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Big Data Analytics for Retail Transformation

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Abstract

The retail industry is an ever changing landscape.The retailers who have access to high-quality data, and know how to use it, are the ones that will deliver unprecedented value to their customers. Big data analytics can be used in retail to gain a powerful competitive advantage in this highly competitive environment. Big data analytics in retail enables companies to create customer recommendations based on their purchase history, resulting in personalized shopping experiences. These super-sized data sets also help with forecasting trends and making strategic decisions based on market analysis.With the pace at which technology is advancing these days, it is crucial for retailers to keep up to date in order to ascertain a competitive advantage. One way that they can gain this edge is by adopting big data analytics, seeking proactive methods of harnessing new data sources in innovative ways. This paper explores the different areas where retailers can apply big data analytics to increase customer engagement. It traces the opportunities ushered in by big data in retail and highlights the challenges faced by retailers in its application.

Keywords: Big data, customer engagement, personalized experiences, retail analytics.

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Introduction

The retail industry is witnessing a major transformation through the use of advanced analytics and Big Data technologies. With the growth of ecommerce, online shopping, and high competition for customer loyalty, retailers are utilizing Big Data analytics to stay competitive in the market. The global big data analytics in retail market was estimated at USD 3.45 billion in 2018. This market is expected to reach USD 10.94 billion by the end of 2024, registering a CAGR of 21.20% during the forecast period (2019-2024).

Big Data analytics is being used at every stage of the retail process to understand the customer behavior, predict demand, and optimize pricing. Most of the Big Data applications

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in retail are for system-wide cost reduction, improving online and in-store customer experience, data-driven adaptive supply chains, and real-time analytics and targeting. In terms of application, big data analytics in retail sector is being segregated as merchandising and supply chain analytics, social media analytics, customer analytics and operational intelligence which are being used in small and medium enterprises and large-scale organizations(Research and Markets, May 2019).

Big data describes a large volume of data that is used to reveal patterns, trends, and associations, especially relating to human behavior and interactions. For the retail industry, big data means a greater understanding of consumer shopping habits and how to attract new customers. "Big Data" is industry's hottest buzzword (Waller and Fawcett, 2013). It is looked upon as a solution to many of the new age retail challenges but, there is virtually no uniformity in defining Big Data, identifying its purpose, or establishing its role in retail management. Categorizing, assessing quality, and identifying Big Data's impact are very new to management in general (George *et al.*, 2014).The use of big data analytics is vital for consumer product and retail companies to remain competitive. The use of these tools helps to build business strategies that directly affect the bottom line and can transform the way companies conduct business.

Incredible amounts of data is being generated by various organizations like hospitals, banks, e-commerce, retail and supply chain, etc. by virtue of digital technology. Not only humans but machines also contribute to data in the form of closed circuit television streaming, web site logs, etc. Tons of data is generated every minute by social media and smart phones. The voluminous data generated from the various sources can be processed and analyzed to support decision making (Ram Mohan Rao *et al.,* 2018*).*

Uses of Big Data in Retail Industry

- **Customer Acquisition and Retention:**
  Big data can help retailers understand customer trends in great detail. Behavioral analytics help retailers to predict what the next big trend will be based on these data sets. This helps brands identify new preferences much quicker, helps them to avoid customer churn and ensures that acquisition costs are kept to a minimum. Data sets based on how consumers behave online can help retailers to predict what will be the next must-have items.

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Other predictive datasets include location, which provides an understanding of the demographics of the customers who visit the stores. This allows retailers to adapt to their changing customer base. For instance, there might be a growing number of millennial visiting the stores. Learning this in real-time allows retailers to be proactive. This could be in terms of the in-store experience. It could make sense to open a specific area with products relevant to these demographics.

Understanding the customer insights will allow the business to be able to deliver what the customers want from them. This is the most basic step to attain high customer retention.In an increasingly competitive market, the ability to retain customers and gain their loyalty can determine whether a business succeeds or fails. Companies are turning to big data analytics to retain the valuable customers they already have by avoiding weak points. Companies can analyze customer experience and behavior, taking advantage of key opportunities to improve customer experience, influence buying behavior, and increase customer retention.

- **Retail Predictive Analytics:**

  The Internet of Things (IoT) allows nearly every technological device to be connected and share information. This means that retailers have never had more data to help them target customers and deliver hyper-personalized shopping experiences.

  Retailers can track past purchases, competitor shopping patterns, most visited stores and a variety of other data points to predict when a shopper needs more shampoo or a new toothbrush. The company can then deliver targeting marketing efforts and shopping experiences to create efficiencies not only for the shopper, but for the company.

- **Dynamic Pricing:**

  Dynamic pricing is one of the most cutting-edge uses of machine learning and artificial intelligence in the retail industry. The best price for a product fluctuates based on seasonality, supply, demand, and competitor prices. Machine learning can enable a company to account for these factors and generate the right price and the right time while still allowing retailers to stay on track for sales goals.

  Dynamic pricing is not a quarterly or even monthly practice. Instead, prices can change throughout a single day based on retail trends. Dynamic pricing has always been in practice on some level, but AI and machine learning has made the processes more automated and efficient.

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- **Omni Channel Analytics:**

  This new approach considers the modern shopping journey which has a multitude of touch points from traditional brick-and-mortar stores to Face book Ads. People do not shop exclusively on one platform.Because of this, companies need to adopt a retail analytics strategy that can track success across platforms and throughout the customer journey. Using omnichannel analytics, retailers can adjust the supply chain based on trends to ensure they have enough stock and optimal staffing to account for demand. Retailers can also increase profitability by optimizing merchandizing based on learning across channels.

- **Retail Store Analytics:**

  In-store analytics provide insights into consumer behavior, utilizing everything from carts with location beacons and in-store Wi-Fi networks to video cameras. Retailers can track when the customersentered and left the store; how they moved around inside and key areas they visited. Using these retail store analytics along with basic demographic data, stores can begin to optimize their in-store experience to drive business, adjusting how employees interact with the customers to developing product displays.

- **Predicting Spending**

  One of the most common ways that big data is collected in the retail industry is through loyalty programs. It is also collected through credit card transactions, IP addresses, user log-ins and more. As more information is collected, retail businesses can analyze the ebb and flow of shopping and spending by consumers historically to predict future spending and make personalized recommendations.

- **Customization and personalized promotion:**

  Retail marketing means matching customers to a product like never before. Big data is making this easier than ever before. Predictive analytics can help to find the right customer for the product with incredible accuracy. Data sets that include location can help tounderstand exactly how consumers behave. This helps retailers to create a better understanding of their customers and create better targeting solutions that provide value and personalize communications.

  In-feed targeting can be a hugely effective way to reach the right customer with the right message when the right data sets are used. Data sets that can tell how customers interact with the brand online and offline allow retailers to provide

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highly contextual communications. This level of personalization also helps to optimize media spend and ensure that you are reaching the right consumers with the right message.

- **Risk Management:**

  The unprecedented times and highly risky business environment calls for better risk management processes. Basically, a risk management plan is a critical investment for any business regardless of the sector. Being able to fore see a potential risk and mitigating it before it occurs is critical if the business is to remain profitable. Business consultants will advise that an enterprise risk management encompasses much more than ensuring the business has the right insurance.

  So far, big data analytics has contributed greatly to the development of risk management solutions. The tools available allow the businesses to quantify and model risks that they face every day. Considering the increasing availability and diversity of statistics, big data analytics has a huge potential for enhancing the quality of risk management models. Therefore, a business can be able to achieve smarter risk mitigation strategies and make strategic decisions.A proper big data analytics system helps ensure that areas of weaknesses or potential risks are identified.

- **Innovations and Product Development:**

  Another huge advantage of big data is the ability to help companies innovate and redevelop their products. Basically, the big data has become an avenue for creating additional revenue streams through enabling innovations and product improvement. Organizations begin by correcting as much data as would be technically possible before designing new product lines and re-designing the existing products.

  Every design process has to begin from establishing what exactly fits the customers. There are various channels through which an organization can study customer needs. Then the business can identify the best approach to capitalize on that need based on the big data analytics.

- **Supply Chain Management:**

  Behind the scenes, big data can help to inform the supply chain and optimize production. This means that customers aren't disappointed when a trend takes off and the product is out of stock. Using big data in retail supply chains is instrumental in predicting trends and ensuring that the stock is in the right place.

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When big retail events hit, such as Black Friday, data set such as location insights can be instrumental to monitor areas where there is increased demand to allow retailers to react to changing demand and trends.

Big data offers supplier networks with greater accuracy, clarity and insights. Through the application of big data analytics, suppliers achieve contextual intelligence across the supply chains. They are able to escape the constraints faced earlier.

This was through the use of the traditional enterprise management systems and the supply chain management systems. These legacy applications didn't leverage big data analytics, and therefore suppliers incurred huge losses and were prone to making errors. However, through modern approaches built on big data, the suppliers can be able to leverage on higher levels of contextual intelligence which is necessary for supply chain success.

Modern supply chain systems based on big data enable more complex supplier networks. These are built on knowledge sharing and high-level collaboration to achieve contextual intelligence. It is also essential to note that supply chain executives consider the big data analytics as a disruptive technology. This is based on the thinking that it will set a foundation for change management in the organizations.

- **Planning store layout:**

  Big data provides retailers with high-level insights around how consumers move in their retail stores. These datasets allow brands to analyze store behavior and measure the impact of marketing spends in store.

  Big data in retail stores also provides a competitive advantage in cross-selling and it can significantly boost the power of in-store promotion. It is a powerful method of understanding how to layout the physical shopping experiences to maximize engagement and ensure that consumers are provided with optimal shopping experiences.

- **E-commerce optimization:**

  E-commerce is a huge part of the modern retailer's store. It's vital that brands can leverage retail data analytics to help make the experience seamless. Customers want an online shopping experience that follows on naturally from their store visits. They want the two to work together without any issue. Services like click and collect as well as abandoned baskets messages are seen as a something consumers expect from top brands.

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Big data can help to fill in the gaps that allow retailers to link the e-commerce world to the physical retail store and provide a seamless shopping experience for consumers. Linking e-commerce to the physical store and ensuring that consumers can find solutions easily is a major benefit of big data in retail.

Before the advent of e-commerce, the retail industry used to thrive on effective salesmanship coupled with great product displays to get the job done. But now things have changed beyond words. Today every industry is devising ways to make better profit armed with technology, and Big Data Analytics is the latest and hottest in this regard.

Big Data is crucial for retail businesses to grow and evolve as per evolving market trends. Retailers must have a fundamental understanding of what is Big Data and should know the contributions it has had on the retail sector.Starting with the choice of payment of each customer and all the products liked by a customer, to the gradual changes in buying patterns over time, each and every detail is accounted by Retail Analytics projectsthat companies undertake today.However, in spite of tremendous scope for retailers to use data analytics for fetching useful market insights in return, there are several challenges as well.

Obstacles faced by retailers in applying data analytics

- **Guaranteeing the accuracy of the collected data:**

  In most of the Retail Analyticsprojects, one can find a considerable percentage of noise that is nothing but unrelated data, apart from loads of crucial data.So, the most obvious question that arises under such circumstances is ‘which data is to be targeted’. A single customer might use multiple modes of payment, so it becomes difficult to identify each of the modes. And, if the customer uses the card information of their relatives to buy products, then that information will also be taken into consideration.The impact of Big Data on Retailcompanies cannot be ignored but the situation becomes extremely complicated due to the presence of inconsistent user data.

- **Sourcing and collecting the data:**

  Today mid-sized retailers are utilizing separate software for every specific aspect of their business, be it taking care of inventory or storing data related to

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transactions.Then it is difficult for Big Data analytics in accumulating all these data from varied software applications and collate them for the sake of analysis.

- **Ensuring unbreakable data security:**

  Any retailer who uses Big Data technology must be well aware of GDPR or General Data Protection Regulationthat is going to be put into effect in the near future. But when it comes to protecting data privacy, the challenge is still expected to lurk around despite these security protocols.Breach of data privacy is a common phenomenon sadly, and without solving it, no retailer would be able to score high points even after incorporating big data services in their business.

- **Drawing the insights requires time:**

  It is true that Online Retail Big data solutions are helpful in gaining insights into user buying and behavioral patterns.But today, trends and patterns are most short-lived in the retail industry. So by the time the retailer manages to make out the buying patterns of users, the trends are usually on their way to phase out. This is because a lot of processes are followed in analyzing user trends and then acting on them takes more time.

- **Making the customer trust the retailers with their data:**

  News reports are common where we read about customers agitating against retail giants for using their data without consent. So, it is extremely crucial to not just protect user data but build a trustworthy rapport with them by assuring that their data is safe with the retailers.

  But in spite of a few challenges in using Big Data Analytics, upon looking at the bigger picture, it is hard to brush off the infinite scope and Importance of Big Data in Retail.

Conclusion

As in any other field, big data analytics in retail presents both challenges and opportunities. It offers substantial opportunities to retailers, allowing them to gain a competitive advantage over other organizations in the sector. Retailers have always had ideas about consumer behaviors and patterns, but the introduction of Big Data signifies the shift from predictive to

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explanatory analytics - specifically identifying things that are having an impact. This is done by incorporating as many technologies as possible to collect data. Applying predictive data analytics in real time, retailers can gather valuable insights from their diverse data and win customers in an extremely competitive marketplace. The wealth of data can be used to optimize processes, from warehouse management and staffing, to store traffic and ecommerce sites; increase sales, save costs through supply chain efficiencies and launch new services, as well as constructing detailed customer profiles.

Potentially the most prominent reason that retailers have to advance their data usage for better targeting of customers, improving their brand image, marketing efforts and increasing operational efficiencies is the pressure felt from competitors. For every problem or hurdle stated above, the solution lies in careful, thoughtful big data implementation using mature tools, guided by the right mix of developers and data scientists. The fear of being left behind drives retail companies to adopt Big Data Analytics and this is really the next big technological bandwagon.

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