

## Personalization in Physical Retail: What, Why, How, and... Why Now?

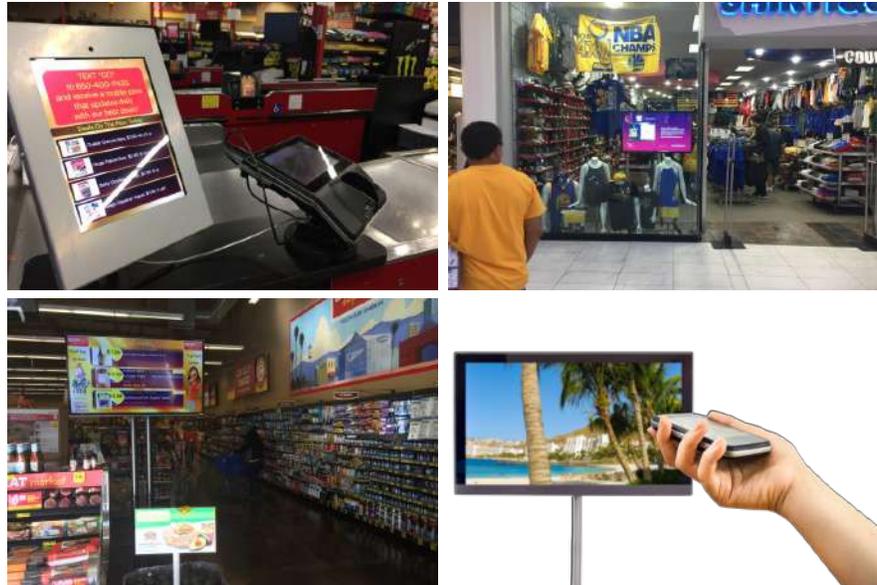
Incredible progress has been made in e-commerce in the last ~20 years (in a gross oversimplification: since Amazon's humble beginnings as an online bookseller), and in personalizing this online shopping experience in the last 10 years (since Google acquired DoubleClick in 2008).

But this white paper is not about e-commerce. Our focus is going to be on physical retail with real-world solutions that can bring a 'web-like' personalized shopping experience to brick & mortar.



**“40% purchased something more expensive than planned because of a personalized experience.”**

- 2017 State of Personalization Study [3]



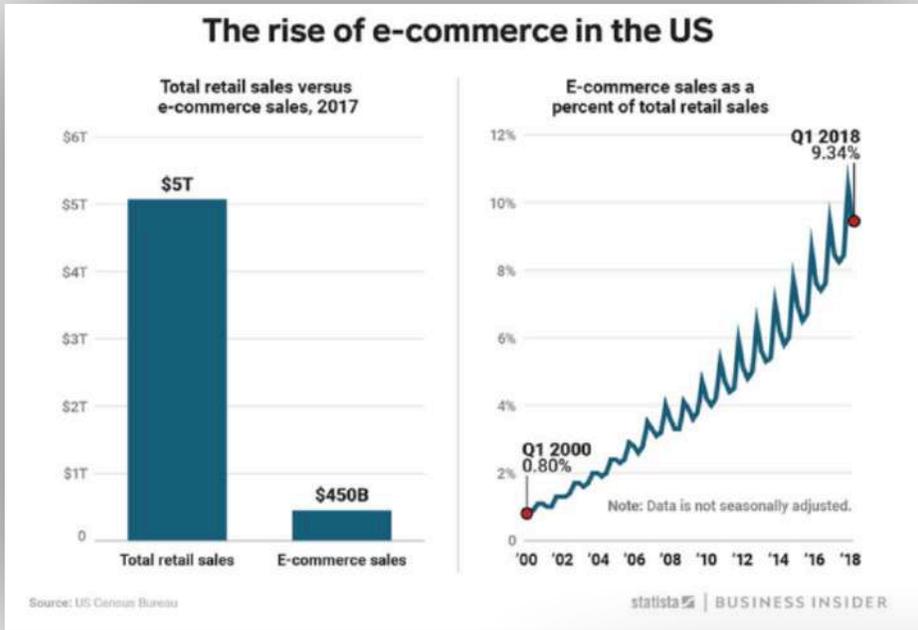
Drawing a parallel with how personalization has evolved for e-commerce in the past, where it is now table-stakes, we believe that personalization in physical retail is the next step. We'll outline how it can be realized, and why its time has finally come, as it relies on a number of technologies that have only recently become ubiquitous and sufficiently 'democratized' to be deployed cost effectively.

We will formulate some specific real-world solutions for personalization in physical venues, and the resulting improvements to the customer journey for those visiting your place of business, whether it is a retail, hospitality or entertainment venue.

But before starting our analysis. Let's first look at the premise...

## “Isn’t there a retail apocalypse? Why still focus on brick and mortar?”

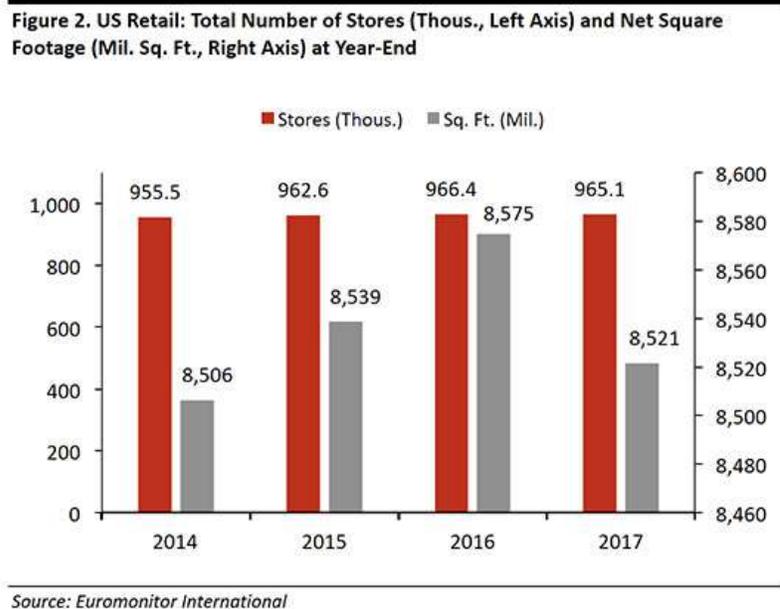
In an opinionated debate it always makes sense to start from some facts and figures... 70% of Americans (230 million) will make an online purchase in 2018, contributing \$474 billion to total retail sales [1].



Total e-commerce retail sales in the US in 2017 was about 9% of total retail: ~\$450 billion out of a \$5 trillion market. Granted, this includes the dollars made from car sales, gas stations, groceries and other categories that aren’t affected as much by e-commerce. But even without them, the e-commerce fraction of total US retail sales would not be higher than 20%. What about its growth over the next few years? The e-commerce share is expected to grow to 12.4% by 2020 [1].

It’s good to bring all this into perspective: even in a few years still over 85% of retail is conducted in physical spaces. These are US-based numbers. In other countries the brick and mortar share of retail is similar if not even higher.

Data shows that retail square footage dropped significantly in 2017 due to the closure of department store and ‘large’ box’ retailers, but the total number of retail stores stays remarkably constant [2]. As a



result, sales per square foot retail space is actually increasing. While the “retail apocalypse” is undeniably true for certain verticals (department stores, soft apparel), some other segments are actually expanding, notably discount, variety and grocery stores with several chains announcing significant numbers in store openings.

It is also notable that, based on 2015 US census data, 91% of retail stores are small-retailer (defined as store owners with less than 20 employees).

## ***Personalization in e-commerce***

To come up with an approach for personalization in physical retail, let’s start with how personalization is actually done in e-commerce, and then draw an analogy to brick and mortar. There is real evidence that presenting shoppers on a website with an abundance of choices from product launches, customizations, promotions, and combinations thereof, actually leads to less sales since shoppers are overwhelmed, and as a result they postpone a purchase decision.

Popular implementations of personalization in e-commerce are [4]:

- **Website personalization:** tailor your site with dynamic content including messages and visuals to target a specific (kind of) shopper. This includes:
  - customizing offers: product shown, price, imposing time limits, changing the supporting copy and visuals
  - personalized content shown in blog posts, downloadable assets, hero images
  - pop-ups: a ‘second net’ opportunity to impact customers when they’re about to leave the site and triggered by clicks, time spent, scrolling behavior, or browser abandonment
  - information bars and other call-out offers: e.g different shipping options shown based on the customer’s location
- **Personalized product recommendations:** People trust the crowd’s recommendation so best seller recommendations are a good start. After you know more about a prospect these can become more powerful and then become based on viewed items and past purchasing behavior.
- **Personalization social proof notifications:** real-time in-browser notifications and updates

- **Personalized triggered emails:** an email is sent based on some sort of user action. The most common type is the ‘cart recovery’ email sent when a customer places an order in a shopping cart but leaves without completing their purchase.

## Why Personalization in brick & mortar matters

A study [3] pointed out the existence of a ‘**personalization gap**’ between customer’s expectations and experiences when they visit brick and mortar stores, from big box retailers to department stores and (to a lesser extent) independent & local businesses.

Retail Sector	Consumer Expectations	Actual Experience
Large online retailer	77%	23%
Department store	51%	17%
Independent or local business	34%	24%
Big box retailer	47%	12%
Online grocery store / service	29%	31%
Niche online-first retailer	24%	25%

**‘Personalization Gap’  
in Physical Retail**

They also found that personalization drives impulse purchases (49% of shoppers purchase a product they did not intend to buy after receiving a personalized recommendation) and leads to repeat shopping (44% of consumers will likely become repeat buyers after a personalized shopping experience).

Yet only 17% of consumers think that retailers are customizing the in-store experience and about one quarter are of the opinion that brick & mortar needs the most improvement when it comes to personalization.

## *Implementing personalization in physical sites*

Clearly email personalization employed in e-commerce also transfers to physical retail. But what about the other items? How can we tailor the in-store customer experience for a specific (group of) visitor(s), and/or at a specific point in time with specific offers and personalized product recommendations? Obviously the store cannot re-organize its shelf space as easily as web servers can dynamically populate content on web pages...

We believe a solution is centered around a new paradigm for the use of digital signage that is not rooted in playlist-based signage that gets refreshed occasionally as currently seen in retail, or static digital menu boards that are commonplace now in quick-service restaurants. Rather we see a dynamic approach with content adjusted on the fly, and automatically, based on continuous analysis of both instantaneous and historical sales data, and also taking into account knowledge about visitors currently at the location, and even within viewing range of each individual display.

But we also don't believe that full 1-1 personalization is suited for all environments. In some cases it may be overkill. A dialed-down implementation results in a, what we call, contextual, rather than personalized, experience.

In our experience with retailers, the right level of contextualization / personalization depends predominantly on how the business scores along two dimensions:

- the duration of the in-store customer journey: a convenience store or QSR environment presents a quick in & out scenario, while at the other end of the spectrum we find a visit to a car dealership for a service appointment where the customer decides to wait
- the intrinsic level of engagement the customer has with the offered products or services: from low-engagement daily grocery shopping to home theater shopping at an electronic store where customers want to interact with the product and perform product comparisons. The engagement level is highly correlated with the price of the product but that is not always the case: viewers of a particular movie on the first day of its theatrical release, may be particularly engaged vs viewers paying the same ticket price on later days.

The longer the visit, and the higher the intrinsic engagement level, the more a fully 1-1 personalized experience makes sense, and the more the business can expect benefits from its rollout in terms of customer perception, loyalty and eventually higher and repeat business revenue.

## ***Components of an in-store personalization platform***

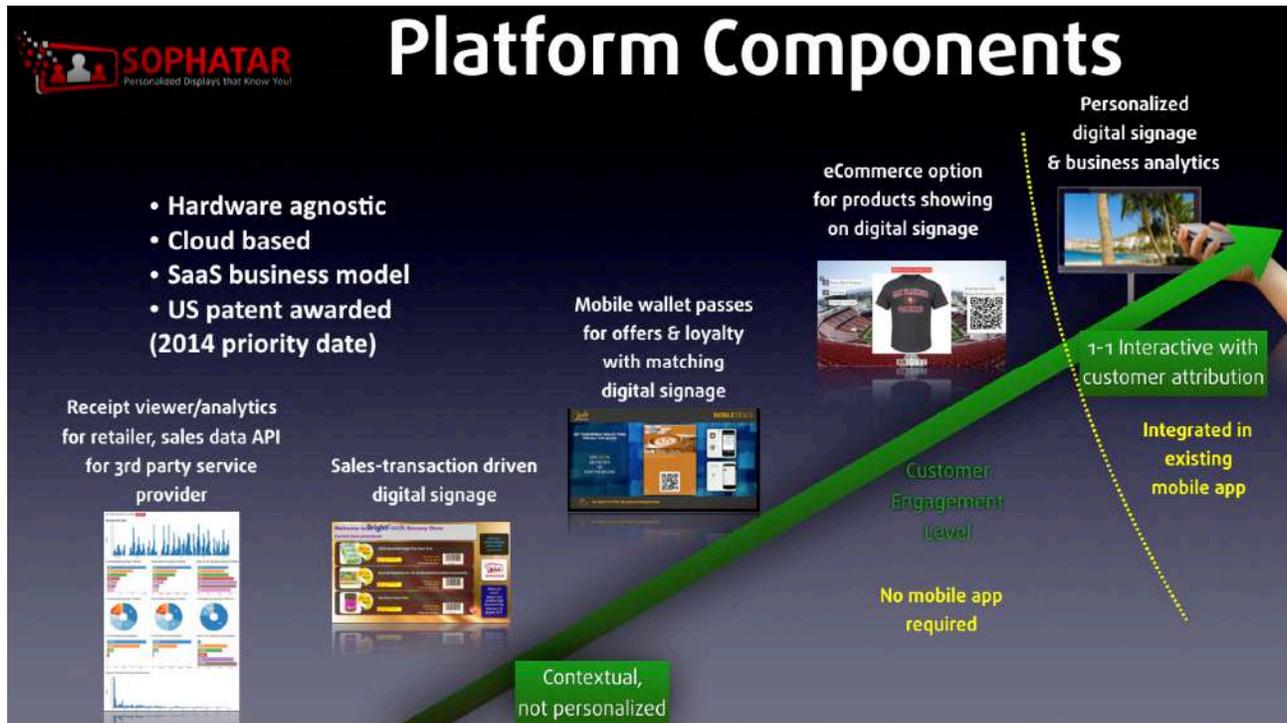
So let's break this down into more concrete components such a 'platform' would need to enable a desirable level of a contextual / personalized in-store experience.

It would need to:

- **ingest sales transactional data:** no contextual experience, let alone personalized experience, can be offered without knowing which SKUs sell at which points in time, under which external circumstances, and which products are sold together.
- **ingest customer presence data** that gives us knowledge of who is in the store and their interests, even before arriving at the POS. Preferably we would also know each customer's past sales transactions.
- **process sales and presence data** in a 'product recommender' and 'sales correlation' engine to generate meaningful aggregate sales information to correlate sales to times of day, day of week, external factors (such as weather), derive which products are frequently bought together, and generate a limited set of time-variant recommendations that could be used for promotions in the limited 'ad inventory' space offered by in-store digital signage. If we have information about customers at a specific location in the store, we can personalize this output data set further by matching the product data vector to the available customer data
- **match visual content** with these recommendations, preferably in an automated way, so we can use these visuals to impact the customer. This is fundamentally missing in any pure data analytics type of solution: here we need a customer-facing component as well.
- display this generated (personalized or contextualized aggregate) content on **large in-store displays as digital signage** to impact the customer while shopping at the store. Goal is to increase shopper basket size by reminding the customer of other products that go well with the ones he has already picked up.
- display relevant content on smaller customer-facing **tablet-size screens at the POS** to increase 'last-minute' up-sell or add complimentary products. Content here could be rather focused on promotions, offers, and loyalty - elements that can be used on a future visit
- provide a way for **dynamic coupons** with content based on aggregate and personalized shopping behavior

- include a **loyalty program** so we can link a customer to a specific prior sale to drive personalized content
- support **handoff** from a large or small digital signage screen showing recommendations, offers and loyalty programs, **to a customer's smartphone**, preferably without requiring a mobile app to limit any adoption hurdle. This allows the customer to have a 'take-home' component which becomes a call-to-action at a future date if he/she will be reminded of the existence of this promotion (or a loyalty program at the store) via a push notification on smartphone when near this store, or when near another store of the same chain.
- include an **"in-store e-commerce"** option to support immediate impulse buys from products seen on digital signage, with the product awaiting pickup when arriving at the POS, or drop-shipped to the customer's home for large or out-of-stock items. This is very similar to the 'endless aisle' concept of a few years ago, but instead of using oversized in-store touchscreens to scroll through catalogs with a final purchase still requiring a store employee, we can now utilize the customer's own phone to finalize the purchase transaction due to the proliferation of mobile wallets.
- **show personalized and interactive digital signage** where the customer can use his/her own smartphone to select from available content based on his/her interest profile; content that can be played back on the digital signage display the customer is in front of
- provide the business with **analytics tracking of various usage parameters** such as customer dwell time, interest profiles, on-demand requests for digital signage, and in-store foot traffic

At Sophatar we develop a platform that provides an implementation of these personalization components.



The platform enables a venue to pick from a number of components, listed in order of increasing engagement and higher personalization:

- **web-based sales receipt viewer and analytics:** a tool purely for the retailer with no customer-facing component, this presents our analysis of the retailer's sales receipt data, the essential building block of the other components
- **POS transaction driven digital signage:** dynamic digital signage that adapts automatically based on historical sales transactions and that suggests product recommendations based on time of day, day of week, products frequently bought together and other (store dependent) factors
- **option for e-commerce digital signage:** a mobile phone-enabled purchase option, integrated with payment via mobile wallet.



- **mobile customer engagement:** mobile wallet passes for “no mobile app required” content handoff from signage to mobile phone

## Personalized Mobile Wallet Passes for No-App Location-Enabled Customer Engagement

**BrightFoods**  
Tangerines, 3 lb.

**BrightFoods**  
Personalized Coupon  
Redeem on your next visit  
Coca Cola Soda, 1.25 L, \$1.23

PLEASE FILL IN THE DETAILS BELOW TO OBTAIN YOUR PASS.

First & Last Name  
Email

SAVE

Please add this coupon to your smartphone and scan it at the store.

**TAO TAPE À L'OEIL**  
PINK STREET  
7<sup>99</sup>

Our Weekly new specials

**SHIRTIQUE**  
Win Your Reward at 500 Points

Passes can automatically update on customers' phones, without manual re-download, for 'weekly specials'

Ask for personal identifying information at pass install. All customer actions related to the pass can now be attributed!

Can use also for loyalty cards ('1 point per \$ spent. Win reward at ... points'). Points on pass update with every redeem

Create multiple wallet pass campaigns for (personalized) offers

- **micro-targeted proximity digital signage:** signage adjusts dynamically based on interest profiles of viewers currently at the store

- **on-demand proximity digital signage:** customers in viewing range of a signage display can override automated playback and use their own phone a remote control to start playback of signage they are interested from the content the business has made available for that particular display. Their phone shows thumbnails of this available content when they are within viewing range.

**SOPHATAR**  
Personalized Displays that Know You!

## In-store Personalization

### Enabled by Proximity-Driven Digital Signage

No need to connect to in-store WiFi !

Customer interest profile created based on item selections, gets better over time

In-app content selections change near each signage display

Items Near You

Cardigan Vapor - Playing for you | Skip

Parka vision Blouse Vacation (FR)

Puffer jacket visitor Jacket Vacation

Because you like: Girl jackets

Items Near You

Sleeveless Jacket...

Because you like: Boy pullover cardigans

Pullover Resume Sweatshirt Horton

Jacket Hologram

Items Available Here

Action

Gods of Egypt San Andreas

Spectre San Andreas

Approaching this with our earlier grid determined by “duration of customer visit’ and ‘intrinsic customer engagement’, it’s no surprise that proximity signage is a better fit for longer duration / high touch environments, while ‘POS signage’ and ‘mobile wallet pass’ components are a better fit for other scenarios. Note that this also correlates to the need for a mobile app: only our proximity signage requires a mobile app - likely already offered and installed by a customer in a high touch/ long customer visit duration environment.

So far we explained the why, what and how of personalization, but an unanswered question remain: why now? Why has this not been in place already? After all it all sounds all fairly straightforward, right?

In the remainder of this text we’ll point out a number of technological evolutions that have become sufficiently available only in the past years, and that are required to make a personalized experience possible in physical sites.

# Why is personalization in physical retail only happening now?

For what we outlined a number of factors need to come together:

- Readily available sales transactional data
- Big data analytics
- Cost effective dynamic digital signage
- Ubiquity of Bluetooth as an indoor location detection technology
- Easy handoff of location-triggered content to mobile phones

## Readily available sales transactional data

POS systems used to be data silos. It was very hard to tap into the data they captured from outside the computer hardware that hosted them since data was stored locally. In many cases the POS ISV (independent software vendor) would not allow access to sales data by third parties. While definitely exceptions exist still with some of the traditional POS vendors, the fact that more data is being stored in the cloud, a drive towards mobile (tablet based) POS offered by new entrants, and a realization that supporting an ecosystem of third parties offering complimentary solutions is beneficial to the reach of a given POS solution, have led POS ISVs to a more open approach.

At Sophatar we took an initial unique step in linking not with a specific POS (a very fragmented market with many suppliers) but with Star-Micronics, one of the leading OEMs for POS thermal receipt printers (there are only a few receipt printer vendors with significant market share). We can ingest sales data from Star printers that have the unique ability to upload digital images of printed receipts to the cloud. We convert those receipt images to structured sales data, that drives both our in-house services to retailers, but also make this data available as a web API to third party technology suppliers for their own retailer services.

This gives us immediately compatibility with virtually all POS's out there: as long as the retailer prints out a receipt, and the retailer opts in to any of our services, we can access the sales data.

## Big data analytics

Continuously processing sales receipt data, and slicing it by time of day, day of week, and other factors presents a significant burden on CPU processing power and memory. Only in recent years have cloud offerings become sufficiently economic to run this almost transparently to the retailer, while allowing for continuous improvements and optimizations that can be done by the service provider as all code can be remotely updated.

## Cost effective dynamic digital signage

In the past years proprietary signage rendering solutions have given way to an almost universal use of HTML markup with CSS styling the same technologies used for rendering webpages. This has been enabled by HTML5, the latest generation of the language that has specific provisions to bring content and functionality (via native web APIs) to all kinds of display sizes, not just computer screens. This also means that a one-time signage campaign design can be done that looks good on a plethora of devices: from high-end 4K UHD displays, to low-end tablets, thanks to HTML5's support for different 'viewports' and responsive design (design that adapts to the resolution and characteristics of the display).

This evolution also decoupled hardware and software: any media player today can render HTML5, utilizing Javascript code in the browser to make it dynamic. This hardware/software disaggregation has had a tremendous impact on prices as now signage customers can source hardware and software independently. Furthermore there is an industry of 100s of third party CMS (content management systems) providers whose claim to existence is the fact that their signage design and scheduling software can be used with various media player hardware, allowing the signage customers to mix and match hardware in a single installation.

The relevance to our discussion is that all this has led to a tremendous reduction of the price of digital signage solutions, and the emergence of solution providers as Sophatar than can work hardware-agnostic, and carve out a new category that blends digital signage with other elements for customer engagement centered around mobile technologies.

## Ubiquity of Bluetooth as an indoor location detection technology

The topic of indoor location detection and tracking is a (controversial) topic by itself. We won't go into a debate on privacy implications of using face detection technologies, using WiFi MAC address sniffers, or WiFi data protocol add-ons that determine position from time-of-flight data pings sent together with regular WiFi packets. But we'll just state this: all these approaches do not ask for an opt-in from the customer.

Bluetooth is different. It is accepted as a positioning technology (beacons) by the major phone vendors (notably Apple, the most privacy conscious one). Each app on the phone needs to ask for Bluetooth access, presenting a per-app opt-in (that is not the case for WiFi, as this is a general setting for network data access, but is not generally associated with position detection).

The question then becomes: what percentage of mobile phone users have their Bluetooth switched on? Recent statistics show that 45-50% of mobile phone users in the US have their Bluetooth on, a percentage that has significantly increased in recent years from the use of smart watches, fitness bands, and wireless headphones (by itself spurred by the elimination of the traditional headphone jack on iPhones).

Interestingly, and unbeknownst to many retailers as it is a capability not promoted by software app developers who charge retailers for mobile app development and support: you actually do not need a mobile app to make use of Bluetooth location detection technology. You can trigger content 1-way on a phone when within a beacon range. You can NOT do this via the browser on all platforms (Apple's Mobile Safari does not allow access to the new Bluetooth Web API), so forget about Progressive Web Apps that run in the browser to offer this capability.

A solution is the use of 'mobile wallet passes', the cards that show in both Apple Wallet and Google Wallet: an installed wallet pass can be triggered as a push notification when within a beacon area or geofence<sup>1</sup> (based on the phone's cellular triangulation for position detection - it doesn't necessarily need to have the phone GPS on). This can remind the customer of a loyalty card or coupon from within ~100 yards from a target location. Interestingly you can put multiple target locations on a pass, so you could have a pass trigger at any store location of a retail chain in a metropolitan area!

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<sup>1</sup> iOS supports push notifications based on both beacon and geo-fence; Android formatted cards currently only support geo-fence trigger. However when using a third-party wallet app, also Android can trigger push notifications based on beacons.

## Easy handoff of location-triggered content to mobile phones

So far we tackled showing content on digital signage screens, and on phone screens. But how do we link both? We need an easy way for viewers of digital signage to 'take-home' related content on their phones (and then have it triggered at specific times or locations, as with the approach we described above). At Sophatar we use 3 approaches for this handoff:

- on-screen QR code: while QR codes were not considered a success in the past, one major change has happened on iPhones since 2017 with the release of iOS11: the QR code reader is now integrated in Apple's stock Camera app. No more need for a third party app to scan a QR code. Now simply pointing an iPhone to an on-screen QR code will either install a wallet pass, or open a web page on a companion signage e-commerce site.
- printed QR code on sales receipt: with cloud connected printers such as the ones we work with, we can also web-print, for instance to print a coupon with a matching QR code
- on-screen SMS number: in some of our plans we include a local SMS number for the store. We show the number and an associated keyword with signage content. Customer can text to the number and obtain a related link.

These approaches are simple and effective, and foremost: they require no specific mobile app on the phone and only minimal data bandwidth, making this an ideal solution also for countries where mobile data access is limited.

## Conclusion

The demographic trend is undeniably toward a generation of shoppers who are used to smartphones in all aspects of their daily lives. For retailers providing a singular 'greatest common denominator' in-store experience these shoppers present a tremendous challenge as they will favor online purchases where they enjoy a highly personalized experience.

But savvy retailers notice a fantastic opportunity to use their mobile phone behavior and the data it generates to their advantage, even when they come to the store, to create an appealing personalized in-store experience.

We outlined a number of components that can be used, standalone or as a wholesome approach, to bring a desired level of contextualization and/or personalization to any physical venue in the retail, hospitality and entertainment sectors.

It took the web 10 years from the early days of commerce to start personalization. In physical retail, personalization has barely started even after more than 100 years...

Traditional retailers have no time to waste to start implementing some of these strategies now.

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