A study on using big data analytics to advance in retail sector with specific reference to retail analytics

Daneshwari Guddad

Guest Lecturer in Commerce

GFGC Haliyal

Affiliated to Karnatak University Dharwad

Pushparaj Kodaganur

Assistant Professor cum Placement officer

KLE's Institute of Management Studies and Research (IMSR)

BVB Campus, Vidyanagar, Hubli – 580031

Abstract

The ability to optimize corporate processes while meeting customer expectations is more crucial than ever as the retail sector becomes extremely competitive. Therefore, it is imperative to manage and channel data in order to strive toward customer satisfaction as well as generate healthy earnings in order to survive and thrive. Big data analytics, or rather data, is now being applied at every step of the retail process for big retail players both internationally and in India. Examples include tracking newly popular products, forecasting sales and demand through predictive simulation, optimizing product placements and offers through customer heat-mapping, and many more. Along with this, the core of data analytics consists of identifying the customers who are most likely to be interested in specific product types based on their prior purchase behaviors, figuring out the best way to approach them through targeted marketing initiatives, and finally figuring out what to sell them next. Data analysis has become an important field of study for both practitioners and researchers due to the recent emergence of big data and its 3Vs (Volume, Variety, and Velocity), which reflect the significance and impact of data-related issues that need to be solved in business organizations, including the retail sector. In order to assess how Big Data will affect the retail business, this study meticulously defined and examined four factors: the data source, the data analysis tools, the financial and economic effects, and data security and privacy. This study examines the effects of big data analysis on retail businesses that employ the so-called data-driven decision-making (DDD) strategy, which uses data and business analytics to inform decisions. The most recent discovery is that the retail industry's data analysis tools strongly supported the financial and economic outcome and had a direct association with it. A survey of various business practices and information technology expenditures by retail firms was used to gather data for the study. This study is the outcome of a descriptive investigation on the past, present, and potential uses of company analytics in the retail sector for developing effective advertising strategies.

Keywords: Retail Industry, Big Data, Business Analytics, Retail Analytics, Marketing Strategy

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Introduction:

Analytics is the process of identifying and sharing significant trends in data. Analytics is a subject that has moved from the fringes of business and technology conferences to the top of the corporate agenda. These technologies have the potential to bring performance increases unseen since the redesign of fundamental processes in the 1990s, and they could alter the competitive environment in a number of industries in the years to come. Big Data is all about using unconventional methods to manage contemporary digital data. We live in a sea of digital information. It includes information that is housed in mountains of organized databases that are kept by businesses, streams of data produced by social networks that are constantly changing, and a variety of tangible and intangible signals that are produced all over the place by various types of digital equipment. The three Vs - Volume, Velocity, and Variety -

are often used to describe large amounts of data. For an organization, big data can be about selecting the appropriate datasets from this data, turning them into easily digestible models, and then extracting insightful knowledge for formulating business strategies. These insights can be utilized to enhance a variety of corporate functions, including marketing, sales, operations, and customer support. Customers in the retail sector may now track and better comprehend information from a wide range of sources, such as CRM, AdWord/AdSense analytics, inventory management systems, emails, transactional data, sensors data, etc., thanks to the use of big data. For hot-selling commodities, businesses can reorder supply, alter prices in real-time, manage and regulate product distribution across several outlets, and discover current trends to better direct their sales. Because of this, the retail business now has whole new ways to view the datasets at their disposal. They may also utilize it to create relevant marketing that cater to their profitable consumers and ensure customer happiness by combining these organizational facts with social media data streams. Customers in this day and age expect customization. They anticipate frictionless interactions between physical stores and internet channels. If consumers find it difficult to make a purchase, they will look for another store. For retail businesses wanting to boost sales and customer happiness, merchandising analytics and retail analytics can provide solutions. Customers in this day and age expect customization. They anticipate frictionless interactions between physical stores and internet channels. If consumers find it difficult to make a purchase, they will look for another store. For retail businesses wanting to boost sales and customer happiness, merchandising analytics and retail analytics can provide solutions.

What is retail data analytics?

Big data is used in retail analytics to improve consumer loyalty, supply chain efficiency, and price. Big data is the term used to describe a vast amount of data that is used to identify patterns, trends, and relationships, particularly those pertaining to human activity and interaction. Volume, velocity, and variety are the three main characteristics that have historically characterized it. Big data will help the retail sector better understand consumer spending patterns and how to draw in new clients. Big data analytics in retail allows businesses to develop customer recommendations based on their purchase history, leading to more individualized shopping experiences and enhanced customer service. These enormous data sets are also useful for predicting trends and formulating strategic choices based on market research.

Business Analytics:

Corporate analytics is a collection of methods and procedures for data analysis and decision-making that may be utilized to boost business performance. It is a division of business intelligence that gives businesses the tools they need to effectively compete in the marketplace. One of the key functional areas in the majority of businesses is business analytics, which is growing more prevalent. Businesses learn to use analytical thinking to justify their judgments. According to Thomas Devonport's book, "Competing on Analytics: The New Science of Winning," a sizable number of high-performance organizations have highly skilled analysts on staff. On the other hand, a recent survey also found that more than 59% of firms lack the data needed to make decisions. According to a recent article from MIT Sloan Management Review that was based on a poll of almost 3000 executives, there is a remarkable association between an organization's analytics sophistication and its competitive performance. The biggest barrier to analytics adoption is a lack of understanding on how to use it to enhance business performance. To improve corporate performance, business analytics employs management, operations research, and statistical technologies. Today, data analytics is used in many different industries and professions. Today, it is widely employed in many different industry verticals for strategic, operational, and tactical decision-making processes. These include, among many others, retail, e-commerce, banking, finance, healthcare, sports, and manufacturing.

How big data is transforming the Retail industry?

How Do Retailers Collect Data?

Loyalty programs are among the most popular ways that big data is gathered in the retail sector. These days, it's also gathered through things like user log-ins, IP addresses, and credit card transactions. Retail businesses can utilize market insights to study the past ebb and flow of consumer spending to forecast future spending and provide individualized recommendations as additional data is gathered.

Predicting Spending:

You're past searches and transactions are used by Amazon to suggest products to you. Their recommendations engine, which examines more than 150 million accounts, earned 29% of their revenues. The ecommerce behemoth has made significant revenues as a result.

Personalizing Customer Experience:

Big data presents opportunities for retailers to improve customer experiences. To keep its customers healthy, Costco collects transaction data. When a California fruit packing company alerted Costco to the potential for listeria contamination in fruits like peaches and plums, Costco was able to email particular customers who had purchased the products in question rather than sending out a general email to their lists.

Forecasting Demand in Retail:

To predict the upcoming big thing in the retail market, some algorithms also look at social media and web browsing patterns in addition to big data. The weather is possibly one of the most intriguing data points for demand forecasting. With the help of the Weather Channel, companies like Walgreens and Pantene customized product recommendations for customers by taking weather patterns into account. Because women would be looking for anti-frizz products during periods of increased humidity, Walgreens and Pantene prepared advertisements and in-store promotions to capitalize on this opportunity. Over the course of two months, Walgreens customers bought 10% more Pantene products, and the company's overall hair care category sales increased by 4%. Retail forecasting and retail projections are used to allocate resources throughout the year in the most efficient manner.

Customer Journey Analytics:

The path taken by a customer is not linear. From research to purchase, there is a zig-zag across channels. Using big data is the only way to understand the customer journey and improve experiences. Retailers can find the answers to questions like: Where do customers actually look for product information? With the aid of analytics solutions. Where do we lose them, exactly? What are the best strategies for contacting them and convincing them to buy? Analyzing customer journeys enables you to:

1. Consider the client in light of their journey: Data from various channels can be seen sequentially and analyzed. You may merge data from your call center, POS, and web properties into a unified reporting dashboard.
2. Make knowledge accessible to all: Democratize data access so that more people may use data-derived insights to make business decisions. Any employee in the company who is in charge of any component of the client experience may quickly reach solid judgments based on more thorough information.
3. Use data science to your analysts' advantage: With the use of customer journey analytics, even regular people can use data science to gain access to insightful analysis.
4. Create interactive visualizations of your datasets using on-demand reporting: Any dataset from the Adobe Experience Platform that complies with a few basic requirements can be used in workspace.
5. Look at non-web data: The term "hit" or "event" no longer has a strict definition in the context of workspace. Data and definitions can be completely customized with custom schemas.
6. Increase your level of control over data manipulation you can edit uploaded data, make datasets, and import them into Workspace. Through the Experience Cloud Query Service, Adobe Experience Platform offers capabilities for querying, extracting, manipulating, and loading data.

Data Analytics:
Enterprise Analytics is a set of techniques and procedures that may be used to analyze data and improve business productivity through fact-based decision-making. It is a division of business intelligence that develops features so that companies may effectively compete in the market. One of the many essential operational components in many firms is gradually becoming enterprise analytics. Businesses grow in their ability to support their own decisions through analytical reasoning. In his book "Competing on Analytics: The New Science of Winning," Thomas Devonport asserts that a significant part of high performance companies have extremely good analytical abilities among their staff. On the other side, a recent study has also shown that more than 59% of businesses lack the information needed for decision-making. According to a recently published article from MIT Sloan Management Review based on a poll of approximately 3000 executives, there is a remarkable association between an

organization's analytics sophistication and its competitive success. Lack of knowledge about using analytics to increase corporate efficiency will be the biggest barrier to adoption. Enterprise analytics boosts business efficiency by using management, operations research, and statistical technologies. Nowadays, data analytics is used in a variety of industries all around the world. Today, it is widely used for strategic, operational, and tactical decision-making tasks across several business sectors. These include, among others, manufacturing, retail, healthcare, finance, and banking.

Role of business analytics in retail industry:

As marketers strive to understand their customers, analytics play a crucial role in their efforts. Businesses will use analytics to gather the rich data that mobile devices supply as part of the growing Internet of Things (IoT) ecosystem. Retailers may learn a lot from how customers use their devices to interact with a brand once they have given their consent to "opt in." What goods, for instance, are they most eager to browse and purchase? How frequently are purchases made, and are any patterns emerging? A reminder to buy, specials alerts, or an automated purchase renewal option would be appreciated by a customer who buys the same package of baby diapers every two weeks, for instance. Analytics allow retailers the ability to spot these trends and modify their product selections to better serve customers, which in turn improves the commerce, convenience, and personalization of mobile purchasing. Retail industry firms must upgrade their offers to reflect shifting customer paradigms as the value, variety, and velocity of retail data increase daily. Customers may be alternating between the rapidly expanding e-tailing network and conventional brick and mortar establishments, but what keeps them coming back to ground zero is the inherent appeal of offering a personalized experience. The days of long-term company planning, however, are now a thing of the past as times change. It has become imperative to transform or else die since technology has deeply ingrained itself in the industry. Traditional retail establishments have little choice but to embrace change and push through a slew of adjustments to increase, maintain, and draw in new customers. Every company plan must be based on an understanding of the customer, so the industry must scale up data gathering, analytics, and utilization. According to a McKinsey analysis, retailers using big data analytics could see up to a 60% rise in operating profitability. It is incredibly difficult to comprehend and win over customers in the fiercely competitive retail industry. The difficulty doesn't lie in the scarcity of data describing people and their purchasing habits, but rather in its abundance. Understanding and interpreting the data obtained from a multitude of channels in order to make wise business decisions is the largest problem.

How will big data help retailers?

The following are some examples of how big data could benefit retail businesses:

i.   **Making and identifying client profiles:** Retailers now have a better way to recognize customers and present them with the ideal product. Based on consumer transaction history, basket analysis, loyalty programs, and social media engagements, the customer segmentation is now much more accurate and data-driven. By analyzing their purchases, big data management segments buyer data to produce personality points that divide the faceless bulk into slots. To find pertinent information and take appropriate action on it, transaction reports and loyalty programs are sifted through. Retailers can more easily gain a comprehensive understanding of their customers and offer them specialized products based on their past purchasing habits or those of customers who are similar to them.

ii. **Price optimization:** Online retailing is built on dynamic pricing, and the price of a product depends on a variety of factors, including market demand, inventories, rivals' prices, if a specific product is a must-have for the season, etc. Pricing is based in large part on data analytics. Algorithms monitor customer demand, inventory levels, and competition activity. They automatically react in real time to changes in the market, enabling quick action based on new information. When prices should be reduced, it aids in what is known as "markdown optimisation." Most retailers used to simply lower prices towards the conclusion of a buying season for a certain product line, when demand had nearly completely subsided, before the age of analytics. But now, thanks to machine learning, prices are changed in real time, and offers or recommendations are given to a certain group of clients who have already bought the products or have previously expressed interest in them.

iii. **Creating Customer Loyalty:** Today's customers expect to be treated royally. They expect retailers to comprehend their needs, make product and service recommendations that are right for them, and keep them

updated throughout the entire selling cycle—from booking to shipping to product delivery to feedback. Given the variety of customers that shops service, this is not a simple assignment for them. They can develop customized marketing efforts to reach out to a particular segment or recommend the appropriate products to a customer with the use of big data analysis. Understanding the customers' path to purchase or their purchasing behavior also helps you reach out to them at each stage of the sales cycle.

iv.   **Demand Prediction:** Modern retailers have sophisticated tools at their disposal to keep up with market trends. Retailers may now quickly determine whether a specific product is in demand during a specific period of the year, in a specific place, or by a specific group and how to adjust the inventory as a result of the improvement in the efficiency of demand forecasting. Retailers also collect a lot of information from social media to comprehend changing consumer preferences or perform sentiment analysis to determine whether a product is receiving favorable, unfavorable, or neutral reviews from customers.

v.   **Inventory Management:** Trend forecasting algorithms analyze purchasing information to determine what products marketing departments should promote and which ones they shouldn't. When retailers have a thorough understanding of customer purchasing patterns, they can concentrate on markets with high demand. To develop a picture of buying behavior throughout the targeted market, this entails gathering demographic, seasonal, occasions-led, and economic indicators data. This significantly improves inventory management.

vi.   **Identify the opportunities with the highest ROI:** Every customer interaction has the ability to significantly affect current or potential relationships. It can be dangerous to introduce a new concept to the entire sales team because a poor choice could result in both short-term and long-term loss of profit. Leading business organizations have discovered that the use of a test-and-learn approach, which involves trying an idea with some sets of customers and comparing the performance of the 'test' group to the performance of a well-matched 'control' group, is the best way to isolate the cause and effect relationship between any strategic shift and key performance indicators. Retailers utilize predictive risk filters and data-driven intelligence to forecast anticipated responses in marketing initiatives, as assessed by propensity to buy / likely to buy, after having a better grasp of their current and potential consumer base.

vii. **Fraud Detection:** Big Data Analytics can be used to detect fraud by examining data from daily transactions and activities like buying, paying bills, projecting sales, moving warehouses, keeping track of employee shifts, returns, and collecting store-level video and audio.

Components of retail analytics:

A effective retail analytics strategy will address the following six categories, according to a recent research titled "Driving Retail Growth by Leveraging Analytics" by consulting firm Price water house Coopers (PwC) and the Retailers Association of India (RAI):

Predictive modeling is the process of creating an analytical model to forecast future events and enable business users to make timely decisions.

i.   **Big data and hybrid architectures:** Integration of structured and unstructured data across apps, sensors, social media, and other channels. Convergence of structured and unstructured data

ii.   **Cloud analytics:** A highly scalable and convenient method for storing and accessing pertinent data that enables users to access more data more quickly. Using advanced visualizations, firms can increase the business intelligence capabilities available to their leaders and other staff by presenting data in visually appealing ways.

iii. **Self-service analytics:** Allowing people to make choices based on their own queries with no technical expertise, making analytics a more democratic process.

iv.   **Real-time in-memory:** An advancement over the conventional relational database that can assist retail analysts in gaining deeper understanding of the complete retail value chain, including purchasing, supply chain management, sales and marketing, store operations, and customer management.

Retail analytics framework:

Retailers can build their programs using an analytics framework that consists of four areas: merchandising, marketing, supply chain, and store operations.

Above image showing retail analytics framework

Retailers may supply the ideal product in the ideal location at the ideal moment by using merchandising analytics. Planners can match their merchandising choices with customer expectations thanks to merchandising analytics. Variety planning, product adjacency, and space allocation are the three main facets of merchandising analytics. The secret to optimizing assortment lies in analytics. Retailers can determine a few criteria, such brand, package size, or flavor, that are significant to customers for each stock keeping unit (SKU). They can then utilize the sales of current SKUs to estimate future attribute-level demand and go on to forecast demand for any set of attributes, including those that relate to new goods the store is contemplating having in its lineup, using these estimations. According to the report, analytics help merchants find new products that have a good probability of succeeding in the market.

Retailers want marketing analytics for greater customer information, targeted interactions, and superior customer service to stay up with evolving consumer demands and ensure loyalty. In order to improve marketing decisions, marketing analytics swiftly aggregate all pertinent customer data, including that from social media, point of sale (POS) systems, customer relationship management (CRM) systems, loyalty cards, etc. Additionally, it can help to increase marketing effectiveness, omni channel performance, and social media presence.

- ✓ **Supply Chain Analytics:** The effectiveness of logistics to maximize demand fulfillment and prevent any back orders or stock-outs directly affects retail profitability. These include improvements to supplier performance, inventory management, and logistics. Global positioning system (GPS)-based advanced analytics tools can be used to track the location of the fleet, understand driver behavior, spot hazards along the way, and other tasks. This can lower overall costs and improve the safety and effectiveness of logistics.
- ✓ **Store Operations Analytics:** As a way to collect and analyze data for better decision-making and increased transparency, more and more retailers are integrating sensors to people, locations, processes, and products. Applications for predictive analytics process this data, improve the supply chain, and reduce inventory shrinkage. Sensors are being used by retail establishments more frequently to monitor inventory levels and replenish shelves automatically. How customers walk throughout a store can be mapped using location analytics. One can monitor which store aisles see the greatest foot activity overall during various times of the day and week using a combination of IoT (Internet of Things)-enabled product and shelf sensors, cameras, and RFID (Radio Frequency Identification) devices. In the future, retailers can see IoT as a tool that enables them to better serve their customers through innovations like smart price tags that can change prices in real time, virtual-try-on mirrors, and packaging that monitors the freshness of products and notifies customers when their shelf life is about to expire.

Challenges in retail analytics:

Retailers have already begun to integrate data analytics into every aspect of their business, including supply chain management, sales and marketing, store operations, and customer service. To increase their revenues through analytics-based decision-making, they must now create a big data ecosystem that processes multiple terabytes of

new data and petabytes of historical data. Although it may sound really exciting, managing and analyzing big data has its own set of difficulties. To maximize the full potential of big data, several considerations must be made. Big data requires strict privacy, security, intellectual property, and liability policies. To use and functionalize the big data, specially trained professionals must be added to the team because big data encompasses sophisticated analytics. Companies must combine data from various sources, frequently from third parties, and implement an effective data infrastructure to support such an environment. Companies frequently exhibit shortsightedness by failing to put analytics insights into practice. However, this could be resolved by ongoing adjustments to retail strategies, where a specific team is assigned the duty of organizing insights and putting them into action.

Conclusion:

The quality of data available from online purchases, social network conversations, and most recently location-specific smart phone interactions have emerged into a new entity for digital-based transactions, making retailing the platform for more data-driven disruption. Organizations benefit from using big data management when it comes to improved performance, better risk management, and the ability to uncover insights that would otherwise remain hidden. Retailers can gain a lot from a structured analytics-driven approach that will enable them to comprehend how their customers use their products and services, how their operations and supply chain are performing, how to manage their workforce, and how to identify key risks—insights that they can then act upon. The speed and skill with which micro data is gathered gives retailers quick knowledge of consumer trends. Using this real-time analysis, they can change their prices and entice customers by announcing on-the-spot discounts on the sales floor in accordance with their recent and past purchasing habits. This information, which is frequently gathered through in-store interactive mobile devices, gives the retailer an understanding of the needs of the customer and provides information for making wiser decisions about where to place products in the store. It is interesting to reflect on how changes in data analytics have impacted the market over the past ten years given how far data capture and analytics usage has come. This area will develop further as the Internet of Things develops and our world becomes even more interconnected.

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