone in on meeting those cross-channel supply chain visibility and control challenges that can directly support CX enhancements. This is underlined by the fact that shoppers are increasingly influenced by the offer of convenient collection points to pick up online purchases, as an example. Retailers are having to reshape their physical footprints to meet such growing cross-channel customer demands, and the redistribution of IT investment needs to follow suit.

It has become necessary to reconcile the direct impact of digitally-influenced expectations with the resulting changes required in retail supply chains to meet them. Some 70% of British shoppers are expected to buy online and collect in-store this year for example. But retailers report that the ‘click & collect’ fulfilment option drives footfall in-store, as well as increased conversion and incremental spend. It is encouraging to see therefore that the key areas of IT spending identified by the Digimarc survey largely support the strategic priorities identified in response to the current requirements and challenges.

Store operations lead the way, claiming 24% of IT budgets, followed by e-commerce with 17% of spend and marketing a close third (15%) overall. Respondents also reported that about 11% of their operational and technology budgets will be allocated to product development (including Private Label). A weighted breakdown by country further illustrates the tight competition between funding areas, with the US and Japan slightly ahead on store operational spending. The US joins Germany in the lead on e-commerce spending however, where (of the four countries surveyed) they have the smallest proportional base of online retail sales to grow from. Planet Retail forecasts e-commerce sales to make up 8.5% of total 2017 retail sales in the US and 8.6% in Germany, compared to 11.2% in Japan and 15.5% in the UK. So it is only right that IT spending in support of online expansion should be more prevalent in countries with a lower base to grow from than others.

Figure 4: Percentage (%) of technology and operational improvement budgets allocated to the following areas, by country and on average – shown to log scale.
2. Modernizing the supply chain

The research supports evidence that retailers are keen to meet the complex expectations set by digitally savvy shoppers. Yet it also reveals a tension arising from that need to reconcile such expectations with the resulting retail supply chains changes required to meet them. If retailers are looking to delight their customers, they are also caught between the modern technology-driven consumer expectations they must meet and the legacy technology limitations that are holding them back.

We have seen there is no lack of appetite for investment in IT that will improve the CX and supply chain visibility, and even enable capabilities for bringing new products to market such as Private Label development tools over physical or geographic expansion. Taking spending intentions as an indicator, respondents reported that on average about 2.3% of their annual revenue will be allocated to technology and operational improvements within the next 12 months. So what characterizes the retailers that are looking to the kind of digital IT therapy that can address dual customer and supply chain needs?

The survey revealed comparatively high 2017 spending plans by midsized, mass or general merchandise retail organizations (with 2.5 to 4.49bn annual revenue in local currency), mainly located in the US, Germany and the UK. The larger the organization, the more they are planning to spend. With the 10 biggest global retailers tracked by Planet Retail accounting for over 26% of total retail sales last year, 46% of those polled with revenues of 9-20bn in annual local revenue or greater were planning on spending above average, 2.5%-7% of revenue, on technology and operational improvements in 2017 (Figure 5).

An overall focus on and commitment to strategic IT investment should be welcomed. This is particularly the case when considered in relation to the levels of customer expectation and satisfaction in-store. Consider, for instance, that last year nearly 40% of shoppers told Planet Retail they wanted to retailers to offer a compelling in-store environment, with inspirational displays and technology linking to retailer’s website, etc. Yet, on average only 13% had a good experience using their mobile device to scan barcodes of products to get additional product information, for example, and only 18% could say the same of using a cell/mobile phone or tablet to access a retailer’s free Wi-Fi when in-store.

Figure 5: Percentage (%) of revenue allocated as budget for technology and operational improvements within the next 12 months by size of retailer according to total annual revenue in local currency (where known, i.e. may not total 100%).

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Battening down the hatches

Cross referencing this spending with the top three strategic business-related challenges and IT areas of focus (in-store and online customer, supply chain and product development), we can understand why our respondents rated some related technology areas as having a greater potential impact on their organization’s profitability (Figure 6).

Perhaps surprisingly, engaging customers with additional digital product information, marketing and promotional initiatives emerged higher here among all retail respondents than even the cross-channel CX and supply chain previously identified as strategic business and IT priorities. But, in the context of the challenges faced by retailers on both customer-facing and operational fronts by the impact of the digitalization of shopping, the importance of improving product information, marketing and promotional initiatives goes to the heart of the issue.

Take the humble barcode, for example: the global average of shoppers that said they used a barcode scanner app to view product information was only 16%. Yet only 18% of those could report a good experience when doing so. It stands to reason then that there is still much retailers can do to modernize and digitalize their existing services and offerings, before they look to develop even more sophisticated ones.

The barcode is also a fundamental example of how digitizing product identification and information enhances, streamlines and speeds processes that span product development and manufacturing to checkout, and enriching shopper engagement at both physical and digital touch points. It addresses the nearly two-thirds (62%) of our retail respondents concerned that a fast check out experience, whether self-checkout or attended check out, could promote customer loyalty, for example.

Figure 6: Percentage (%) of respondents who rated the given option in terms of the impact they will have on their organization’s profitability as ‘slightly’ and ‘highly’ impactful.
3. Overhauling brand strategies

Where previously retailers needed to center on investment online, the shift to in-store CX and supply chain requirements is highlighting the strategic importance of those retail manufacturing technologies that can support operational efficiencies, sales growth and enhanced customer service, all at the same time.

The CX, product/inventory and brand challenges shared by our survey respondents place such retail manufacturing technologies at the top of the retail IT wish list. This is underlined by the split of technology and operational improvement investment according to strategic business areas of focus (Figure 7). These largely support the previous survey findings. But, where inventory visibility and control were top of the strategic agenda, supply chain improvement will, on average only lay claim to 13% of retail IT spending in 2017.

This finding is all the more surprising when considered alongside our barcode example, for instance. Planet Retail’s shopper poll clearly shows the barcode, as a legacy form of machine-readable product data, is holding retailers back when it comes to enhancing the CX using digitally-rich automatic identification and data capture (AIDC) technologies on packaging and at the shelf edge.

Yet, the task that made adoption of Universal Product Code (UPC) barcode ubiquitous – automating supermarket checkout systems – is now at the tip of the iceberg when it comes to the applications of automatic identification and data capture (AIDC) technologies throughout the retail manufacturing and distribution supply chain, as well as now at the center of the CX.

Moving beyond the barcode

The growing digitalization of the shopping process is undoubtedly having a profound effect on the development of consumer, product and brand strategies. And imperceptible barcode technology, such as that patented by Digimarc whose machine-readable codes can permeate the entire surface area of a package, is already proven to speed the checkout process and enhance the checkout experience. But, in the context of the challenges posed by overall impact of digitalization, its AIDC benefits reach far further.

The richer, digital AIDC capabilities of imperceptible barcodes can also enhance the data availability and insight possibilities from product presentation and marketing, as well as more immersive, rich-media enabled shopper interactions. These include, for example:

- loyalty, marketing and promotions delivered in place, at the moment of purchase intent as well as the shelf-edge;
- digital shopping journeys encompassing product self-scanning for auto-replenishment and shopping list or basket building that can then be used to power mobile app wayfinding features in-store;
- product transparency and information access initiatives for sharing more detailed and accurate product and inventory data and attribute information with suppliers and customers; and,
- increased accuracy and richness of product and inventory data and attribute information to cross reference with customer and sales data in support of more innovative and successful product development initiatives.

![Figure 7: Q: When you are thinking about setting budgets for technology and operational improvements, what percentage of your organization’s IT funding will be allocated to the following areas?](image-url)
Figure 8 breaks out those IT solutions the retailers polled said were on their shopping lists for this coming year. In line with the customer, product and supply chain benefits AIDC technologies offer, it is easy to see why barcode solutions emerged on aggregate as only second in importance (among 30% of respondents) to customer and/or supplier relationship management systems (cited by 35%).

The prospect of adding embedded real time, connected digital tracking intelligence into interactive packaging, signage and displays is understandably compelling. Coupled with the benefits of improved supply chain and inventory management with serialization, and its track and trace and counterfeit deterrent capabilities across the manufacturing and retail value chain, barcode solutions don’t seem so humble after all.

Supply chain and product development-related areas, including the warehouse and packaging solutions, also edge out the likes of mobile and marketing that have previously ranked higher, when customer’s digital expectations were just emerging. So it is essential that retailers take a holistic view of those polymathic solutions that can deliver the greatest return on investment (ROI), where the spread of strategic business and IT investment priorities are well aligned between the front and back office – these are the ones that will provide the right retail IT remedy.

The only alarm bells ring when the the largest group of respondents (23%) characterized their organization’s approach to their adoption of innovation as “Do-it-yourselfers”. Even the next ‘best’ result was that 21% considered them to ‘Laggards,’ while ‘Fast followers’ and ‘Early adopters’ bring up the rear. Only 8% would describe their organizations as ‘Industry leaders’.
Conclusion

Enabling meaningful customer experiences
The thinking that shaped the research underpinning this white paper was designed to understand what demands and challenges retailers are coping with in the face of unprecedented change driven by the digitalization of shopping in the 21st century. It has confirmed that retailers are seeking to embrace new and better ways of working across both their customer-facing and supply chain operations so they can ride these waves of change more effectively to gain a competitive advantage.

Applying the principles of cutting-edge innovation to the example of the humble barcode takes this holistic approach to its most logical conclusion. The richer, unique identifiers available with imperceptible or ‘invisible’ barcodes can be added to packaging, printed materials, and even audio to deliver benefits across a number of crucial strategic areas of focus:

Customer Experience
• Increased self-checkout efficiency
• Richer store and e-commerce multimedia product and marketing information access
• Enriched traditional store and e-commerce multimedia information access
• Social media and retail reviews

Supply Chain and Logistics
• Increased supply chain accuracy, visibility and information access
• Improved product flow to stores
• Enhanced on-shelf availability
• Planogram setup and store compliance

Operational Efficiency
• Store and checkout efficiencies
• Labor savings
• Increased employee productivity
• Enhanced inventory control

Loss Prevention
• Prevention of barcode swapping
• Faster inventory cycle counts
• Reduced staff comp claims

Few would have perhaps thought that barcode evolution could serve as a potent example of the right digital IT remedy at the right time in terms of its capabilities in addressing the widest number of the most pressing retail industry challenges.

Planet Retail and Digimarc urge retailers to assess whether their digital IT investment can boost:

• Customer experience and engagement at both digital and physical touch points;
• Product development (including Private Label) efficiency, including product identification, data capture, attribute information; and,
• Sales efficiency and productivity, as well as help amplify the brand.

In this way the industry should be looking to such digital AIDC innovations as a fundamental resource available to share and harness between retail business and brand organizations that are looking to learn from consumer technology adoption and rethink end-to-end retail processes by harnessing the power of digital transformation.

Methodology – Retailer research
OnePoll conducted the retailer survey during December 2016 on behalf of Planet Retail for Digimarc. More than 350 responses were gathered from senior decision-makers across the US, UK, Germany and Japan employed in one of the following industry sectors: Retail, Cosmetics, Electronics, Fashion and/or Luxury Goods, Food and Beverage, Hospitality and Leisure, and Travel.

The respondents confirmed that they worked for a company in a relevant industry sector whose most recent annual revenue exceeded USD$750m. They included board members, managing directors, chief executive officers, chief information officers, chief marketing officers, directors and senior managers drawn from, among others, the following functions:
• Operations (including store operations, supply chain, logistics, warehousing, shipping and transportation)
• Information Technology (IT) (data management, retail systems, POS);
• Merchant / Buyer (product sourcing, buying);
• Private Label management (product development, design and packaging); or,
• Marketing & Customer Experience Management (including sales/business development and marketing, e-commerce, digital, omnichannel and multichannel, consumer, customer or shopper engagement).

Methodology – Shopology™ research
Planet Retail conducted a global survey among shoppers across 14 markets to get a complete picture of shopper behavior and sentiment. Unless otherwise stated, this report draws on Shopology™ poll data gathered from a base of 63,000 responses between November 2015 and April 2016.

Please note numbers might not be exact due to rounding.

* * Planet Retail e=estimate, f=forecast