FANPLAYR WHITEPAPER

The Transformation of Retailing

Empowering the Online Retailer

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1 June, 2017

Abstract

This paper begins by reviewing the historical evolution of retailing and the modern retail value chain, with its central role for information technology. It proceeds to identify the area where many online retailers need the most help, efficiently converting web site visitors to buyers and loyal customers, especially in the face of the increasing competitive threat of Amazon and Walmart. After that, it illustrates, using the central example of Fanplayr, how this need is being addressed with urgency and significant success, through cost-effective, dynamic personalization that goes well beyond previous options available to online retailers. The paper concludes by drawing out the implications of our analysis for the future of retailing, both physical and online.

Prelude: According to Jon Nordmark

"When I first met Simon Yencken, a founder & CEO of Fanplayr, several years ago in an incubator on University Avenue, in Palo Alto, I knew that retailers needed the Fanplayr solution. Today I am even more certain of it.

"As Amazon continues to radically transform the retail landscape, and each month, iconic retailers announce store closures or bankruptcy, there is an imperative within the e-commerce industry to innovate or perish.

"In my opinion, for many major retailers, the Fanplayr solution is a 'must have.' It offers a one-to-one personalization solution that uses AI and big data to optimize the e-commerce conversion funnel, providing a material uplift in revenue and a measurable ROI. I've seen many Fanplayr successes, first hand. Best of all, it's simple to push code live and test its efficacy.

"Because of the successes we've seen, at Iterate, Fanplayr is one of our most recommended solutions."

Jon Nordmark

was a founder and original CEO of eBags which started in a suburban bedroom office in Denver in 1998. He served as CEO for 10 years, then as Chairman of eBags, which had sold more than 28 million bags when it was acquired by Samsonite. Jon was Chairman of the Runa Advisory Board before they were acquired by Staples. Today, he is CEO of Iterate.ai, which is an innovation workflow platform that pairs digital challenges with start-up solutions.

The Transformation of Retailing: Empowering the Online Retailer

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1. The Internet Changes Everything.

After two decades of the mainstream Internet, the evidence for its disruptive impact is mounting, from media (Netflix, YouTube) to music (iTunes, Spotify) to socializing (Facebook) to travel (AirBnB, Uber) to politics (Twitter), and of course, shopping (Amazon). But what exactly changes? For media and music, the digitization of content has changed modes of access and consumption. Travel and transportation are among services where supply and demand are time-sensitive and better matching both sides of the market has high value. Maintaining friendships or initiating collective action benefit from new levels of scale and spontaneity.

The transformation of so many aspects of society has tended to divert attention from one of the central facets of the Internet, online retailing, often treated as synonymous with e-commerce. Of course, Amazon and other pure online retailers have disrupted retailing in many dimensions, contributing to the demise of large chains such as Circuit City and Borders. Other brick-and-mortar chains are closing physical stores (Macy's, J.C. Penney, Sears and many others) or searching for better online presence (Walmart with its purchase of Jet.com and other online stores). In 2017, the trend seems to be accelerating.[1] Why is this happening? Online retailers can manage inventory more efficiently, taking advantage of economies of scale and scope together. Consumers can search more easily for product and price options, to make better comparisons and better choices. Especially for Millennials, mobile devices add immediacy to this process.[2] In some cases, consumers can bypass the retail intermediary, buying direct from producers, especially small-scale makers (e.g., Etsy).

With all this disruption, however, online retailing still accounts for just a tenth of the US market. How will it grow? Will existing retailers survive or simply end up ceding their business to online giant Amazon.com?[3] This paper argues that much of the answer to this question depends on how retailers deploy digital technology. In particular, while advertising designed to funnel potential buyers to competing web sites has become ever more sophisticated and ubiquitous, and back-end systems for managing inventory, payment and fulfillment have kept pace, not enough attention has been paid to the critical details of how online retailers interact with visitors to their sites, including the need to personalize (where Amazon has a significant lead)[4] and to overcome short attention spans.[5]

This paper begins by reviewing the historical evolution of retailing and the modern retail value chain, with its central role for information technology (Sections 2 and 3). It proceeds to identify the area where many online retailers need the most help (Sections 4 and 5), efficiently converting web site visitors to buyers and loyal customers, especially in the face of the increasing competitive threat of Amazon (which is spending more than $13 B annually on R&D) and – more recently – Walmart.[6] After that, we illustrate (Sections 6 and 7), using the central example of Fanplayr, how this need is being addressed with urgency and significant success, through cost-effective, dynamic personalization that goes well beyond previous options available to online retailers. The paper concludes (Section 8) by drawing out the implications of our analysis for the future of retailing, both physical and online.

2. The Evolution of Retailing

It is easy to assume that the structure of retailing prior to the Internet was somehow natural, and more or less fixed in time. In fact, the evolution of retailing illustrates the malleability of that activity through history.[7] Retailing is an example of specialization, the hallmark of a modern economy. Farmers, artisans, soldiers and priests were among early specialist occupations. Retailers, as specialist intermediaries, emerged as a response to factors such as the development of towns instead of villages, this development itself reflecting increased occupational specialization. These retailers – including mobile ones such as peddlers, could manage inventory and aggregate to provide more variety than individual producers.

Overcoming barriers of distance and timing was a key aspect of the economic value created by these new specialists. Retailing as a vital economic sector emerged with the Industrial Revolution, which changed the economics of production as never before, with new economies of scale and specialization.

Retailing continued to evolve in tandem with the modern industrial economy. Greater specialization among retailers also emerged – a grocer and a cloth store would each provide a non-overlapping range of products for larger local markets, while in other settings, the 'general store' persisted. From the late nineteenth century, what we now think of as modern retailing emerged. The drivers were increases in incomes of the average person, accelerating urbanization, and improvements in mass transportation and logistics. Stores grew larger with the invention of the 'department store.' Wholesalers and distributors, which had evolved earlier from traditional merchants and traders, became more important, permitting retailers to specialize more in the last mile of the value chain. A key innovation was the creation of the retail brand, which allowed for replicating successful retail business models across stores in multiple locations. A parallel development around this time was the emergence of mail-order catalog retailing, which leveraged retail scale further, allowing large retail chains to reach well beyond the geographic limits of their stores, no matter how many such stores were built (Sears being the best-known early example). At the same time, mail-order specialists also emerged as a new form of retailer.

Despite initial optimistic projections, mail-order soon plateaued as a share of overall retailing in the US. For many consumer goods, physical inspection and timeliness proved to be critical attributes for buyers, who continued to rely mainly on bricks-and-mortar stores. Those stores also continued to refine their operations, making display and store layout into a sophisticated exercise, after the self-service model had liberated stores from wall displays and separating counters patrolled by store employees. Attention to signage, lighting, music and circulation patterns all became part of successful retail store operations.[8]

Histories of retailing often focus just on the last century, but even in this abbreviated period what has been seen is a continuous refinement of the basic model developed a hundred years ago. Retail stores have innovated in the ways in which they have taken advantage of scale and scope, from large specialty stores to hypermarkets. They have tried to squeeze out new efficiencies in the value chain, working more closely with manufacturers and trying to bypass wholesalers. They have continually looked for new ways to attract customers, identify them and their needs, and hold on to them. They have changed how and where they cluster, seeking to match the changing lifestyles of middleclass households, in particular. Retail malls, especially, became cultural icons, regularly featured in movies, and even becoming effective weekend 'picnic' sites for the emerging middle class in countries like India.

3. The Modern Retail Value Chain[9]

Early in its evolution, the retail value chain developed a standard structure, consisting of producer, wholesaler/distributor, retailer and consumer, with logistics providers linking the first three stages of the chain, while consumers typically went to the store for the last mile (although local retail deliveries were not uncommon). Wholesalers could achieve scale and scope in dealing with multiple small producers, performing management and inventory-smoothing tasks that might be beyond the capacity of smaller retailers. In the case of large manufacturers, wholesalers freed the manufacturers from the complexities of dealing with significant heterogeneity in the retailing space. Wholesalers and distributors still provide these functions, aggregating and disaggregating as needed, and funneling combinations of products from producers to retailers.

As retailers grew, they sometimes found it made economic sense to absorb the distribution role into their own operations, so that the wholesaling stage of the value chain disappeared for those companies. Large retail chains, in particular, took this route, with their own warehouses and direct relationships with manufacturers that increased their efficiency and their bargaining power vis-à-vis suppliers. The bilateral relationship between large retailers and large manufacturers made it possible to introduce information technology in the value chain, with EDI (electronic data interchange) describing these customized, proprietary systems that

managed orders and deliveries from one to the other. Simultaneously, electronic cash registers and inventory control systems brought information technology inside stores. Many of these legacy systems, as well as their more contemporary counterparts, continue to be central to making the retail value chain work smoothly.[10]

The personal computer allowed small retailers to apply information technology to their internal operations, but backward linkages in the value chain (through EDI) were still too expensive for them. This changed with the Internet, which reduced the size of investments needed for retailers to communicate and coordinate with wholesalers or manufacturers. For bricks-and-mortar retailers, as much as their online counterparts, information technology now has a central role in the modern retail value chain. An illustration of this centrality and how it is leveraged comes from the shoe store chain, Aldo. Stocking shoes in multiple sizes is expensive in a marquee retail location such as an upscale shopping mall. However, information technology allows such stores to focus on displays and reduce inventory, with varying size needs being met by ordering in-store and a choice of home or store delivery. Convenient return for consumers in case of a poor fit completes the service.

The hybrid model of physical inspection and immediately ordering in the store has actually evolved subsequent to the take-off of online retailing, although it has roots in ordering from mail-order catalogs for in-store pickup, used earlier by some department stores. Home delivery and return by mail represent another configuration of the last stage of the retail value chain. Again, catalog retailing introduced this model, but online retailing has expanded and refined it. Logistics companies have upgraded their own use of information technology, allowing consumers to track their shipments, reducing uncertainty when there are variable delivery lags.

Two other hybrid models are driven by consumers rather than retailers. In ‘showrooming,’ customers browse in a store and buy online (possibly immediately with a mobile device[11]); in ‘webrooming,’ they switch the two tasks, searching online before buying in a store. Many consumers use both methods at different times. This flexibility of consumer behavior increases

the complexity of competition for physical and online retailers alike, although the recent rise in webrooming is hurting the latter.[12]

A final aspect of the value chain highlights the innovation of online retailing versus print catalogs: the way in which consumers connect to the retailer. Print catalogs were, and still are, pushed periodically to consumers. Physical retailers also continue to send out flyers and catalogs to stuff mailboxes and remind consumers of their existence and their offerings. Without these methods, consumers would have to visit a store, seek out a catalog, or search online. This last-case pull approach to connecting with consumers is one of the hallmarks of online retailing, lowering consumers' search costs. At the same time, retailers have to compete for potential customers' attention, and advertising online has become a pervasive characteristic of the Internet, supporting the economics of e-commerce, and generating huge profits for companies such as Alphabet/Google and Facebook. Competition for eyeballs and funneling potential buyers to specific web sites have intensified and grown in sophistication, with behavioral tracking and targeting. Retargeting or remarketing – the ability to reach out to consumers who already visited a web site or opened an email – is an increasingly important approach for online retailers.[13] But an important part of online retailing remains relatively underdeveloped, as is explained next.

4. What Online Retailers Need and Why

The story of retailing in the last few decades can be summarized as one of increasing flexibility enabled by information technology. This flexibility also comes with challenges: the ideal of 'omnichannel' retailing encapsulates the increased demands on all types of retailers, but especially the large numbers of traditional retailers that have had to develop online strategies in addition to operating physical stores. Pure online stores, perhaps with the exception of the 800-pound gorilla that is Amazon, have their own major challenge of building new brands, and some (such as Birchbox and Bonobos) have opened physical stores for more visibility.[14] As more shoppers become comfortable with buying online, and even prefer it to trekking to a physical store, competition for their eyeballs, attention and engagement has intensified.

But in the scramble for eyeballs, the consumer's experience on retailers' web sites still leaves considerable room for improvement, if one is to judge by the very low conversion rates, especially for first-time visitors. On the other hand, physical stores have had a century of experience in refining what to offer the store visitor: displays of products and prices, their layout throughout the store, navigation options for visitors,[15] and aspects of the ambient environment such as lighting and music all receive intense attention. Depending on their business model, they may also provide personal service at various levels, answering queries, providing proactive guidance, or even nudging store visitors toward particular product options.

Despite this richness, physical stores are typically severely limited in what they can do. In a large store or one that is part of a chain, it will be rare for a store employee to recognize a customer, let alone know their previous buying patterns or personal characteristics beyond what is immediately and obviously visible. This makes it hit-and-miss, not to say costly in terms of time, to provide useful guidance to potential purchasers.[16] Customers who use store credit cards or are members of a loyalty program will be identified when (if) they buy something, but by then that particular store visit is effectively concluded, and the best the retailer can do is offer an inducement to return. And it is almost never the case that an individual employee can make a customized offer to a store visitor, with an instant discount, or bundled purchase, or other inducement. [17] Physical retailers can use cameras to study in-store traffic patterns, but analyzing video of individual consumer behavior in a store may strain the limits of technology and other resources.[18] More recently, tracking of customer in-store movements using beacons or cellphone signals has gained some traction and allowed personalization and dynamic offers to shoppers ("proximity marketing"), but it has also found disfavor with consumers and regulators for its invasiveness.[19]

Online retailing still permits the most sophisticated use of information technology, to track individual behavior of visitors to retail web sites, to match it with other historical information on individuals or those with similar behavior patterns, and to identify such patterns over time. Furthermore, prior information can be combined in real time with an individual's behavior on a web site to make customized offers, including displays of products, prices, special offers, and

even add-on services, dynamically throughout the customer's site visit. The potential for privacy concerns can still exist, but these can be contained, an increasingly important consideration as regulations tighten.[20]

Many of these ideas for using behavioral data have been incorporated into online advertising, though often – as in the alternate case of in-store surveillance – to the point of escalating discomfort for users of social networks or other web services.[21] But it is impossible to implement many retailer-specific strategies until after the visitor initially lands on the retailer's site.[22] Focusing on each visitor's site-specific experience is what online retailers need to do to survive and thrive, as the dollars at stake in online purchases continue to grow more rapidly than conventional physical retailing.[23] The rate of return for improving the effectiveness of conversion of browsing visitors to purchasers, and increasing the average dollars spent per visit, is now higher than for continued struggles for eyeballs that may come, scan and go, without an impact on the bottom line.

5. What Do Consumers Do?

Before drilling down to the issue of how to convert browsers to purchasers, it is useful to step back and examine consumer behavior. Several aspects of consumer behavior have already been discussed here, but let us remind ourselves of models of consumer decision processes that have been developed alongside the digital data revolution: this provides a clearer roadmap for identifying paths to success for online retailers.

Chart 1: The Consumer Decision Process

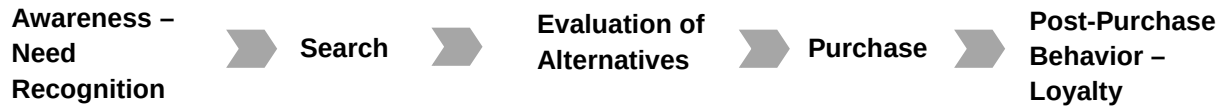


Chart 1 is a familiar five-stage "textbook" mapping of the consumer decision process.[24] The chart itself is simple and self-explanatory. In practice, there are significant possibilities that are left out. For example, there may be a looping back and forth between search and evaluation. Or the search for alternatives may lead to a modification of the initial need recognition, or the

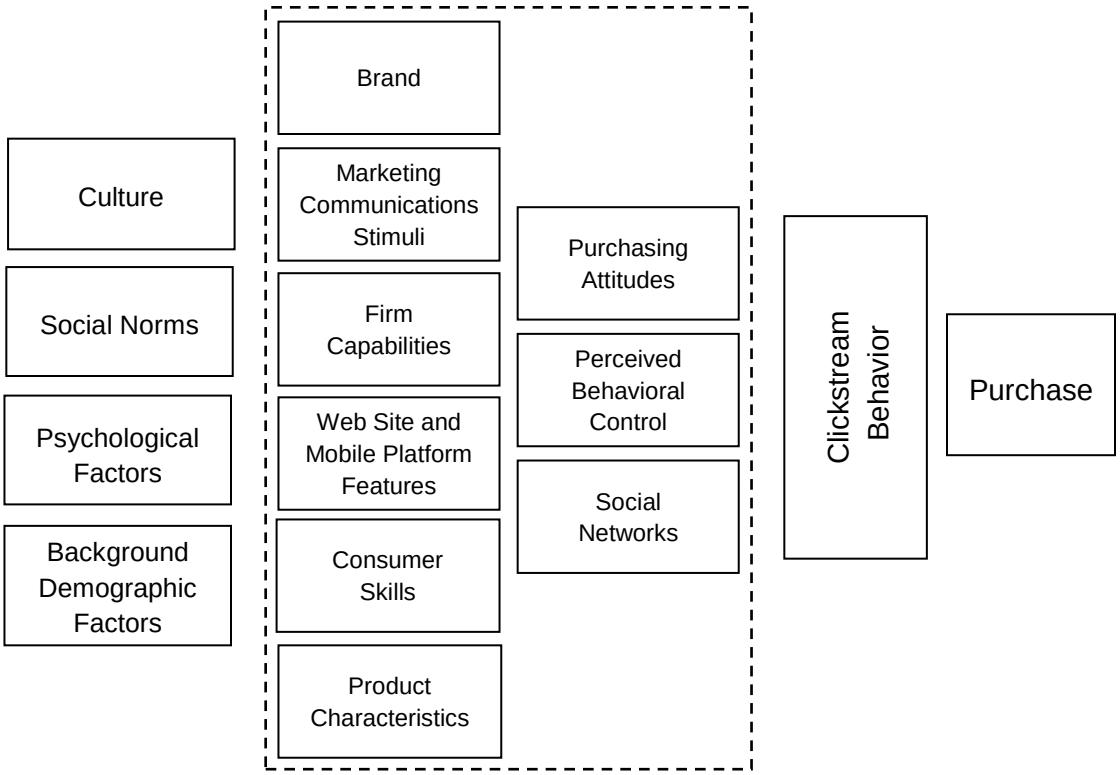
triggering of additional needs. The evaluation of alternatives may end with the process being abandoned, without reaching the purchase stage. The fifth and final stage also consists of a complex set of actions that constitute post-purchase behavior, as well as the possible build-up of customer loyalty, affecting future iterations of the process.

Once one considers the process at the level of granularity that matters for practical decision-making by online retailers, further possibilities have to be incorporated. A consumer may be "just looking," with no immediate intention to buy – the search is not fully intentional, but may trigger some need recognition. Another person may be browsing to build a wish list for future reference, or until they have the spending money. Someone may be looking on behalf of a friend or family member. Evaluation may end not in immediate purchase or complete abandonment, but in an intermediate situation of waiting for a better price, and so on. A consumer may leave a site without buying, but change their mind and return.[25] The flow chart for these possibilities is no longer simple or linear.

Furthermore, the seller has the potential to influence consumer choices in a dynamic fashion. An almost-abandoned online shopping cart may be "rescued" with an offer that responds to a signal of exit intent.[26] A well-crafted retargeting effort may bring the consumer back to the site to go through with the purchase at a later time. Even before these "extreme" situations, a retailer can potentially adjust product and price offerings that are displayed to the visitor to its web site, without waiting for the checkout stage. All of these retailer strategies require the right tools to be successful, as measured by the bottom line.

The stages of the consumer decision process occur in a context that includes underlying demographic, social and psychological factors, as well as intervening variables such as marketing communications, branding and other firm capabilities, and, most recently, social networks.[27] An expanded version of this traditional marketing model is displayed in Chart 2.[28]

Chart 2: A Model of Online Consumer Behavior



The complexity of the environment displayed in Chart 2 has tended to create challenges for online retailers. There are so many structural and behavioral factors to consider, and so much competition for getting potential customers to the retailer's web site, that the final steps in converting a visitor to a purchaser have not always received optimal attention. Even clickstream behavior deserves more targeted, retailer-specific analysis, an approach that can yield measurable returns. One study (Van den Poel and Buckinx, 2005), of over 10,000 visits to an online wine store, estimated that the exact pattern of clickstream behavior on the web site was as important in predicting a purchase as were the visitor's demographic characteristics and prior purchase behavior.[29] This suggests possibilities for dynamic responses to onsite visitor clickstreams that increase the likelihood of a purchase. Indeed, these responses can be largely privacy-regarding – not necessarily requiring deep knowledge of the visitor's individual or personal characteristics – providing a benefit over strategies that rely on identifying or responding to customers based on their demographics or social networks. So, what can retailers do, in the context of this model of online consumer behavior?

6. Empowering the Online Retailer

Online retailing is growing faster than conventional bricks-and-mortar retailing – close to thrice as fast in the US, for example.[30] Even though online retail sales still account for just about 10 percent of direct retailing revenue in the US,[31] large numbers of consumers use retail web sites to browse and evaluate options before going into a physical store. Over time, as consumers grow increasingly comfortable with buying online, purchase decisions are more likely to be made online. Demographic shifts will accentuate this process, as millennials who were born at the same time as e-commerce come to predominate among shoppers.[32] The globalization of Internet access (including the population giants China and India), combined with rising incomes and mobile technologies, will contribute further to accelerating the importance of online retailing.

Over the last two decades, the basic building blocks that enable e-commerce have been developed: web storefronts, order management systems, payment systems, and fulfillment infrastructure.[33] In many cases, information technology was already being used in physical stores, and online retailing built on the existing foundations, but at a much greater level of sophistication. Online shoppers can expect to seamlessly select a product, go through a checkout process that includes payment and fulfillment options, and then track delivery of their purchase.[34] They are also bombarded with information about products through pervasive digital marketing. Despite all this technological and marketing sophistication, conversion rates on typical online retailing sites are low – often between 2 and 3 percent of visitors to such sites actually buy when they visit.[35] The problem includes phenomena such as shopping cart abandonment, but that is only one aspect of an underdeveloped part of the online retailing value chain.

One way to frame what online retailers need to achieve might be the idea of a Customer Engagement Hub (CEH), a concept floated by Gartner Research.[36] According to Gartner, a CEH is not a packaged item of software, but a “system of systems” that need to be integrated. The CEH can be seen as seeking to create a way of managing the complexity inherent in the model of online consumer behavior illustrated in Chart 2. According to a Gartner research director,

Olive Huang, "to offer an end-to-end customer experience across channels and departments, IT leaders must build a CEH. Only a CEH can connect employees across departments, employees with customers, and customers with their peers, while also managing and optimizing personalized customer interaction."[37] The CEH is a significant idea, but there are two challenges with making the concept implementable. One is the heterogeneous and encompassing nature of the postulated CEH, and a second is that this comprehensiveness could put it out of reach of any but the largest companies.[38]

Even if a CEH can be implemented, its encompassing nature makes it difficult or impossible to isolate and measure the impact of implementation. How does having a CEH affect revenue and profits? What is the rate of return on the investments required for a CEH? Luckily, for online retailing, there is a more specific focus that permits measurement of impacts on customers, purchases and revenues. For example, a Forrester report[39] lists eleven key metrics for online retailers (Table 1).

Table 1: Online Retailing Metrics

- Site conversion rate
- Shopping cart abandonment rate
- Average order value (AOV)
- AOV for repeat customers
- % of sales from repeat customers
- Returns as a % of sales
- % of revenue spent on IT expenses
- New customer acquisition cost per order
- Marketing cost per order
- Customer service cost per order
- Fulfillment cost per order

The six elements on the right of the table relate to costs, while the five on the left measure revenue, or factors that affect revenue, at the most critical point in the online retailing value chain: ***when the shopper is engaging with the retailer on the latter's web site***. To these eleven, one should also add gross margin, the classic retail performance measure.[40] Online retailers, whatever else they do to create and strengthen CEHs[41] or other pieces of their IT infrastructure, need a laser-like focus on improving the key metrics, especially the conversion rate and AOV,[42] as well as gross margin. If this can be done in a manner that gives them control, flexibility and significant return on their investment, only then are they empowered to succeed.

Focusing on optimizing the shopper's experience on the retail web site affects costs, and not just revenues. Increased conversion rates can translate into lower customer acquisition and marketing costs per order. Fulfillment costs might go up, if optimization and higher conversion rates require more free shipping offers. Impacts on gross margin and total ROI also need to be considered. But these are trade-offs that can be measured very precisely, ***if*** the focus is on the customer's behavior at the retailer's site. ***Data analytics need to be brought to bear in a more fine-grained manner than many online retailers realize, or are capable of implementing.*** And this step is more immediately addressable than creating an entire CEH, however laudable that larger goal. This reinforces the point made earlier, in discussing the importance of clickstream behavior, in the context of Chart 2.

Empowering the online retailer in this way also achieves a key element of what Regis McKenna articulated as "real-time marketing," at the dawn of e-commerce.[43] Too much of that vision has been diverted to funneling potential buyers to web sites. McKenna began with the challenge of brand-building in the digital age, but at the heart of his vision was a plea for dialogue and continuous connection with consumers. In an age of Facebook, Snapchat and Twitter, it is ironic that this message has not permeated the operation of retailing web sites, where the sale is ultimately made (or not), where the visitor becomes the buyer (or not), and where the customer increases their loyalty and engagement with the seller (or not). The retail web site is where the value of innovation for online retailers has the greatest, most easily measurable potential, provided the right analytical software tools can be marshalled on such sites.

7. What Works: How, Why and for Whom

Amazon is the paradigmatic online retailer, offering an incredible array of products to consumers. A customer signing in to Amazon can view their browsing history, purchasing history, and a range of recommendations organized by category, constructed from a large database of knowledge of both that customer's previous online behavior and purchases, and the behavior of other 'similar' consumers. Searching for a specific item provides rich information, including extensive customer reviews and, if requested, a list of sellers of the item, along with their seller ratings. Typically, the shopper can distinguish between items sold directly

by Amazon, those where Amazon fulfills the order, and those where Amazon just connects the buyer and seller.

Even when it is only a middleman, Amazon may provide a range of backend services to other retailers, all under the umbrella of Amazon Web Services, which have been the most profitable and fastest growing part of the company's business.[44] These services also represent components of the potential CEH, described in the previous section. What is missing from these services for retailers, however, is full customization and control of the customer engagement. Indeed, Amazon pits third-party retailers against each other in their listings, reducing the possibilities for them to build brands – the online shopper mostly just remembers that the item was bought "on Amazon."[45] As important, there is limited ability for the individual retailer to gather data from the customer engagement,[46] and no option to adjust offerings dynamically to complete a sale that might hang in the balance.

Some small retailers do not want to get into the intricacies of dynamic customer engagement in online shopping. This was the experience of Runa,[47] which used machine learning methods to focus on calculating optimal discounts that would convert visitors to buyers, without having to pay for increased traffic. Runa found that small online retailers did not trust the system, even when their conversion rates and revenues improved significantly. We will return to this challenge later in the paper, but continuing with the Runa story and its lessons, they switched focus to the 100 largest online retailers, and met success with a free shipping offer program for eBay, with an algorithm for optimal targeting of offers.[48]

Soon after Runa began adding customers, in 2013 it was acquired by Staples, the second-largest online retailer and largest seller of office supplies. This was a strong validation of their approach, but it eliminated Runa as an independent provider of valuable customer engagement tools for other online retailers. The result was a significant gap in the marketplace, given the value of specialist technology providers for online retailers. All but the largest online sellers (and sometimes even they) need such specialists to handle the intense demands of flexibility and personalization imposed by e-commerce.

Enter a new generation of specialist innovators to meet the needs of online retailers. A perfect example of this new breed is Fanplayr, which has demonstrated its capabilities across diverse market segments, multiple countries, and, of necessity in this day and age, multiple types of devices. In essence, Fanplayr analyzes terabytes of historical behavioral data, combining it with real-time behavioral information, to meet the needs of online retailers and service providers. The new generation epitomized by Fanplayr goes significantly beyond predecessors like Runa by offering more transparency and control to retailers as users of the technology, as well as more options for how they interact with customers and potential customers.

The kind of approach offered by companies like Fanplayr addresses the central problem faced by online retailers: how to convert browsing into buying while improving the quality of engagement and increasing customer loyalty. The product focus is on ensuring return on investment for retailers adopting such platforms, and Fanplayr reports ROI of the order of 10x for merchants that are using its real-time shopper targeting and machine learning platform. To achieve these kinds of returns, the company makes the individual consumer the focus, implementing personalized targeting by effectively answering the questions:

- Who are you?
- What can I do for you?
- How can I “convert” you?

In the spirit of modern approaches to customers that seek to maximize lifetime value created and captured, conversion includes not just getting browsers to buy, but also transforming buyers into loyal customers. This is where the new analytical sophistication of the tools that companies like Fanplayr provide begins to give retailers some respite from the relentless pressures of online competition.

For example, an important new tool developed by Fanplayr, called Creative Editor, brings the sophistication and flexibility of digital marketing to the core of the customer engagement. What Fanplayr delivers is analogous to being able to create personalized store interiors in the physical world – something that is, of course, impossible in brick-and-mortar situations. Essentially,

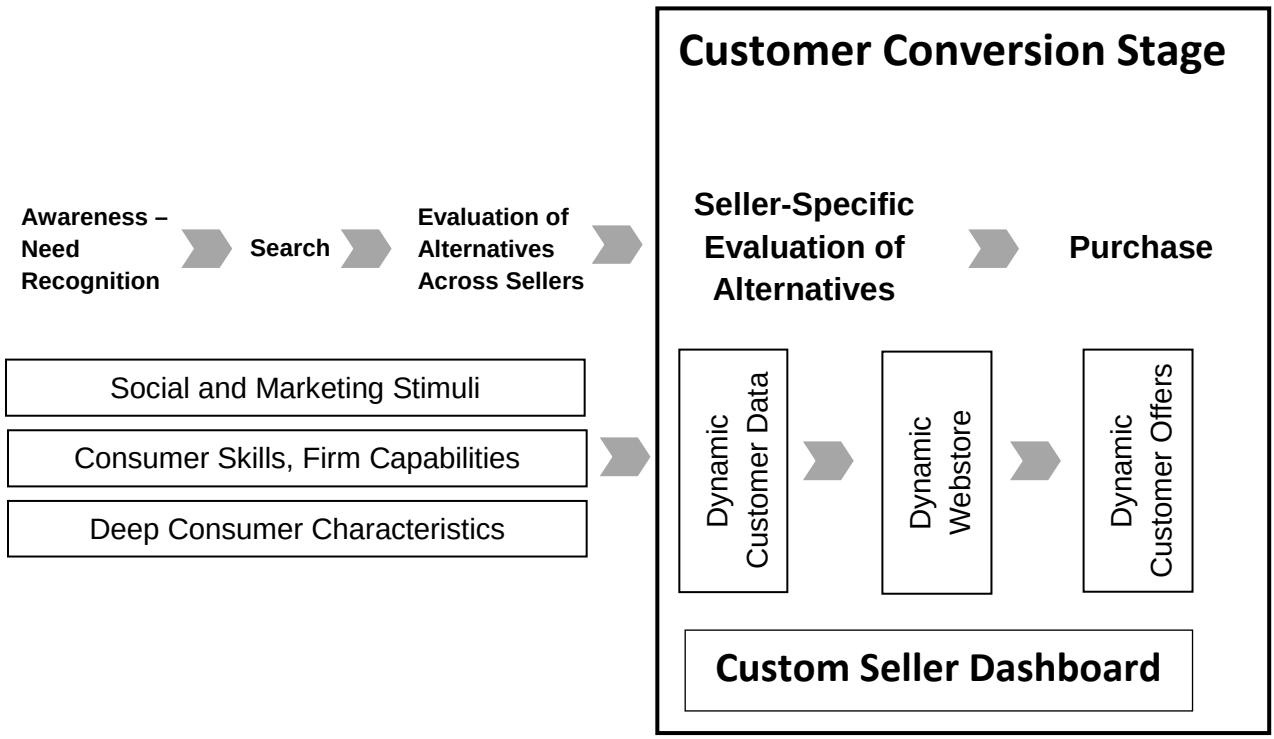
what Fanplayr's Creative Editor tool does is present customized displays on the fly, including targeted special offers, images and messaging, in ways that optimize conversion rates and increase average order value.[49] Hence, personalized immediacy is introduced with respect to what product or service options the consumer sees, as well as to the pricing and delivery options.

What is interesting is that many of the components of tools like Creative Editor are available across the universe of online retailing. But there are two problems with the pre-existing situation that Fanplayr has addressed. First, much of what consumers currently see comes earlier in the value chain, when they are still exploring or they are uncertain about their final goals.[50] Second, previous offerings on retail or travel web sites have tended to be internal software developments by a few large companies, but without the modularity, automation and accessibility that the multitude of online retailers need. The Fanplayr approach addresses both these shortcomings, and even raises the possibility of creating an integrated, highly personalized digital environment for shoppers at the most important point in the retail value chain.

There is an important issue underlying the design of tools such as Fanplayr's Creative Editor. To the extent that dynamic, real-time displays and offers are moved from an earlier stage of the retail value chain, where they might be developed and delivered by specialized digital advertising and marketing companies, online merchants have to reconfigure their internal operations to some extent. This reconfiguring can be optimized, and the approach of companies such as Fanplayr, integrating the power of machine learning, with the more basic and well-understood uses of databases, achieves this optimization, thus allowing for unparalleled transparency, flexibility and control for online retailers. In a nutshell, merchants can choose among multiple levels of customization and automation, ranging from basic reports (more sophisticated versions of what physical retailers manage with their existing inventory and other ERP systems) to full-scale automation of personalized dynamic displays and offers. In the case of Fanplayr, this is made possible by a customized dashboard and analytics, purposefully designed for each retailer, travel company, or other service provider.

The Fanplayr approach to empowering online retailers can be visualized in Chart 3, which draws on elements of the two earlier "textbook" charts. Compared to Chart 1, the consumer decision process in Chart 3 emphasizes what we here call the "Customer Conversion Stage." This is a much more focused concept than the CEH described earlier, without ignoring the wider factors recognized in the CEH. Furthermore, the deeper, prior levels of knowledge of potential customers (demographics, social networks and so on) are explicitly seen as just a component of "dynamic customer data," which also includes integrated collection and analysis of clickstream behavior. Hence, Chart 3 gives a clearer picture of what is possible and necessary than the static separation implicit in the textbook Chart 2. Finally, and critically, real-time presentation of options (through a dynamic webstore, as enabled by Fanplayr's Creative Editor) and personalized offers (prices, bundles, delivery choices) are made explicit at the Customer Conversion Stage, all governed by a custom dashboard that is one of the hallmarks of this innovative and empowering toolkit for online retailers.

Chart 3: Empowering Online Retailers



To summarize, companies like Fanplayr are demonstrating solutions to the most pressing needs of online retailers. A few very large retailers – like Amazon and Walmart, which also pose existential threats to many smaller competitors – can produce their own internal solutions. Very small retailers can rely on whatever services Amazon can provide them. But a wide range of online merchants, including service providers as well as retailers, need to improve what they can offer consumers at the core point of customer engagement: the merchant web site. Without this focus, their survival will be in question, as documented in earlier parts of this paper.

A visitor experience that is more personalized, relevant and attractive can be achieved by software suites that can dynamically deliver appropriate displays, special offers and messaging to individual consumers or specific market segments. This translates into improved conversion rates and increased average order values, while simultaneously managing gross margins in an appropriate manner. An added advantage to this innovation in customer engagement is that personal behavioral and demographic information is being used at a point in the value chain where the consumer has already signaled interest and intent: this is much less intrusive and less likely to be "creepy" for consumers, as compared to similar techniques applied in other contexts such as re-targeting ads (served by companies like Criteo) within the browser, but after the consumer has left the site. Obviously, those other contexts do not permit the comprehensive, integrated and dynamic approach delivered by solutions such as Fanplayr's on merchants' actual e-commerce sites. Solutions such as Fanplayr's empower online retailers in 'fighting back' against commoditization and the destruction of their brands.

8. Conclusion: The Coming Transformation

Considering the history of retailing reminds us that 20th century retailing was just one stage in a complex evolution of this central economic activity. The retail value chain became longer and more fragmented over history, and absorbed the impacts of multiple technological changes, in production, transportation, and human habitation, as well as in the core retailing activity of selling products and services. The digital revolution, including the use of information technology

within business firms as well as in connecting firms and consumers, has launched the latest chapter in the evolution of retailing.

Whether for physical or digital goods and services, online retailing and service offerings have benefited from the ability to exchange and process large quantities of information, and to connect potential buyers and sellers across large distances. Much of the effort in online retail innovation has gone into making options known to potential buyers, and trying to funnel those individuals to specific sellers: in a sense, a hyper-development of the traditional advertising model. To some extent, this has left the quality of the core customer engagement, the experience on the retailer's web site, lagging behind. This is reflected in low conversion rates and high shopping cart abandonment percentages.

Physical retailers have also not stayed still during the digital revolution. They have incorporated information technology in more sophisticated ways, and sought to improve the quality of the shopping experience in physical stores. However, they are limited by the technologies they can deploy without intruding on traditional privacy expectations or conflicting with the organization of human resources within physical stores. On the other hand, companies like Fanplayr (and Runa in the past) have demonstrated the potential for improving online customers' experiences on retail web sites, in ways that translate into measurable and significant returns on investment. Such companies have achieved this by bringing and enhancing the new sophistication of digital marketing and advertising to the core site of the customer engagement – the retail website. In doing so, companies like Fanplayr have gone well beyond what is possible in engagements that are further removed from the buying decision – social media sites, news sites or other places where individuals browse and communicate. This is reflected in the ability to customize online retail displays as well as special offers and personalized messages.

In a sense, the latest innovations bring retailing back to its early days, where merchants knew customers personally, and could accommodate and guide their preferences. One modern difference is that digital technology allows unprecedented scale and reach, without sacrificing

affordability, for online retailers trying to provide high quality service to their customers. But making digital technology work optimally for online retailers requires relentless focus and innovation. Amazon has shown that this approach can have massive benefits, and other large retailers have followed that company's lead in setting up innovation labs. Jon Nordmark, the co-founder and CEO of Iterate Studio, makes a strong case that retailers need to invest in such labs to help them predict and shape the future of their digital markets (Nordmark, 2014). Speaking in a podcast interview (The Jason & Scot Show, 2016), Nordmark observed, "Culturally, every retailer has to move at triple the speed they're used to…" Nordmark's company, through its AI platform and associated services, provides one approach to the innovation needs of many industries, including retailing. On the other hand, Fanplayr offers an integrated, flexible solution focused on the needs of retailers. But the problem they are addressing is the same: digital disruption of retailing and the destruction of brands by Amazon, which require responses at "triple the speed."

In the future, the sophisticated analysis of purchasing behavior and other data from multiple online retailers will provide actionable insights to analysts, investors and even macroeconomic policymakers, as well as individual retailers. As noted by commentators (e.g., Guleri, 2013), the immediate future of Big Data is in specific verticals such as retailing, where it has immediate and measurable benefits, but also allows for more focused information collection and analysis than in more amorphous or undifferentiated online activities. This development has the potential to be transformative of important segments of the advanced economy of the future.

Endnotes

[1] Among dozens of stories of store closures even by large chains, "America's Retailers Are Closing Stores Faster Than Ever," by Lindsey Rupp, Lauren Coleman-Lochner and Nick Turner particularly captures the magnitude of the changes taking place (Rupp et al., 2017). Notably, Warren Buffet signaled his views when Berkshire Hathaway sold a large chunk of Walmart stock in February 2017, having earlier said at his 2016 shareholders' meeting, "It [e-commerce] is a big, big force, and it has already disrupted plenty of people, and it will disrupt more" (Lutz, 2017).

[2] For example, see Weller (2016).

[3] For example, see McDuling (2017), on the threat to Australian retailers from Amazon's entry into the country.

[4] See, for example, DesJardins (2013) and Honigman (2016), on how Amazon operates in this dimension.

[5] See Microsoft Canada (2015) for a widely cited recent study.
[6] Amazon's R&D is analyzed by Nordmark (2016). Its increasing dominance of search by product shoppers is discussed in Soper (2016). Its personalization is discussed in DesJardins (2013) and Hongiman (2016). Its impacts on store closings are detailed in Bano (2016), Bryan (2017), Kestenbaum (2017), and McKay (2017), in addition to articles referenced in notes 1 and 3. The success of Wal-Mart's most recent online efforts is documented in Boyle and Smith (2017).
[7] A study of the early history of retailing in Britain is Nancy Cox's, *The Complete Tradesman: A Study of Retailing, 1550-1820* (Cox, 2016). For a broad history of the development of commerce before the Industrial Revolution see Fernand Braudel's trilogy, *Civilization and Capitalism, 15th-18th Century* (Braudel, 1992).
[8] Indeed, retailing has become a textbook subject, as in Patrick Dunne and co-authors' *Retailing* (Dunne et al., 2013).
[9] In addition to Dunne et al. (2013), other treatments of the retail value chain include Levy et al. (2014) and Finne and Sivonen (2009).
[10] In addition to retailing textbooks such as Dunne et al. (2013) and Levy et al. (2014), there are a large number of treatments of information systems in the retail sector (e.g., Burden and Proctor, 1997), as well as more broadly, across sectors (e.g., Gallaugher, 2016). Walmart is a good example of a retailer that continues to use EDI heavily: see, for example, http://corporate.walmart.com/suppliers/merchandise-support-center.
[11] See Dolcourt (2010) for a description of Amazon's barcode scanner app, permitting immediate price comparisons.
[12] See, for example, Adler (2014), Cayan (2014), Khan (2016), and Spivey (2016).
[13] See, for example, Walker (2013), Criteo (2016), and ReTargeter (2017).
[14] Other examples are Indochino and Warby Parkers. See Martinez (2015) for a discussion of this trend.
[15] See, for example, http://aisle411.com/.
[16] One technology innovation is software that allows shoppers to check in or set up appointments so that they get informed and personalized attention in physical stores. In surveys, shoppers emphasize the lack of such attention as a major barrier to buying when they visit stores, but both the technology and consumer adoption remain to be tested at sufficient scale to matter.
[17] Exceptions are special cases such as automobiles, where 'retailing' is structured very differently.
[18] Nevertheless, this process is also receiving innovative attention. See, for example, Wadsworth (2014) and Ghai (2015).
[19] For differing views on in-store tracking, see "How tracking customers in-store will soon be the norm," (Datoo, 2014); "New study: consumers overwhelmingly reject in-store tracking by retailer," (OpinionLab, 2014); "Customer-Tracking Technology Can Work Without Being Creepy," (Merrifield, 2016). The scope of proximity marketing using beacons is described in Martin (2016), Mittal (2016) and Britt (2017).
[20] See, for example, Osborne Clarke (2017) on proposed new European regulations.
[21] Two examples of pieces that highlight concerns about the approach of entities such as Google and Facebook, as well as possible consumer responses, are Daley (2016) and Solon (2016).
[22] After an initial visit, the retailer can use retargeting tools discussed earlier – see Walker (2013), Criteo (2016), and ReTargeter (2017).
[23] The data for this assertion are plentiful. See, for example, Wahba (2016), Soergel (2016) and Hodson et al. (2017).
[24] Indeed, this model is taken from a textbook, Laudon and Traver (2016).
[25] A complementary approach to thinking about the consumer decision process involves attempts to classify different types of consumer behavior, or even different types of personalities. See, for example, Paul and Hogan (2015), Birchall (2017) and Marketing Teacher (2017).

[26] Statistics on, and reasons for shopping cart abandonment can be found in Davis (2016), Baymard Institute (2017) and Statista (2017).
[27] This general model of consumer behavior is also well-entrenched in textbooks: see, for example, Kotler and Armstrong (2012). The emerging impact of social media is outlined in, for example, eMarketer (2016) and Hartjen (2017).
[28] Chart 2 is adapted from Laudon and Traver (2016), Figure 6.3.
[29] Another early study of clickstream behavior is Moe (2003). More recent work demonstrates the power of deep learning algorithms in analyzing clickstreams: see Vieira (2016).
[30] According to US Department of Commerce data, overall retail sales in April 2017 grew 4.5 percent from a year earlier, whereas online sales increased by 11.9 percent: see BBC (2017). Other evidence includes some of the references in notes 1 and 3, as well as Corkery (2017) and Taggart and Granville (2017).
[31] See BBC (2017), for example.
[32] For varying perspectives on how millennials shop, see, for example, eMarketer (2017) and McGee (2017).
[33] An elementary introduction to the various software components of an online store can be found in Laudon and Traver (2016), Chapter 4.
[34] Supply Chain Digital (2015) describes the increased use of tracking by online shoppers.
[35] Examples of data and analysis for conversion rates include Bez (2016), Chaffey (2017) and Saleh (2017).
[36] See "CRM Technologies for the Emerging Customer Engagement Hub," (Maoz, 2012). Similar ideas, without explicit use of the CEH concept, can be found in another Gartner document, "Magic Quadrant for Ecommerce," (Sengar, et al, 2013).
[37] See "Ten Steps to Plan a Next-Generation Customer Engagement Hub," (Goasduff, 2016).
[38] Gartner does implicitly recognize this. For example, Maoz (2012) states, "The CEH includes general purpose tools/applications such as:

> CRM customer service and support functionality
> Content management (including video)
> Expertise and presence management
> Knowledge management
> Portals (or work spaces)
> Mobile platforms for customer support
> Web conferencing/collaboration/cobrowsing technologies
> Business process modeling and rule servers
> Analytics and workflows
> Linguistics/natural language processing engines
> Social CRM tools, such as peer-to-peer community support applications"

[39] See "The State of Retailing Online 2013: Key Metrics and Initiatives," (Mulpuru, 2013).
[40] For example, on the importance of gross margin, see Traxler (2013) and Hiiemaa (2016).
[41] This is irrespective of whether they conceive of their overall customer engagement in those terms.
[42] In fact, the conversion rate alone has become a key focus for analytical methods leading to the birth of conversion rate optimization (CRO). Analysts emphasize the range of techniques that can be brought to bear on CRO, going beyond A/B testing to include methods such as multivariate testing and customer journey analysis. See "5 Conversion Optimization Mistakes That Make You Look Like a Noob," (Patel, 2016).
[43] The classic article is titled "Real-Time Marketing," (McKenna, 1995).
[44] See Levy (2017) for a summary of Amazon's recent quarterly results.

[45] Examples of Amazon's commoditization and brand destruction in retailing are numerous. See, in particular, Holmes (2016), Dryden (2012) and Galloway (2017). A broader analysis of Amazon's strategy can be found in CB Insights (2017).

[46] Instead, Amazon can use this data to its own advantage, including a foray into advertising that may challenge Google and Facebook. See "How Amazon Could End Google and Facebook's Stranglehold on the Advertising Market" (Palmer, 2017).

[47] See "Staples Hits the Easy Button in Big Data and Acquires RUNA," (Guleri, 2013). This article describes Big Data and Big Retail as a "marriage made in heaven," and emphasizes that the future of Big Data is in these kinds of vertical applications.

[48] This can be seen as a refinement of the kind of approach that Amazon has taken, but taking it in a different direction: Amazon is large enough to offer more blanket programs, like Amazon Prime, to capitalize on the impact that free shipping has on conversion rates. Amazon has also been well-known for sacrificing profits to build market share, something other retailers cannot get away with.

[49] As noted earlier, these capabilities are available for multiple devices, languages and currencies, as is vital in a globalized retail universe.

[50] BMO Capital Markets analyst Daniel Salmon, discussing Amazon's potential advantage in the advertising market, notes that "While Google knows what people are searching for and Facebook knows what people are interested in and who they are connected to, Amazon knows the specific products that customers are purchasing and how frequently they are purchasing these products" (Palmer, 2017). Fanplayr can provide this capability to other online retailers.

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