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# Know Your Customer: **How Retailers Have Used Data Throughout History**

Produced for [NetChoice](#)



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# Introduction

This article examines the use of data and analytics in retail over the past 100 years, demonstrating how retailers have consistently collected and analyzed customer data to improve customer experience, satisfaction, and business operations. By reviewing academic literature and case studies, we observe striking similarities in business motivations and outcomes for data analytics across different eras, despite advancements in data and technology. Since the early 1900s, despite changing economic conditions and different business models, retailers have persistently worked to understand customer needs and outperform competitors.

We also discuss how retailers' data usage benefits consumers, and we reveal that 84% of the largest U.S. publicly traded retail companies use customer data to enhance the customer experience.

## Key Insights From Our Study:

- Data and analytics have been crucial in retail history, helping retailers predict demand, understand consumer behaviors, improve operations, enhance customer experiences, and align offerings with customer needs.

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## The Early Days (1900 – 1980)

Before the 1980s, retailers lacked UPC scanners and point-of-sale (POS) data. They relied on grocery diaries, where customers tracked their household grocery purchases, despite low accuracy and reliability. Retailers also surveyed consumers to understand local market preferences and shopping factors. These labor-intensive data collection efforts involved mail or in-person surveys, in-store observations, and manual recording by retailer staff.

### A&P – Pioneering Data Use

In this era, A&P stood out as an innovative retailer utilizing data to optimize operations and enhance customer offerings,

- Regardless of technological eras and data types, retailers aim to increase sales, enhance operational efficiency, and improve profit margins using data.
- In the "Early Days," retailers utilized more intrusive methods, such as in-store observation and surveys, to understand shopping habits. Despite their limitations, these techniques enabled retailers like A&P to cater to diverse customer preferences.
- During the "Big Box Era," big-box retailers like Walmart used scanner data to anticipate demand, expand product categories, and enhance consumer convenience and satisfaction.
- In the "Modern Omnichannel Era," ongoing technological advancements and new data sources allow retailers to optimize operations through innovative practices, improving customer experiences with reduced search time and personalized product recommendations.
- Data-driven insights into diverse consumer preferences have led to the proliferation of niche products and private labels, enhancing consumer welfare by offering tailored products at competitive prices.
- Contemporary retailers commonly utilize customer data to inform their business decisions and elevate the customer experience. Our analysis of the latest annual reports for retailers with a market cap of \$1 billion or more revealed that 84 percent of them mentioned leveraging customer data to improve the overall customer experience.

despite limited data and cumbersome collection methods. A&P, now defunct, differentiated itself by offering a wider product range and lower prices. The company was among the first retailers to use data to inform business decisions, both internally and externally. For example, A&P leveraged order flow from retail stores to run manufacturing plants at full capacity, reducing waste from underutilized equipment (Levinson 2011).

A&P catered to regional preferences using customer demand data, such as adjusting butter specifications for Philadelphia and New England: "Philadelphians, it found, liked their butter lightly salted, with a light straw color, whereas New Englanders

preferred more salt and a deeper yellow coloration.” (Levinson 2011, pg. 105). Accurate demand forecasting based on sales data minimized stale bread returns, reducing costs and retail prices (Muris and Nuechterlein 2019).

A&P also pioneered the private-label strategy, selling its coffee brand (Eight O’Clock) alongside Maxwell House and Folgers. This approach is now common among modern retailers, such as Kroger, Whole Foods, Walmart, Costco, Macy’s, CVS, and

considered breaking up A&P due to concerns of it being "too big," consumers wrote letters in support. One representative letter stated, “I am dropping you a line to see if you will try and help us housewives save our A&P stores. We surely could not make our money go so far in small stores.” (Muris and Nuechterlein 2019).

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## UPC Scanners And The Big Box Era (1980 – 2000)

From the 1980s to the 2000s, two significant retail trends emerged: advancements in retail technology, including UPC scanners, and the rise of big-box chain stores such as Walmart. These trends led to:

1. Big-box stores adopting retail technology to improve operations and gain insights, lowering their costs and enabling them to expand their scale, offering more product categories at lower prices than smaller competitors.
2. Consumers enjoying lower prices and the convenience of a one-stop shop, leading to increased patronage of big-box stores.
3. Big-box stores using increased revenue to further expand their geographical coverage, store size, and product categories, enhancing consumer convenience and capturing even more market share.
4. The scale and complexity of big-box stores incentivizing significant investments in technology, which in turn made retail more efficient overall.

The efficiency allowed big-box stores to scale up, offering more product choices as a one-stop shop for consumers. Similar to A&P's innovation of data-based practices, big-box stores' early adoption of retail technology enabled them to benefit from new data and insights, facilitating their expansion. During this time, big-box chains increased their square footage, employment, sales, and product breadth.

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### Walmart’s Use Of Retail Technology And Data For Growth

Walmart exemplifies a big-box chain retailer that thrived during this era through its use of technology and data. A brief timeline of Walmart's pioneering adoption of retail information technology, fueling its expansion from the 1970s to the early 2000s, is as follows (CIO 2007; Wang 2006):

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- In 1975, Walmart leased an IBM 370/135 computer system for inventory control and income statements. Electronic cash registers were installed in over 100 stores to record point-of-sale (POS) data for improved inventory control.
- In 1977, Walmart built a company-wide computer network and implemented a system for ordering merchandise from suppliers.

- In 1983, Walmart began using bar codes for scanning point-of-sale data, and in 1984, store associates started using Texlon handheld terminals for reordering merchandise. The technology provided product descriptions, order history, and other data.
- In the early 1990s, Walmart created a prototype data warehouse and deployed the Retail Link system to strengthen supplier partnerships, providing vendors with sales trends and inventory level information.
- In 1996, Walmart made Retail Link an internet-based electronic data interchange and started using the internet as an application platform for data exchange with thousands of its global suppliers.
- In 2005, Walmart deployed radio frequency identification (RFID) technology.

Walmart's growth from 125 stores and \$340 million in sales in 1975 to \$349 billion in sales, nearly 2 million employees, and 6,775 stores worldwide by 2006 was fueled by technology (CIO 2007). Walmart used data to manage its complex global supplier network and inventory levels, improving supply chain efficiency. With a vast geographical presence, millions of customers, and numerous product categories, Walmart had access to consumer product preference data, allowing for better demand prediction and timely inventory allocation across regions.

The various data uses allowed Walmart to improve efficiency at all levels of its operations, from the front of the store in terms of demand prediction and understanding store operations (such as how many cashiers are needed during certain hours at a particular store), to the back of the store, where details about manufacturers' punctuality in filling inventory are recorded to use for future negotiations.

A 2004 New York Times article provided a vivid account of Walmart's use of data to guide business decisions. When Hurricane Frances was about to make landfall on Florida's Atlantic coast, Walmart used data on what had happened when Hurricane Charley struck several weeks earlier:

*"Backed by the trillions of bytes' worth of shopper history that is stored in Walmart's computer network, the company could 'start predicting what's going to happen, instead of waiting for it to happen', as put by Walmart's CIO Linda M. Dillman.*

*The experts mined the data and found that the stores would indeed need certain products - and not just the usual flashlights. 'We didn't know in the past that strawberry Pop-Tarts increase in sales, like seven times their normal sales rate, ahead of a hurricane,' Ms. Dillman said. 'And the pre-hurricane top-selling item was beer.' Thanks to those insights, trucks filled with toaster pastries and six-packs were soon speeding down Interstate 95 toward Walmarts in the path of Frances. Most of the products that were stocked for the storm sold quickly.*

*Such knowledge, Walmart has learned, is not only power. It is profit, too. Data are also used for insight into the planning of new stores and the expectation of consumer demand and taste in the new region: "...achieving sleeker operations is not the whole story. In many ways, data are used to forecast and drive Walmart's business. 'we use it in real estate decisions, understanding what the draw is like and what the customers will be like' Ms. Dillman said." (New York Times 2004).*

This approach aligns with Kelley (1958)'s original marketing treatise advocating for retailers to gather regional demand data to inform store locations and sizes.

As illustrated above, Walmart and other large retailers effectively utilize data to adhere to fundamental marketing principles – stocking the right products in appropriate quantities for their target customers, while maintaining profitability. Additionally, POS and UPC data have helped rectify inaccuracies in identifying "bestsellers." Previously underestimated genres, such as romance novels and country music, were undercounted in sales because sources like the New York Times and Billboard relied on information from specialized books and music retailers. With the availability of Walmart's barcode data, bestseller lists can now better represent purchases made by consumers at Walmart, providing a more accurate reflection of cultural trends.

# Modern Omnichannel Era (I.E., 2010 – Present)

The modern retail era is marked by "big data", as retailers must adapt to the rapidly changing market landscape driven by customers shopping in-store, online through mobile channels, and via other connected devices. These data sources enable retailers to develop new business practices such as personalized recommendations and omnichannel retail, enhancing customer convenience and shopping experiences.

As the cost of data storage and processing continues to decline, retailers are collecting more data, including purchase data from enterprise systems (e.g., quantity purchased, price and cost of each item, size of discounts applied, composition of the shopping basket, and time and date of purchase) and customer social media and demographic information. Retailers can now create large data warehouses that combine multiple data sets to uncover unique insights.

## Retail Analytics For Private Label

Private labels have a long history in retailing. Since the 1920s, vertically integrated retailers like A&P have used data to tailor their private-label offerings to customer preferences. Private labels and store brands now account for an increasing share of retailers' assortments, evolving from low-priced, low-quality options to multi-tiered assortments with premium private-label brands offering quality and affordability.

Access to data has improved retailers' private-label practices, with industry reports declaring retailing as "one of the hottest markets for big data analytics" (Ingram Micro, 2018), and big data as "a complete game changer in the retail sector" (Dekimp, 2020). Gielens et al. (2021) discuss how data and analytics advances enable retailers to understand various customer journey stages better, supporting more precise targeting and personalization.

Retailers and their design teams gain new insights into the needs of different segments, prompting them to offer a wider variety of brands (national and private label). Major brick-and-mortar retailers (e.g., Walmart, Carrefour, Aldi, Lidl, Trader Joe's) and start-ups (e.g., Flamingo, Brandless.com) now offer

smart private-label brands. Today, the use of customer data and analytics in managing private label programs has become ubiquitous among traditional brick-and-mortar chains:

*"Retailers are grounding their private label strategies in deep shopper insight and powerful data mining, including loyalty card analysis... Through analysis of loyalty card and POS scan data, these retailers have refined their assortments, pricing, and consumer targeting efforts with significant success. Today, both Kroger and Tesco offer multi-tiered private label products, managed as part of a comprehensive portfolio." (Houlihan Lokey, 2017)*

*"Analysts say that Tesco's big advantage over major international rivals, which also include Germany's Aldi and Lidl, is its unrivaled ability to manage vast reams of data and translate that knowledge into sales. While data crunching may sound dull, it has given Tesco two major advantages: an unmatched ability to operate multiple retail formats ranging in size from convenience stores to hypermarkets and the market knowledge to offer what many analysts say is the best and broadest range of house brands from any retailer." (CSP News, 2008)*

Kroger's partnership with Dunnhumby has allowed it to use loyalty card data for various purposes, including the determination of successful new private label launches such as Private Selection meats and cheeses:

*"Through its joint venture with London-based Dunnhumby — which specializes in data management, customer analysis and insight-led planning — Kroger crunches customer loyalty card data to better understand its customers and identify opportunities to enhance their shopping experience in its stores. The retailer is able to target promotions based on individual shopper preferences — to a level that's far above what most other retailers are able to do today."*

*Hertel says the joint venture has facilitated a great deal of shopper insights development, at both a key category level and a total store level.*

*It also can be of tremendous help on the product development and assortment sides of the equation.*

*'The era of product customization has come to the grocery industry,' Meloche adds. 'This relationship will allow Kroger to keep its finger on the consumer's pulse and adapt their product offerings for various locales as needed. This can really only be done with private label.' (Canning 2010)*

Safeway has also established private label brand management teams that "...increasingly focus on consumers and consumer analytics in developing new lines and new products," relying in particular on "...data and insight from proprietary data systems to get granular information on what's working." (Dairy Foods 2012).

Albertson's and Rite Aid are relying on data analytics to integrate their private label offerings in one another's stores:

*"Combining with Rite Aid will enable Albertsons to better cater to today's health and wellness-conscious consumer, as the supermarket retailer will more than double its pharmacy counters and get access to the drug chain's EnvisionRx pharmacy benefits management network and services. The merged company also will have extensive scale on both the East and West Coasts.*

*'That is an operator's dream come true in realizing synergies from both a cost perspective and revenue perspective,' Donald [Albertsons Cos. President and Chief Operating Officer] said. The companies also will use data analytics to integrate their loyalty programs and bring Albertsons' own-brand food and fresh items to Rite Aid's front end and, in turn, Rite Aid's health and beauty brands to Albertsons stores." (Redman 2018)*

## **How Brands Benefit From Retailers' Access To Consumer Data**

As large retailers adopt similar omnichannel models, the line between traditional brick-and-mortar and e-commerce retailers blurs. Retailers like Walmart, Kroger, and Target use customer-level data to help brands connect with consumers more efficiently through advertising services.

For example, in a partnership with 84.51°, a data science company that helps its clients understand consumer preferences and develop strategies to improve customer experiences, Kroger developed Kroger Precision Marketing, an advertising service combining Kroger's customer data with 84.51° targeting and personalization science. The service helps advertisers better understand their ad campaign performance between in-store and online campaigns with data on transactions that take place both online and in-store.

In a public presentation, Walmart claims to be "leading the omnichannel evolution, touting that its "scale is truly massive" and that "our proprietary data encompasses 95% of U.S. house-holds", such that "Walmart.com is a daily destination for searching and browsing...16 million searches per day, 717 page views per second, and 12 million visits per day." (Walmart Media Group 2020). Walmart also created its own advertising service, Walmart Advertising Partners. Like Kroger, Walmart offers brands the ability to better connect with Walmart customers. Walmart also recently launched Walmart+, a membership service designed to compete with Amazon Prime, that offered its members unlimited free delivery, early access to deals, and various discounts and convenience features.

Similarly, Target also created its own advertising service Roudel, which uses insights from the data it collects to help create advertising campaigns and connect brands with consumers. These brick-and-mortar retailers' advertising businesses resemble Amazon Advertising, leveraging rich data and customer insights to benefit both themselves and external brands. Retailers now compete not just for consumers, but also for brands utilizing their digital advertising services.

## **Analysis Of Public Companies Using Customer Data To Improve The Customer Experience**

To gauge the prevalence of contemporary retailers using customer data to enhance customer experience, we reviewed the annual 10-K reports filed with the U.S. Securities and Exchange Commission. We analyzed the annual reports of 113 publicly traded U.S. retail companies. Eighty-one percent of these companies specifically referenced using customer data to improve customer experience. And 84% of U.S. retail companies with a market cap of \$1 billion or more noted the use of retail data and analytics in their annual reports.

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# Concluding Remarks

Our study highlights that regardless of technological advancements and data evolution, the fundamental objectives behind retailers' data use remain remarkably consistent - optimizing operations, enhancing customer service, and diversifying product offerings to boost revenue and reduce costs. The sole driving force is profit maximization, as retailers invest in data collection and analysis to achieve these goals. Consumers benefit from greater convenience, improved shopping experiences, and products tailored to their needs and preferences.

This research serves as a historical overview and testament to the enduring importance of data and analytics in retail, emphasizing their role in product and business innovation,

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and consumer welfare enhancement. As retailers adapt to the ever-changing technology and data landscape, they gain insights into evolving consumer preferences, enabling the development of new products and services that delight customers. Given the significant improvements in customer experiences, consumers now expect retailers to possess the necessary information to provide seamless and enjoyable shopping experiences.

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