



it's about time

# **Kx Whitepaper**

## **Big Data in Retail**

*The importance of Data and Technology in helping retailers win through delivering an optimized, personalized and easy shopping experience*

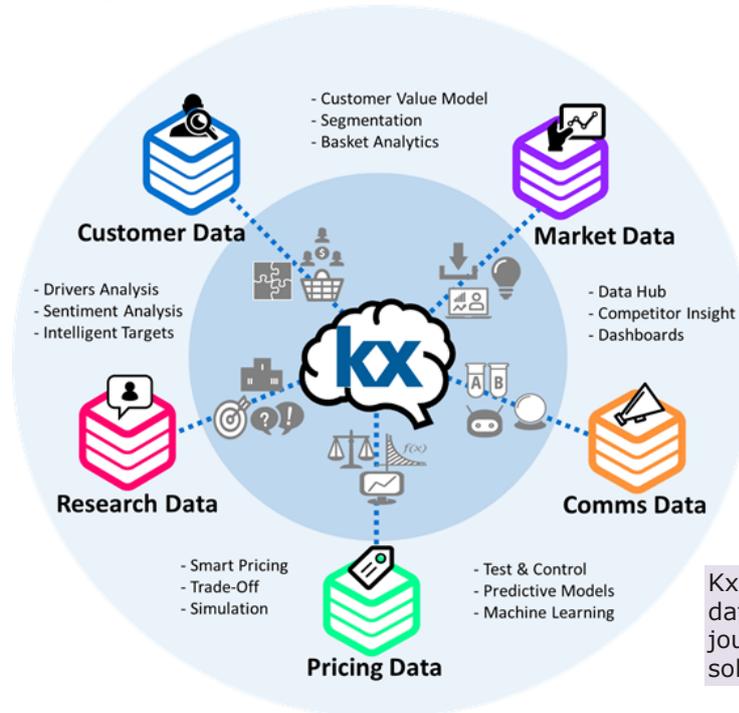


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## Introduction

Easy and frictionless, two terms that are becoming increasingly relevant and important to retailers looking to stay ahead of the competition, as we move in to a data rich omni-channel world. Retailers historically associated with the high street, like John Lewis, are realising that delivering a seamless customer experience across all channels is critical to long term success. Ease is becoming even more critical online, with one click shopping and product to customer in as few steps as possible (e.g Amazon Prime and Asos free shipping and returns). This is the new battleground.



Kx is designed to connect data across the full customer journey, enabling analytical solutions all in one place.

Data has become the new enabler of ease. The customer journey is now traceable across channels, with customers researching online and through mobile devices before purchase, creating the ability to offer a personalized shopping experience. It is critical that retailers are able to capture, process, and act upon this data at pace. According to a Google report, over 82% of those who own a smartphone explore various options online while physically in a store contemplating what to buy, which has led to a 29% increase in mobile conversion rates between April 2014 and 2015.

Product range remains key, but in the era of distance shopping, goods to customer with the least amount of hassle is hugely important. Ease can be speed, cost, or a personalized range that makes it effortless to find what they need. Ease in retail will continue to be driven by data and technology. Retailers that leverage this to drive business decisions, and an easier shopping experience for customers, are the ones that will win.

## Why data is now critical to retail

The battle to win in retail has never been more competitive. Large, multi-retailers and long established high street brands, such as BHS, M&S and Debenhams have laboured in recent years, with share prices tumbling and, in the case of BHS, businesses collapsing. The need to be agile and move with consumers is key to sustaining business growth.

The grocery retail marketplace has been shaken up, with low cost entrants such as Aldi and Lidl eroding the market share of the big 4 players. Further disruption is likely, as the likes of Amazon enter the market.

The reason retailers should be fearful of Amazon is clear – they are using data to drive ease. In general, the retail market is fairly simple, give customers the product they want at the best price, and make it easy for them to get it. When thinking of the 4 Ps, Product, Price and Promotion are important, but Placement is critical and king.

***Technology and data are now driving convenience. It's not necessarily the best brand that will win, but the easiest one to shop with.***

Convenience is the number one reason customers choose a grocery retailer. Convenience used to be about location – “I go there because the shop is nearest to me”. But with the growth of home shopping, quite quickly, convenience is becoming more about bringing the shop to the consumer.

This changes the role of convenience. No longer is it about being nearby, easy to navigate the store and get through the checkout, it's also about how easy it is to navigate a website, and get products to my home without having to make an effort. Same day delivery and short delivery windows become the norm. Ultimately, enabling a customer to receive goods without having to be in is where the market is going.

Convenience and ease remains key in the store environment too. One of the biggest costs to a retailer, and frustrations for the consumer, is the checkout process. Despite self-scan becoming more popular, this still requires a level of human intervention. How often do you see staff watching you scan your items ready to pounce to prevent your frustration when those now immortal words appear on the screen “please place your item in the bagging area”. Amazon has recognized this too. With Amazon Go, you can now walk in to a store, pick your items and leave. No need to checkout. This is where data and technology win – when they reduce costs for the retailer, and make it easier for customers to shop. According to a 2014 study – with a sample of 2800 consumers from around the world – 73-94% of consumers are using self checkout lanes. As you may suspect the 94% range consists of younger people aged 18 to 34 years, with the 65+ group at the 73% end of the scale.



Connecting data and insight in one place

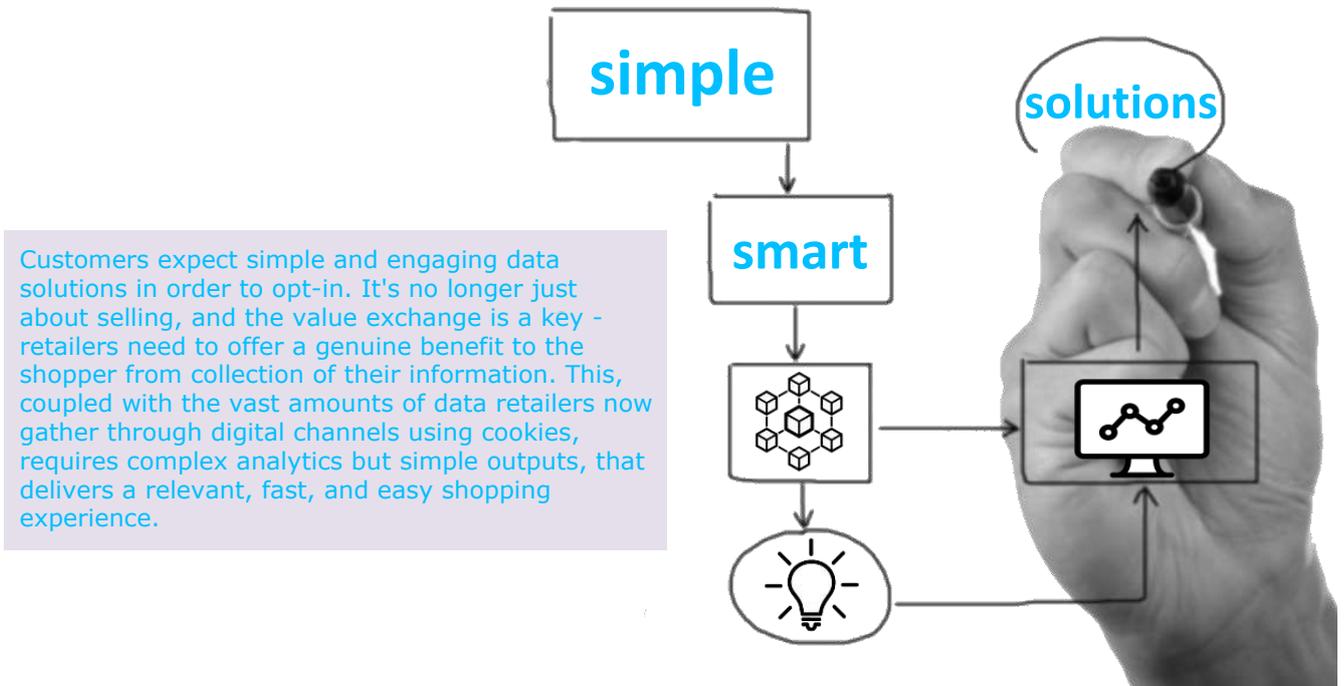


Rich analytics & visualizations

As a result, data collection has now become key to all retailers. The creation of technology in store that makes the shopping experience easier, is also generating huge amounts of data. As retailing moves at an increasing velocity towards omni-channel, the creation of Big Data across channels has never been greater. Consumer interaction with a retail brand now spans stores, ecommerce, mobile and social media. By one estimate, 51.2% of online purchases (95.1 million) will be made through a smart-phone next year in North America. In Europe, the case is no different: 51% of online retail sales in the UK occurred on either a smart-phone or a tablet between November 2015 and January 2016.

As the number of multi-channel interactions increase (with the volume, the velocity and the variety of data sources all expanding rapidly), customer expectations of relevance and personalization are also growing. Through eReceipts, mobile payment and other @till technology, retailers are suddenly able to collect and store customer data, that has historically only been available to home shopping and digital retailers. Collecting customer data will now become vital to delivering a personalized and convenient service to shoppers. This enables retailers to engage with customers as they move through the buying cycle, rather than waiting for them to come to your store.

We must remember though, customers won't just hand you their data. There has to be a clear benefit to them for doing so. In order for customers to give you their data, retailers need to deliver solutions for them. Google excel in this space. You know they are collecting your data, and using it to advertise to you, but their products make your life so easy you're happy to give it to them. There's that word again – easy!



Transformation is sweeping the retail industry. Consumers today are much better informed and more connected. They want mobile shopping, personalized service and instant gratification. These changes are giving rise to a host of innovations around omni-channel retailing, mobile apps, customer data mining, responsive supply chains and cutting-edge in-store self-help technologies.

Even without expressed opt-in, retailers can still be personalized and targeted to shoppers. Research online, purchase in-store is now the norm. This is especially true on mobile devices, enabling the collection and use of cookie data to understand shopper intent, and serve relevant content at the key moments of the purchase cycle.

## Considerations for Big Data Solutions and Analytics

A foundation of data capability is critical to enable the ease agenda. Retailers will need to build on existing infrastructure in key areas such as big data/analytics, in-store technology, and customer-facing applications to take advantage of the vast data generated by these devices:

- *Retailers will need to think about the compatibility of multiple data warehouses from different sources, and how they integrate with other applications. How do you process all this data quickly to create usable business intelligence, and sync immediately with consumer facing applications.*
- *Solutions and data interchanges that optimize speed of queries for real-time analytics will become key in delivering services to customers*
- *Bluetooth beacons that now enable retailers to send messages to registered customers and unregistered devices that respond when the customer enters a store*
- *Real-time inventory management, and real-time targeted advertising with supplier monetisation will become standard*

But it's not just the evolving market, big data is here in retail today and is being leveraged to drive better decision making, and customer experience. Real-time big data decisions are already being used in examples such as Amazon's product recommendation engine, driving the Amazon Go technology, and delivering dynamic pricing for airlines based on customer location and demand.

The traditional retail model of ATL to drive footfall, with in-store conversion is no longer relevant.

Brands now need to engage with customers at a 1 on 1 level across multiple channels. Data drives and enables this. High street retailers have not tended to need this experience and capability in-house, and this is where Kx can help with their technology and consultancy model.

## How Kx can help retailers win though leveraging big data today

As technologies to support Big Data evolve, the business around it evolves too. Born from financial markets where big data has been the norm for some time now, Kx is a data capture and analytics platform for the modern era.

Key to leveraging big data in retail to lower costs or drive sales is the ability to collect, store and integrate data with end user systems. The Kx technology lends itself to this perfectly as it is able to take data feeds from multiple sources and formats, combine this and perform high speed analytics all in one tool. It also integrates seamlessly with applications allowing businesses to make real-time decisions and execute them on their website, a mobile device or on a till in a store.

Performing analytics on real-time and historical data, processing queries, delivering results and feeding downstream applications requires an immediacy and agility that is often difficult to achieve. Kx is agnostic and can easily integrate with these systems, whether that be supply chain management systems, or a website/mobile device.

Kx enables retailers to store and process their customer data in real time. As a result, use that information to drive better decision making, and better, more personalized experiences for shoppers in store or online.

The benefits of real-time big data are driven through reducing costs and driving sales by:



### Merchandising

Range optimisation tools to create powerful insights from basket data



### Pricing & Promotion

Smart pricing algorithms and impact analysis built on usable technology



### Marketing & CRM

Harnessing customer data to build marketing platforms for an omni-channel strategy



### Performance Media

Digital media optimisation and DMP preparation with real-time solutions



### Supply Chain

Assortment and supply chain optimisation through real-time data insights



### Market & Customer Analytics

Powerful customer journey analytics unlocking value through connected insights and data

## How Kx for Retail can help

At Kx, we provide the services required to help at every stage. From consultancy to help form your roadmap and audit your current capabilities, through to hands on analysis to complete the projects that will deliver early wins and ongoing success.

**We can help retailers leverage their data to drive growth in 3 areas:**

- Enterprise Big Data solutions / connecting data in one place (IOP)
- Data tools and solution development supporting:
  - Big Data BI/MI and visualization
  - Retail analytics / consultancy / advanced analytics solutions
  - Customer journey / segmentation
  - Digital marketing optimization – performance media
- Fully mobilized Data Scientists and analytical resource – deployed on/offsite

Using the power of the Kx technology, all solutions and services can be carried out in real-time, enabling instant and powerful decision making and optimization.

We are equally at home engaging with senior level business executives, focusing on how data-led business decisions and customer solutions help them achieve their major goals, and working with technical staff to gather, manage, analyze and interpret large and varied data sets.

We enjoy nothing more than talking about your business challenges and finding ways to address them, in partnership with you. If you'd like to explore the possibilities of working together, please contact us.



## Why Kx?

### Kx can support retail through much faster data analytics

- Kx has a native 64-bit architecture that is essential for real-time execution of customer facing solutions using the massive amounts of data created from retail data sources.
- Kx's columnar design simplifies database indexing and joins to dramatically speed up search performance and support real-time queries and decision making.
- Kx can scale to tens of terabytes of data with no degradation in query response times and is ideally suited for grid computing and parallel processing.
- Kx's open architecture and feedhandler framework simplifies integration to new data sources and makes it easy to incorporate the rapidly increasing range of datasets being generated in retail.

Kx is superior to Hadoop type implementations because of its small hardware footprint. It does not require banks of super computers with the attendant complexity of managing resources and because the programming needed to analyze the data is easy to learn for people with retail backgrounds. Kx is a unified platform with a simple software stack in contrast to the smorgasbord of open source and vendor supplied software elements.

### Kx is used by some of the world's top data scientists

- Kx provides an integrated real-time visualization layer enabling complex queries and self-service Business Intelligence. Open interfaces to third party packages and visualization tools enable existing solutions to access data in Kx.
- Kx includes a general-purpose programming language, q, that has direct support for databases. This gives an enormous advantage over systems that force the user to rely on traditional SQL for data access, or that must depend on a supplier for pre-written queries.
- Kx offers great flexibility in OLAP queries and drilldown. Many other technologies introduce redundancy and additional maintenance overhead by using database views or pre-canned queries.
- Kx is ideally suited for clustering and optimization techniques such as regression algorithms, cohort analysis and k-means clustering.

Kx integrates with multiple 3rd party technologies but provides better performance than commonly used languages such as R. These packages load data from files or from a database and there is significant overhead in loading and preparing data as well as persisting any results. For large datasets the difference in accessing data before applying the algorithm and persisting any output could potentially be in the order of days or even weeks.

### Kx Performance Stats

- Single inserts, updates, joins and selects -**million per second core. Consistent performance with 10s of billions of inserts per day**
- Bulk inserts, updates, joins and selects: **10s of millions of bulk inserts per second. Trillions per day**
- Supports multi-threaded time-series analytics and aggregation queries **across billions of rows of data**
  - Provides **real-time publish/subscribe** mechanism using built-in messaging
  - Historical databases allow users to **access terabytes of records** in seconds
    - **Native** Nanosecond timestamps
    - Size of database is limited only by RAM & disk capacity



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