Abstract

Retailers generate large volumes of data across their supply chain and at various customer touch points across omni-channel operations. At the same time, the current digital customer and social media experience is feeding a massive data explosion. The analysis of this huge volume of Big Data presents a sizeable opportunity for retailers. Leveraging advanced technologies to understand this data, they can maximize the potential of these disruptive trends and win in the competitive marketplace.

This paper explores the current state of the retail industry and discusses how Big Data is a fast becoming the solution retailers can adopt to maximize revenue. It explores the key pillars of Big Data along with its transformative opportunities and an adoption roadmap for retailers.
In a marketplace riddled with slow economic growth and high costs, retailers are battling aggressively to increase their share of the customer’s wallet. Operating within tight single-digit percentage margins, retailers are striving to improve efficiencies and reduce costs. The rise of a new breed of digital customers that wants convenience, personalization, and promotion-based pricing has made winning in this environment even more challenging.

Disruptive trends associated with digital customers – such as e-commerce, social media, and mobile commerce – have created a wealth of data residing in emails, blogs, videos, phone calls, and social network messages. Processing such voluminous and diverse data sets to better understand customer behavior is a tremendous challenge for companies. In the coming years, this challenge will continue to grow as seen from recent studies. According to Gartner, the volume of data is set to grow 800% over the next five years and 80% of it will reside as unstructured data. Another study by a leading research firm indicates a 30-fold increase in digital content over the past 10 years to 35 zetabytes with a 60% annual growth in data volume.

This explosion of data is both an opportunity and an asset – but only if retailers can make sense of what it means. Retailers are realizing that the power of Big Data cannot be harnessed using usual database management tools. The retail industry requires solutions that can help them access this customer and product information, understand and play with the trends of customer behavior, and ensure their continued relevance and survival in a highly competitive market. The solution needs to quickly gather and process this mass of data from multiple sources and draw near real-time insights and analytics to enable quick decision-making for generating true business value.
Earlier, retailers and customers connected at limited touch points, usually brick-and-mortar stores. Retailers relied either on some kind of customer identification programs – such as loyalty cards – or on the customer’s physical presence within the store to wield influence and provide information on promotions and offers. Today, customers purchase products across multiple channels such as mobile and web, use real-time information through social media, customer forums and blogs, and make purchase decisions through ratings, reviews, price comparisons, and product recommendations. At all these touch points and across all transactions, customers leave a trail of information about their preferences and behavior that retailers can follow to find their way through the market. Retailers need to gather, aggregate, process, and analyze such structured and unstructured information to adopt customer-centric strategies that help them engage customers.

Moreover, to ensure the success of such strategies and campaigns, retailers need to access relevant customer information in real time and deliver options to customers at the moment of truth. Retailers need solutions that gather data residing in silos across channels and apply advanced analytics to yield useful insights and marketing intelligence. For instance, how can retailers run a profitable one-to-one marketing campaign without eroding margins? How can they ensure customer micro-segmentation to provide relevant marketing messages to target customers? How can they combine data from different sources – internal and external to the organization such as social media and forums – to provide relevant recommendations to the shopper at crucial purchasing moments?

Conquering the Data Mountain for Customer Intimacy: Problem and Opportunity

MANAGING VOLUME

The ability to process large volumes of data is a classic requirement. For instance, retailers want to adopt a dynamic pricing model where the cost of merchandise varies based on market conditions and the competitor’s price. Such a model should track various quantitative and qualitative measures to understand demand, monitor the competition’s pricing strategy, and generate an appropriate real-time response on their stores and eCommerce site. This requires the processing and analysis of large volumes of data, which existing systems are unable to handle.

HANDLING VELOCITY

Increasingly, retailers are driven to make real-time decisions based on a large number of data points available in an instant. For instance, the capability to make timely and relevant offers to customers at crucial touch points to drive sales and ensure customer loyalty. For large retailers with multiple channels and Point of Sales (PoS) systems that handle millions of customers at a single moment, such a capability requires simultaneous gathering and processing of high velocity data.

DEALING WITH VARIETY

Data types – which vary from structured information such as customer demographics, basket data, and sales data to unstructured text, audio, images, and video – can be analyzed to provide useful information. Take, for example, a coffee retailer who wants information on global weather patterns to estimate the supply of coffee beans to preserve margins, or a retailer who wants to know about local events to predict and plan for future demand of products. In both these cases, the analytics provided can drive top-line and bottom-line growth. However, it involves quick and timely processing of a variety of data sets. All enterprises can now bring all possible data types and volume necessary for accurate and timely decisions into play with Big Data.
Enabling Insights, Driving Sales

Solving the data problem requires flexible systems that scale exponentially while maintaining a linear increase in cost. Traditionally, available data management technologies and systems are unable to support such a cost vs. requirements balance. Big Data solutions can augment the existing information processing capabilities in the enterprise and help solve the data problems that retailers face.

The future of information management in a retail enterprise will consist of three pillars:

1. Big Data solutions to process unstructured data and large data volumes as well as structured data that is not modeled
2. Structured data solutions to enable traditional Online Transaction Processing (OLTP) and other structured data processing needs leveraging Big Data constructs to address volumes
3. Real-time analytics through Big Data solutions that process large amounts of real-time data for immediate insights

Leveraging Big Data can provide an unparalleled competitive advantage to enterprises such as extreme personalization, real-time context-aware recommendations, dynamic pricing, and improved operations and merchandising.

Further, Big Data can be used to improve supply chain efficiencies and help retailers to accurately estimate demand. For instance, a leading coffee retail chain has begun analyzing social media data to identify upcoming local events. These events act as triggers within the supply chain, thereby enabling the retailer to be prepared to meet the demand and avoid stock-out situations.

The transformative nature of Big Data lies in its ability to leverage insightful analytics, discover new trends and patterns, and aggregate internal and external data to provide a holistic customer view, on time, accurately. It enables the ability to tap opportunities unforeseen till now and help with new demand generation mechanisms and targeted campaigns, and ensures long-term customer relationships.

The processing of Big Data requires a new breed of technologies and tools that are capable of handling a very large volume or velocity of data. Retailers can augment their data processing potential by combining the ‘map reduce’ capability with real-time capabilities. Doing this provides a complete view of the information processing required by the enterprise.

Retailers looking at adopting Big Data must take a holistic view of their information management needs. Big Data is a capability to be leveraged to drive greater insights and improve the bottom line. While Big Data can be a transformative capability, it is important for retailers to focus on solving their data problems by leveraging the three pillars and adopting cost-effective solutions for the enterprise. This requires a robust strategy for Big Data adoption.
A study from McKinsey indicates that retailers who optimally adopt Big Data analytics extract a 60% enhancement in margins and a 1% labor productivity improvement. If the primary goal for retailers is to reduce costs and improve operating margins, Big Data provides some key transformative opportunities:

**Micro-segmentation** – Traditional customer segmentation was based on macro-variables like age, gender, life stage, store visits, basket spend, etc. Today, the variables guiding customer segmentation have increased from the basic ones to varied multiple dimensions based on basket analysis, customer preferences, and social media interactions, among others. Big Data enables better and granular customer segmentation by collating customer information from various sources and feedback from marketing campaigns. Such mechanisms enable higher success rates and create a fundamental change in how retailers market and promote their products by enabling them to avoid mass promotions and coupon proliferation.

**Price optimization and inventory management** – Big Data promotes real-time transparency, enables predictive alerts within the supply chain, and uncovers local/global supply-demand trends. This optimizes inventory, minimizes inefficiencies, and helps avoid stockout incidents. For instance, inventory can be redistributed to stores where it is required to avoid stock-outs.

**Expanding business verticals** – Retailers often expand into other industry verticals such as banking, financial media services, digital content, etc. Big Data enables such enterprises to combine customer data across all verticals, ensuring better cross-sell and up-sell capabilities and creating a better value propositions for customers.

**New product development and crowd-sourcing** – Retailers are adopting creative techniques to engage customers with their brands. For instance, a leading fashion retailer designed an online portal where customers could create their own boutique using the retail product catalog and win special offers for the maximum number of visits. Such strategies provide insights into what customers actually want, allowing retailers to fashion product lines to ensure merchandise relevance.

**In-store analytics and location-based pricing** – Most promotional offers and distributions are conducted offline through direct mail, email, or vouchers, which have low conversion rates. Big Data analytics allows retailers to offer such promotions at the moment of truth at the PoS through in-store analytics as well as self and mobile-based check-out devices, thereby improving conversion.

**Generating customer loyalty** – Amazon is able to generate over 25% of its sales using its recommendations engine that suggests popular products. Big Data allows retailers to make such instantaneous recommendations and advertisements to customers, thereby improving merchandise sales and associated services. Big Data analytics can also leverage unused data assets such as surveillance videos to improve shop floors design, thus improving customer satisfaction.

**Effective marketing campaigns** – Current retail campaign strategies offer less visibility and analytics into successful marketing messaging, maximum sales generated, etc. Retailers need the flexibility to adjust campaigns to target the right audience through deep analysis of market trends and customer behavior. Big Data solutions maximize campaign effectiveness by providing a 360-degree customer view and analyzing customer actions.

**Predictive demand** – Retailers need analytics that help them predict fluctuating market conditions to ensure they are on top of their game. For instance, a leading sportswear retailer released a new product during peak season while underestimating the potential demand for the product. It soon faced a stock-out situation. Big Data solutions enable retailers to identify and assess patterns that affect product demand, thereby optimizing the supply chain.

Thus, the transformative nature of Big Data can drive efficiencies across the entire supply chain, thereby accruing higher business value.
Roadmap for Big Data Adoption for Retailers

Even as retail players aim to improve margins and drive efficiencies into their supply chain, they are careful to avoid solutions that require a large amount of restructuring since most of them do not want to invest in such an overhaul. Retailers want holistic data management solutions with a proven successful adoption methodology that can be implemented in a cost-effective manner. The adoption strategy for Big Data involves the following five steps:

**Strategy** – Since Big Data capabilities are maturing, several retailers want to test its capabilities within their IT environments to gauge its efficacy. They must create a clear-cut strategy that defines a roadmap for Big Data adoption in the enterprise that typically starts with a pilot implementation to gauge complexities and build a business case.

**Pilot** – Retail enterprises should identify a small business unit or department that can be used to conduct a pilot run. The managing team should identify solution objectives, delineate Key Performance Indicators (KPIs) that are easily measurable and demonstrable to the business, and give a clear value proposition.

**Large-scale adoption** – Once the pilot test churns satisfactory results, the enterprise can expand Big Data adoption across the different lines of business such as customer analytics, product development, etc. At this stage, the enterprise should initiate a top-down approach to generate awareness of the value driven by the advanced analytical capabilities of Big Data.

**Managed growth** – At this stage, it is necessary to institute measures that ensure that solution implementation is being managed properly. Large-scale enterprise-wide adoptions sometimes end with a host of Big Data solutions residing in silos across the organization. The implementation of different solutions should be deployed in a controlled manner to enable them to communicate seamlessly across all business departments.

**Data-driven enterprise** – The Big data adoption and enablement leads to the possibility of a data-driven enterprise, delivering transformational value to the enterprise. Big Data roadmap and adoption are often initially driven by cost savings but it is advisable to take a more holistic approach that aims to deliver value to the topline of the business.

Several retailers are already ahead of the curve in adopting such technologies and have piloted Big Data solutions in functional and technical areas. By witnessing first-hand the tremendous business value generated, such retailers want to extend these solutions across the enterprise. They seek solutions that help them smoothly transition from traditional solutions to enterprise-wide Big Data solutions, thereby creating a business case for Big Data to drive funding opportunities for large-scale solution implementations.
Big Data is enabling innovation at all levels. With its ability to augment existing technologies, process structured and unstructured data, enable real-time analytics, and deliver on the Cloud, Big Data is becoming the game changer in solving functional problems. These include enabling targeted marketing, improving marketing spend, and enhancing campaign, offer, and royalty management. These impact various fundamental business functions such as:

MARKETING
Through multi-channel customer interaction, segmentation, and real-time recommendations, Big Data can drive significant business revenue.

MERCHANDISING
Innovative business models help customers to engage in product co-creation, thereby optimizing production costs and creating a relevant product mix.

OPERATIONS
Retailers can enable operational efficiencies, standardization, and cost savings, leading to better performance and higher Return on Investment (RoI).

SUPPLY CHAIN
Big Data facilitates advanced inventory management for retailers with expansive item catalogs and analytics to improve supplier negotiations.

NEW BUSINESS MODELS
Big Data enables seamless execution of new models such as dynamic pricing, offline price comparison, and price differential vouchers.

From an innovation perspective, retailers have been late in adoption. There is an emerging trend where enterprises are expanding their boundaries beyond physical limits by leveraging owned data along with data from partners, competitors, and third parties to create innovative business models.
Conclusion

The retail industry is faced with a gridlock which is stifling growth. Presented with a huge opportunity to better understand and serve customers, retailers need to tap into the large volume and high velocity of unstructured data being generated to enable effective targeted messaging, product creation, and supply chain planning. They need to equip themselves with technologies that will help them break through the gridlock and garner dramatic growth.

Big Data solutions are the new frontier for retailers seeking to drive business transformative value and accrue higher margins and profits from their marketing strategies and supply chain planning. Big Data helps retailers leverage large and high-speed data sets through intelligent analytics to uncover customer trends and track customer behavior—in-store and online—in a cost-effective manner.

Retailers need to embrace the power of Big Data and implement solutions using a comprehensive strategy. Such a strategy requires a robust adoption roadmap that defines the scope, application, and predicted benefits of a Big Data enablement. Some retailers are ahead of the curve and are driving a business case for Big Data with its proven results of enhancing productivity, streamlining supply chain efficiencies, and increasing product sales, thereby improving operating margins. By enabling effective customer micro-segmentation, assortment optimization, in-store analytics, location-based pricing, inventory management, and predictive demand forecast, Big Data solutions provide tremendous opportunities to help retailers win.

About the Authors

Srinivasan N

Srinivasan Nithyanandam is a Client Services Manager in the Retail, CPG and Logistics industry vertical, Europe at Infosys. He has 15 years of IT and consulting experience, primarily focusing on CRM solutions, Loyalty card solutions, Shopper engagement and Retailer Analytics programmes across Europe. He has been involved in developing some of the world’s largest consumer loyalty & CRM programmes. He also specialises in the area of Datawarehousing and BI systems.

Rajeev Nayar

Rajeev Nayar is an Associate Vice President at Infosys and leads the big-data practice as part of the cloud unit at Infosys. He has more than 18 years of experience in the information management area. His key areas of focus now are big-data analytics and extreme data processing, which deals with very large-scale data solutions. His works spans multiple vertical areas and has helped guide the development of a patent pending solution for big-data at Infosys. He has presented at a number of conferences and co-authored a book on big-data called Big Data Spectrum.

About Infosys

Infosys partners with global enterprises to drive their innovation-led growth. That’s why Forbes ranked Infosys 19 among the top 100 most innovative companies. As a leading provider of next-generation consulting, technology and outsourcing solutions, Infosys helps clients in more than 30 countries realize their goals. Visit www.infosys.com and see how Infosys (NASDAQ: INFY), with its 150,000+ people, is Building Tomorrow’s Enterprise® today.

For more information, contact askus@infosys.com

www.infosys.com

© 2012 Infosys Limited, Bangalore, India. All Rights Reserved. Infosys believes the information in this document is accurate as of its publication date; such information is subject to change without notice. Infosys acknowledges the proprietary rights of other companies to the trademarks, product names and such other intellectual property rights mentioned in this document. Except as expressly permitted, neither this documentation nor any part of it may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, printing, photocopying, recording or otherwise, without the prior permission of Infosys Limited and/or any named intellectual property rights holders under this document.