Research Article

Data Analytics in Retail Industry

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A B S T R A C T

Data Analytics in Retail industry or in short, Retail Analytics is the process of gathering data from various sources and using it for the making educated decisions. These decisions could be anything that supports the retail business operations, such as market analysis, customer spending, promotions, service and product procurement planning, etc. There are several sources from where the data can be gathered and it is up to the business to mine the relevant information and categorize it use it to optimize and grow the business. Using the information gathered, these retail companies can make smart decisions that could very well shape the future of the organization. This could effectively eliminate the guess work and the errors as it the proposals and the investment decisions would be backed up by relevant proof.

This document throws light on some of the different steps and layers involving data analytics that are applicable to retail industries from the source to the final cleansed data and the various application in retail domain. The document also highlights some of the key benefits and challenges associated with this process and the potential future of the retail analytics.

Keywords: Oracle in Retal, Data Analytics, Data Cleansing, Retail Data, Data sorting, Information categorization, Data Compartmentalization, Data Organization, Processing Raw and Unstructured Data, Data Mining.

1. Introduction

Retail Industry, in simple terms, is the mode of business which procures products in bulk from a wholesale vendor or directly from a producer and sells it to end consumer. This is also referred to B-to-C or Business-to-Consumer type of business. In the past two decades, the retail industry has transformed phenomenally, both in terms of how the customer s shop and the way the retail companies do their business. Unfortunately, there are several large retail chains have failed read the market and adopt leading to loss of market share, at times complete shutdown and the ones still standing are those who have made smart and data driven decisions and moved in the right direction. Data Analytics is the process that helps provide this insight. As a matter of fact, data analytics needs to work the hardest in retail industry, because, unlike other industries, these companies deal directly with the end users who could be in millions and each customer is unique and are potential input provider and this can come in any form, such as verbal feedback, survey forms, online reviews, social media influencing and comments and the choice are endless. While it is true that this feedback is needed even by the product and wholesale companies, it has a direct and immediate impact on retail industries. Also, online shopping taking retail by storm, it has forced them to think of ways to attract customer well beyond the conversional ways, such as visuals that they see online, the delivery time, cost benefit and of course the quality. The ability of the retail company to dissect this information and properly channel it can assist in some of the major decision such as the market demand, the inventory they need to hold, the promotions that they can offer. More macro level pointers such as political conditions, weather and the awareness of the consumer can help the retailer plan and predict the market swings.

2. Need for Retail Analytics

The new retail age is both glorious and a challenging one. While it has opened doors for anyone with an appetite and talent

to start their own retail business, it has increased the competition and the customer's demand for personalized and cost-effective products. These retailer, big and small, need to leverage the data analytics in some way to tune their business such that they stand apart from other to their customers. Additionally, it is important that the internal operating practices be reviewed to find what works and what does not and make timely and necessary changes to plug the gaps, which otherwise might lead to wastage or time, money and resources.

Today's market can be very unforgiving. Customers no longer want to compromise on the products they buy and are ready to scorch through the internet to get what they want. With the modern search tools such as visual search and AI it is not that hard to find them. Also, with globalizations and open market practices, the customer demands have widened and enabled them to buy from any part of the world within the legal limits. These changes have forced the retail industries to rethink their business strategy and the operating models. With the facilities today, anyone with an idea and the business acumen can start a business. Unlike the large retailers, they do not need large warehouses or a fancy outlet to do their business and with online shopping abilities they can pretty much reach anyone who is looking. Though, these cottage industry retailers might not be a serious threat for large retailers today, they can surely take away few targeted customers within the locality and circle of influence and in due course of time corrode their profit. To keep up with the growing trends in the market the retailers need to rely on the findings from data analytics to guide and decide their direction in several areas both internal and external.

Unlike peer-to-peer marketing, retailers need to have warehouses to stock-up their inventories and outlets. Though online shopping has increased exponentially, still majority of the of the shopping is done in-store and people still would like to touch and feel the products before buying them. However, nowadays, the retailers cannot expect their customers to wait or return back if the desired product is not in stock, they decide to move on. On the other hand, the outlets need to display such that it helps the user to shop with ease and entice them to buy more by strategically placing related products within the close proximity so that the end customer by see a wider picture. For instance, in a clothing retail, placing winter jackets and beanies next to each other would attract the customer to buy them both rather than two ends of the store, in which case the user might just buy one or be frustrated with not finding the right pair and leave without buying.

With the help of data analytics, these retailers can gather, process and identify patterns to optimize their inventories and outlets. Information such as the shelf time, search frequency, the customer demographics and special events and weather conditions can be collected and mapped with sales patters to decide when to stock up and when not. Having incorrect or insufficient information in this regard can lead to serious consequences, such as running out of stock leading to missing revenue or procuring the products at a premium price from suppliers or over stocking, forcing the retailer to offer unfavorable discounts or even total wastage. Also, by analyzing the buying patterns, the retails can identify the products that are usually bought together or looked for and smartly arrange them alongside each other aiding the customers to buy them easily. Also, these patterns can be used to optimize allocation and redistribute the products to different geographical locations based on special events and local holidays

to meet the customer demand or to explore new market based on developments and migration.

These are only a fraction of what data analytics can do to retail industry, such as sales analysis, employee reskilling, production planning and optimization etc. Depending on the need and the focus area, data analytics can be a great partner in restructuring the retail industry in every operating domain.

3. Type of Data Analytics in Retail

The Descriptive Analytics is the type which breaks down the entire process into smaller chunks, categorizes it and lay it down for further analysis. This type acts as the base for further analysis, by providing detailed metrics in every dimension such as volume, time, revenue, location, customer response, surrounding conditions, etc. This forms the core of the retail analytics since all other analytics are based on the outcome of this type. Hence extreme caution needs to be taken in design these analytics to ensure all the relevant data and numbers are captured to the smallest level possible.

Performance Analytics is the type in which the system continuously tracks the flow to provide insight on the effectiveness. This can either be real-time or batch analysis. This type of analytics usually has pre-set target and conditions along with periodic milestones and checkpoints. Any deviations to these metrics will be analyzed to identify the factors influencing these changes and the impact. Additionally, the rate of change and deviation and the impact of this is analyzed and identified. This impact could be positive or negative. If positive, the case is closely monitored and will be extrapolated to a wider range and if not, counter measures are suggested to bring it back to track.

The Diagnostic Analytics is the type where the data is analyzed after an event has occurred to identify the factors that made it happen. It is more like a post-mortem of an event or series of event to find what worked and what did not. Similar to performance analytics, there is a pre-set target based on which these analytics is done. In this type, the information is gathered form every source and for every factor surrounding the event, it tries to identify the root cause or the combination of actions that led to the outcome. While these analytics are predominantly used in negative situations, it is fully relevant in positive conditions too, where the outcome would have exceeded the client's expectations. A detail analysis of these strand of flow can show what point the curve took a sharp turn and if this can be sustained or manufactured for the benefit of the retailer.

The next type is the Predictive Analytics. As the name indicates, this analytics is used to forecast the future events. It is based on the mantra "History repeats itself" with the idea that given the same situation and influencing factors, the chances are that the outcome will be the same. This type uses historical data and the factors preceding it and succeeding to identify what might be the next big thing that the business that the business can expect. It reads the current events in silos and in connection with the other factors and scan for similar situations recorded and the maps the outcome. These analytics can either be external such as market predictions, the next global trend, etc. or internal such as efficiency, financial solvency, employee and customer reactions and response and the subsequent domino effect that it might cause. Typically, the predictive analysis provides multiple possible outcomes in the given situation, which the management can weigh in to identify the best net advantage for the company.

Finally, the Prescriptive Analytics, where the suggestions are made to the company on what the next steps should be based on where the retailer is, what the target and the market climate. This analytics uses the knowledge gained by reading the market on various scenarios and its outcomes, wither within the company or market as a whole and makes suggestions on what would be the best course of action. For relevant prescription, the system to have a complete and accurate knowledge of the company it suggests for, such as their financial status, the long term and short-term vision, business model and culture, operating model in terms of both strength and limitations. and the external knowledge such as the market conditions, political situations, customers spend capacity, their preference, etc. It is important to note that the same situation does not guarantee the same outcome for two different organizations.

4. Best Practices in Retail Analytics

There are several ways to define and implement retail analytics to assist the retail organization in making educated data driven decisions. There is no one right way to go about it as every organization is different in every way imaginable. However, there are certain fundamentals that needs to be kept in mind while designing the solution as these are key for successful analysis and accurate outputs.

The Data Analytics system should be able to gather data from multiple sources, formats, domains and anything else that is deemed relevant. As mentioned above, effective descriptive analytics forms the base for all other analytics and this can only have a large diverse set of data in the central pool that the system can read, decode, categorize and store. The system should not only rely on a templated data source but be able to read through various sources and formats. With the new generation, there is a whole new language used for conversation, such as emojis, memes, etc., this layer should be able to scan and understand the emotions and feedback provided. Also, with every age group there is a different slang and way of shortening or use of phrase to express themselves. There needs to be a constant growing repository of such jargons with relevant indicators to understand what is being actually said. For instance, "Right" and "Yeah! Right!" mean tow completely different things. While the former is the sign of acceptance, the later is a sarcastic tone for disapproval. These understanding is a rightly capturing what the customer says about the product.

The next point is that there needs to be a clear set of goals. The organization as a whole, can have a large long-term and short-term goal, but for the retail analytics to be effective, there needs to a concise and acute sent of goals and measurements that the system needs to work towards. Having a generic goal, such as maximize profit or optimize inventory, can be too vague to the data analytics tools to provide any accurate result. This might spit out too many solutions or open-ended prescriptions, which might be too complex to understand and implement. While the data collection should look for any and all data available, there need to be clear and concise target and controlled feed of relevant information into the systems to get clear view of the data transformation in each stage. Flooding the system with all information available, might slow down the analytic process and in worst case generate undesired result. Even the relevant data needs to be properly layers and prioritized based on the company need identify the best possible path with most benefit.

The Key Performance Indicators (KPI) needs to be constantly monitored to track the progress made. These are the various focus points identified by the organization or by the market which shows if the retailer is performing good or bad. For instance, a retailer can have the KPIs as the weekly sales, online traffic, inventory movement, revenue, operating cost, etc. The upward or downward movement of these indicators would mean if whatever the organization is doing works for or against the end goal. While adopting the suggestions made by the retail analytics systems, these KPIs needs to be periodically monitored to see if the desired results are achieved. If not the prediction and prescriptive algorithms needs to be revisited and tuned to factor in the new conditions.

The other key practice is to constantly learn and evolve. Any organization, retail or not, which has failed to adopt to the changing market has failed miserably and there are some really big brands that can be shown as an example. There should be a constant experimentation with trying various permutations and combinations and sampled at the right time to see how the market reacts and perfect it. All algorithms, assumptions and categorizations need to be reviewed and refined to best suit the current market. Though it is recommended to have a concise target set for retail analytics to work efficiently, there should also be effort made to wire the various findings to observe the movements in various functional domain.

5. Conclusion

The need to collect data and use them for one own benefit has been growing at an exponential rate. It has crossed the lines of organizational scope and has expanded to analyze global and political trends to plan one's business. With the growth of AI and ML, data analytics has seen capabilities that was never possible before. Yet, with the constant shift in the way the information is produced, such as new jargons, vernaculars or slangs, the algorithms, tools and the methods need to continuously adopt with the new trends.

Though the way retailing operates has changed, domain by itself cannot go out of relevance. Also, with online shopping revolutionizing the retail industry, by leveling the playing field in terms of customer reachability, has forced every retail company who wants to sustain in the market long term to use every means necessary to benefit their business and data analytics can be a great ally in decoding public's thoughts into the next big thing, benefitting themselves, the investors and their customers.

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