Evaluating Significant Impact of Big Data Analytics in Retail Sector

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Abstract – Big data has found its application and use in every sector which requires mining of enormous data to extract fruitful information and results. The retail sector too is not an exception anymore. The big giants like Walmart, Amazon, Coca-Cola, and Netflix made use of big data analytics to boost their revenue growth. The biggest asset of retail companies is data gathered by them referring to customer's behavior, buying patterns, likes, and dislikes. For handling such a huge database of millions of customers, companies make use of powerful framework like Apache Hadoop. Apache Hadoop is one such framework which is capable of handling huge databases via its several components. It makes use of Map Reduce technology. The research paper is intended to discuss different parameters which the retail companies need to focus on to know their customers better. The paper discusses the concepts and strategies which would be preferably followed and should be known to the retailers to target their customers like when and where to approach them.

Keywords – Analytics, big data, customers, Hadoop,retailers.

1. INTRODUCTION

The data which is huge in size, gets generates at very high speed and is of different variety and poses a challenge for conventional database technologies in handling it, can be termed as big data. As like many public and private sectors using big data analytics, the retail sector is no more anexclusion. The most important asset for any commercial retail industry or organization is its customers and data relevant to them. In today's world where every person is busy and has no time for unwanted and unnecessary calls, messages, and surveys, it becomes more important for the company to get insight about the interest of the customer and approach him/her with only those offers in which he/she might be interested [1, 3]. The company should be crystal clear about customers like and dislikes. As it is important to know about customers likes, it is equally important to have knowledge about his dislikes. As per study conducted recently, 54% of customers thinks of terminating their relationship with their retailer if retailer fails to provide personalized content, deals, and offers. So, in order to connect with target audience, the retailer needs big data having relevance with personalized needs of the customer [2].

Gone are the days when one size fits all mentality. Big data enables retailers to understand the prospects on a deeper level using metrics like devices preferences, browsing behaviors, and geographical demographics. Along with digital-only retailers, the big data finds its use in-store analytics too. The study conducted by Cisco discovered that $61 billion business in confined to in-store operations [4].

The notable benefits concerned with big data in retail are mentioned as under [6].

- Demand: By having proper insight of customer habits and preferences, retailers can come know which services and products are in high demand and which ones are not? The products and services

not in demand should be potentially stopped offering. Such analysis helping in saving money and provide customers with what they exactly want.

- Prediction: Companies and organizations can make key market predictions and forecast customer trends based on algorithms concerned with big data. Data alerts, demand fluctuation in real time, and retailers monitor assist developing products that may provide best return on investments.
- Pricing: On analyzing real time customer transactions, retailers can know about the prices that yielded maximum profits on particular products. Big data analytics find its application in markdown optimization too. Markdown optimization is concerned with knowing when to lower the price of particular items. Retailer giants like Walmart has reaped the reward of real-time merchandising and is busy in constructing the world's biggest private cloud to get even deeper into the practice of gaining insight of customers behavior.
- Cross-channel: As mobile technology and social media become all the more sophisticated, consumer craves a retail experience that offers value across a host of mediums and devices. Retail big data gives brands the power to harness insights extracted from these various devices and mediums to create campaigns, initiatives and offers that create a buying journey that works seamlessly both in a digital and physical sense [5].

Fig. 1 depicts the sales dashboard which has been smartly divided into sub-sections showing monitored total orders, perfect order rate graphically, pie-chart detailing the reasons behind return, and the products which were most popular among the masses.

Fig. 1 The figure shows the dashboard concerned with sales details

By utilizing big data analytics to one's advantage, the retailers will be able to understand the desires and needs of the targeted audience, make smart decisions, predict future market trends, and come up with valuable cross-channel shopping experience.

2. BIG DATA USE CASES IN RETAIL INDUSTRY

The below mentioned five use cases highlights the use of big data analytics in the retail industry [7].

- To perform customer behavior analytic

Data driven customer insights required in order to handle the challenges like personalizing campaigns in order to boost revenue growth, to improve customer conversion rates, and minimizing customer acquisition costs. Today there are multiple modes of interactions between companies and customers like social media, stores, mobile, and e-commerce sites. On aggregating and analyzing the data, it comes up with interesting results like identifying high-value customers, motivating aspects to buy more, appropriate time to reach them.

- Personalizing the in-store experience

With the growth of online sales, a new trend emerged where customers performed physical research on products at stores and later on purchased the product online.A data engineering platform can help retailers make sense of their data to optimize merchandising tactics, personalize the in-store experience with loyalty apps and drive timely offers to incent consumers to complete purchases with the end goal being to increase sales across all channels. The insight is provided by web portals, mobile applications, PoS systems, supply chain systems, in-store sensors, and may more. The omni-channel retailers can utilize customer's purchase and browsing history to identify interests and personalize in-store services as per customer preferences.

- To upsurge conversion rates through predictive analytics and targeted promotions

There is a need for 360 degree view of customer's preferences which should be highly accurate. Today customer interaction is much more than customer transaction and all this occurs through multiple channels and social media. This is because of these trends that the retailers are dedicated to convert customer's data into wealth of deeper customer insight and information. Performing correlations often reveal hidden patterns. For instance, suppose many customers of any retailer likes to watch Food channel on television and because of this they frequently shopped at Whole food store. The retailer on the basis of these insights project advertisements.

- To analyze customer journey

Modern customers are much more connected and permitted than ever before. There are multiple sources like social media, mobile, and e-commerce via which customer can access any information within no time. The customer decides what to buy, from where to buy and at what price. On the basis of information gathered by the customer, he/she decides when and where to buy from. With the use of big data technologies, the data (structured, semi-structured, and unstructured) can be brought together into Hadoop and analyzed to reveal hidden patterns. The retailers get useful information like who are their high-value customers and what's the appropriate time to reach them.
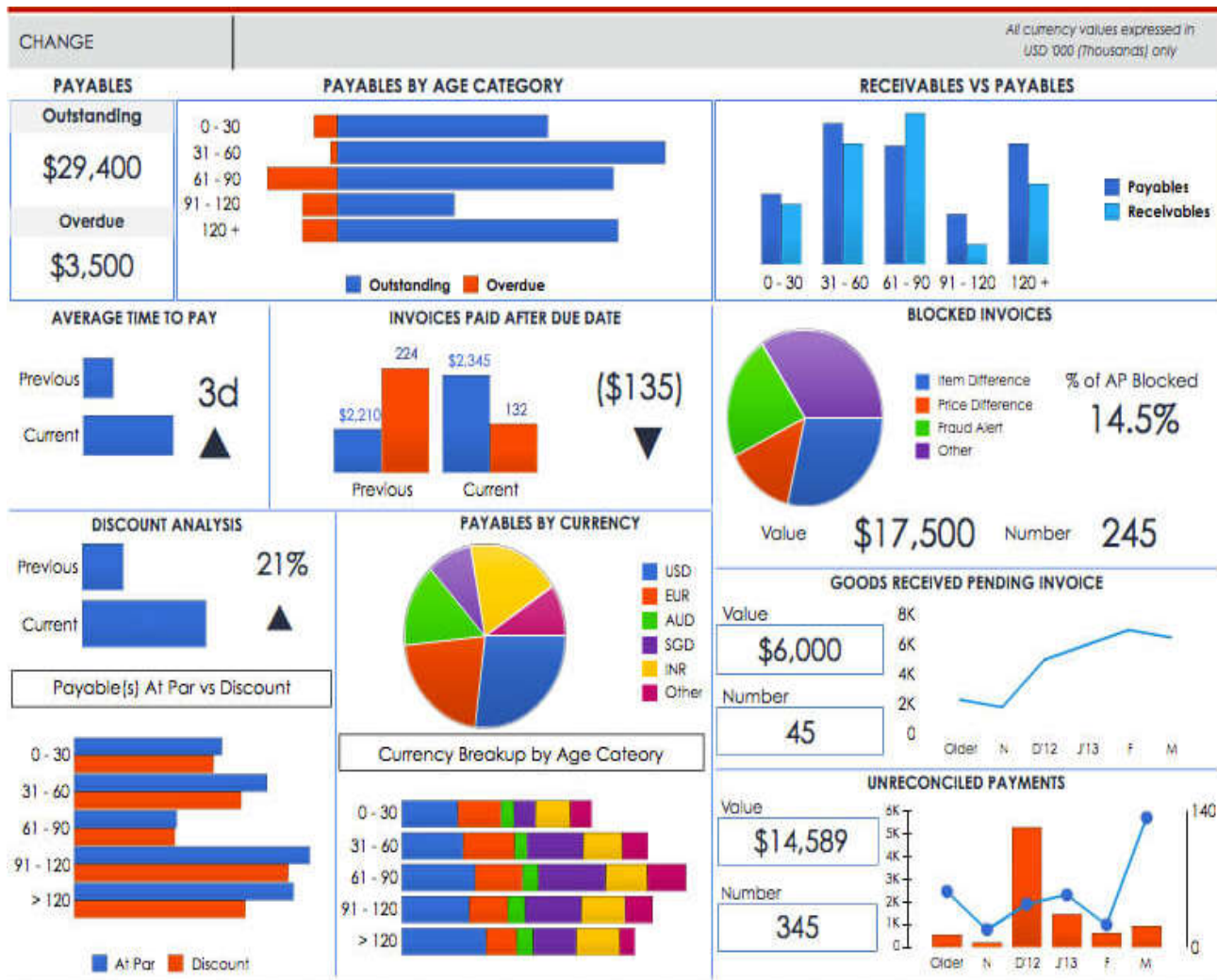
Fig. 2 The figure shows retail store dashboard showing useful information extracted from data

3. COMPANIES THAT BROUGHT REVOLUTION VIA BIG DATA IN RETAIL SECTOR

When it comes to Big Data, it's not how much you have — it's what you do with it that counts. Below mentioned are examples of retailers of made most of it in appreciable manner [8, 13].

- Costco prefers customer faithfulness above all

As like other retailers, Costco also track what their customers buy and when. Once a California based fruit company warned Costco of listeria contamination in its stone fruits like plums, peaches, and nectarines. Costco as a reaction to this warning, notified its customers both by phone and letter. Costco has adopted data mining much before the realm of big data to provide customers with effective service [13].

- Target approach pregnant mothers even before baby is born

It is well know that once a woman gives birth to a baby, the baby's birth becomes public record. But Target is smart enough to approach pregnant mothers before baby birth. Target was able to identify that women buying large quantities of unscented lotion, cotton balls, supplements and washcloths might mean that she's anywhere from a few weeks pregnant, to very close to her due date. And if they can get her shopping at Target before the baby is born, chances are, they'll hook her for life.

- The Weather Channel brilliant strategy

The Weather Channel purpose is not just forecasting weather, but actually it goes much deep than expected. The Weather Channel predicts viewer's emotion based on weather conditions. One such example was the partnership between Pantene, Walgreens and the Weather Channel. Using data collected by the Weather Channel, Pantene and Walgreens were able to anticipate when humidity in the air would be at its highest, prompting women to seek out a product at their local drugstore to prevent frizz and flyaway hair. This was branded as a "haircast" and lead to a 10% increase in sales of Pantene at Walgreens for the months of July and August, along with a 4% sales lift across the entire hair care category at Walgreens [13].

- A Red Roof accommodation

U.S. economy chain Red Roof Inn opened large number of hotels close to major airports where the chances of flight cancellations are maximum due to bad weather conditions. By correlating big data and flight cancellations and browsing on mobile devices, Red Roof Inn's marketing team did a promotional campaign targeting those areas most likely to be hit by flight cancellations due to inclement weather. This ended up generating a 10% increase in business in those areas [13].

4. TECHNOLOGY ASPECT OF BIG DATA

Hadoop is a java based framework that is efficient for processing large data sets in a distributed computing environment. Hadoop is sponsored by Apache Software Foundation. Applications are made run on systems with thousands of nodes making use of thousands of terabytes via Hadoop. Distributed file system in Hadoop facilitates fast data transfer among nodes and allows continuous operations of the system even if node failure occurs. This concept lowers the risk of disastrous system failure even if multiple nodes become inoperative. The inspiration behind working of Hadoop is Google's Map reduce which is a software framework in which application under consideration is broken down into number of small parts [9, 10].

Hadoop is a framework which comprised of six components [11, 12]. Every component is assigned a particular job to be performed.

- HDFS – HDFS are distributed cages where all animals live i.e. where data resides in a distributed format.
- Apache HBase – It is a smart and large database.
- Zookeeper- Zookeeper is the person responsible for managing animals play.
- Pig – Pig allows to play with data from HDFS cages.
- Hive- Hive allows data analysts play with HDFS and makes use of SQL.

- HCatalog helps to upload the database file and automatically create table for the user.

5. CONCLUSION

The research paper introduced a vision of analytics as a new guiding principle for operating in today's tumultuous retail environment. The paper discussed the power of becoming a data driven decision-making culture, and shown how access to accurate, scalable, and actionable data can help retailers set a roadmap to success through a better understanding of their customers and of their store operations. The paper also covered how data can reveal exposures as well as opportunities for the retailer. Knowing who is not purchasing and why can be as important as understanding those who do purchase. The right insights enable a closer, stronger relationship with consumers.

REFERENCES

1. Gagandeep Jagdev et al., "A Comparative study of Conventional Data Mining Algorithms against Map-Reduce Algorithm", in International Journal of Advance Research in Science and Engineering (IJARSE), ISSN (O) – 2319-8354, ISSN (P) – 2319-8346,Volume – 06, Issue – 05, May 2017.

2. N. Marz and J. Warren. Big Data: Principles and best practices of scalable real time data systems. Manning Publications, 2013.

3. Gagandeep Jagdev et al., "Analyzing Maneuver of Hadoop Framework and MapR Algorithm Proficient in supervising Big Data", in International Journal of Advanced Technology in Engineering and Science (IJATES), ISSN – 2348-7550,Volume – 05, Issue – 05, May 2017.

4. R. Smolan and J. Erwitt. The Human Face of Big Data. Sterling Publishing Company Incorporated, 2012.

5. Jagdev, G. (2018). Augmenting Revenue Growth in Retail Segment via Data Mining. International Journal of Research Studies in Computer Science and Engineering (IJRSCSE), 5(3), pp.1-8. http://dx.doi.org/10.20431/ 2349-4859.0503001.

6. Katal, A., Wazid, M., &Goudar, R. H. (2013). Big Data: Issues, Challenges, Tools and Good Practices. IEEE, 404-409.

7. Dr. Gagandeep Jagdev et.al (2017). "Big Data in Retail Sector – An Evolution that Turned to a Revolution", International Journal of Research Studies in Computer Science and Engineering (IJRSCSE), ISSN: 2349-4840 (P), ISSN: 2349-4859(O), Volume 4, Issue 4, pp.43-52, DOI: http://dx.doi.org/10.20431/2349-4859.0404006.

8. Kaisler, S., Armour, F., Espinosa, J. A., & Money, W. (2013). Big Data: Issues and Challenges Moving Forward, International Conference on System Sciences (pp. 995-1004). Hawaii:IEEE Computer Soceity.

9. Dr. Gagandeep Jagdev et al., "A Study of Clustering and Classification Techniques involved in Data Mining", in International Journal of Advanced Technology in Engineering and Science (IJATES), ISSN – 2348-7550,Volume – 05, Issue – 05, May 2017.

10. Undefined by Data: A Survey of Big Data Definitions, by Jonathan Stuart Ward and Adam Barker, School of Computer Science, University of St. Andrews, UK, 2013. Available at: http://arxiv.org/pdf/1309.5821v1.pdf.

11. Gagandeep Jagdev et al., "Association of Big Data with Map-Reduce Technology Augments for Economic Growth in Retail", in International Journal of Engineering Technology Science and Research (IJETSR), ISSN: 2394 - 3386, Volume 4, Issue 2, February 2017.

12. http://mike2.openmethodology.org/; Last Accessed: 20th November 2018.

13. https://neilpatel.com/blog/retailers-are-using-big-data/; Last Accessed: 20th November 2018