

INTEGRATING CUSTOMER RELATIONSHIP MANAGEMENT WITH BIG DATA ANALYTICS IN RETAIL STORES: A CASE OF HYPER-STAR AND METRO

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ABSTRACT

Today, the world experiences an era of advanced technology, but organizations in Pakistan are still struggling with massive bundles of records especially in the retail sector, which is one of the largest industries in Pakistan, with respect to customers. It is a need of time to integrate Customer Relationship Management (CRM) and the Big Data System to solve the problems faced by retail stores and other organizations. This study investigates the prevalence of Big Data Analytics in retail stores of Pakistan, and analyzes the benefits of integrating CRM and Big Data. This study has used both the primary and the secondary sources for data collection. For primary source, a questionnaire was developed and a sample of forty-eight middle-level employees of Hyperstar and Metro was selected. Secondary sources have been used to explain the method through which the integration can take place between CRM and Big Data. This study found that the integration of Big Data and CRM in retail stores have manifold benefits, it can help handle data efficiently, increases sales, diversify business and creates better marketing impact.

Keywords: Customer Relationship Management, Big Data Analytics, Retail Stores

INTRODUCTION

In the current market-oriented era customers are considered as kings and organizations are always trying to find out the ways by which they can retain and attract more customers. In this connection, the software companies are also trying to find new and advanced solutions to meet the expectations of their customers i.e. services sector, operations

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management, and supply chain management (Shaw, Subramaniam, Tan, & Welge, 2001). Most recently, their organization have introduced the concept of CRM which is referred to the practices and the technologies used by the organizations to manage, record and access the interactions of the customers with the organizations (Rai, Patnayakuni, & Seth, 2006). The data is increasing with technological speed and thus has created the concept of 'Big Data', which is used to extract value from vast bundles of data and capture velocity, discovery, and analysis (Shaw et al., 2001).

Metro, the one of the largest retail supermarkets in Pakistan, was founded in 2005. They were the first ones to introduce the concept of self-service retailing in Pakistan. They have strong cultural values through which they have become a part of the lives of their customers and have won their hearts. On the other hand, Hyperstar, a megastore that has been operating in Pakistan and serving customers since 2009. Over the years they have significantly expanded their business and now operate in diverse segments. They have committed to provide the best services to people and also have pledged to look after their unsaid needs too. So, both of these super markets focus primarily on maintaining good relations with the customers and the market community to deal with a pool of customers. This study attempts to analyze the benefits of CRM, and Big Data integration, brought to these retail supermarkets.

Organizations are struggling hard to keep up with the enormous bundles of records they gather on daily basis. Though they have CRM facility in their processes, the need of time is to introduce such a system in which management, especially retail supermarkets management, can extract the exact information they want from the large set of data. It is also a fact that CRM cannot administer large data instead, it can provide one to one solutions to customers in solving their product or service related issues (Papathanassiou, Arkoumani, & Kardaras, 2003). Previous research studies suggest that the survival of the organizations in this competitive world has become more challenging. Hence, the need to perform big data analytics in organizations has become vital. To dig in-depth information on big data analytics, this study set the following core objectives:

- To examine the prevalence of CRM in Pakistan's retail stores especially Hyperstar and Metro
- To evaluate the need for integrating CRM with Big Data in

Hyperstar and Metro supermarkets.

- To analyze the ways by which CRM can be integrated with Big Data in retail stores.

The current study mainly examines the effects of integration of Big Data analytics on CRM in the retail supermarkets. It will help in getting a comprehensive overview of the buying patterns of customers shopping habits. Moreover, it will bring value to the retail stores and will help them in predicting the patterns and decisions of the customers and thus maximize their profits. Retail supermarkets are an ever-growing business, and so are its customers, so there is a great need to handle and organize the whole bundle of data so that the retail stores can extract the exact information in the least time to cater the customers and business needs.

LITERATURE REVIEW

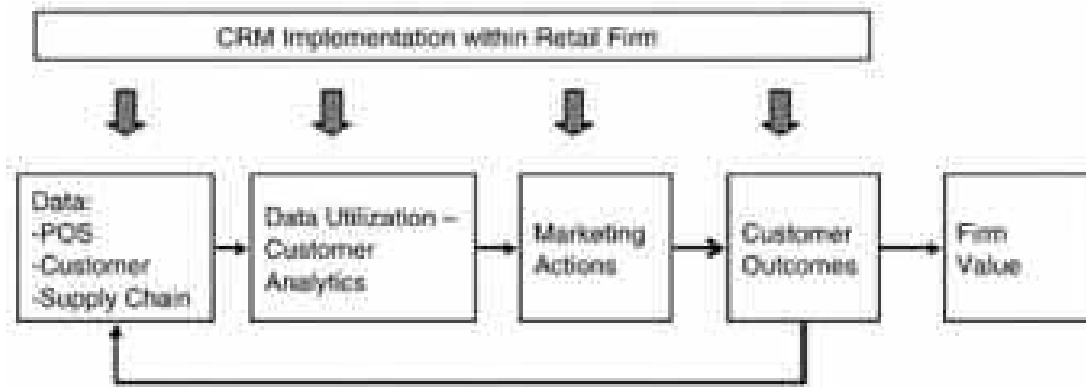
Customer Relationship Management (CRM)

The key purpose of CRM is to know how efficiently organizations administer the information which is directly associated with the customers. CRM system includes the name, phone number, address and date of birth of the customers (Kumar, 2010). Kumar explains that there are various methods through which the data is collected, and stored. Further, the information is stored in a database which is backed up by network technology. The data collected through various means, help organizations in managing reports, solving problems and in knowing the patterns of customer behavior (Anton, 1996).

The past researchers in favor of CRM have deduced that after the implementation of CRM in the processes of the organizations, the customer satisfaction can be increased (Anton, 1996). Through CRM, the organizations can customize the products and services according to the requirement of the customers individually (Verhoef, 2003). Verhoef asserts that all information regarding customers is saved in the network's databases. The organizations use that information to access the hidden buying pattern, and through that, they customize the product or services according to the separate needs of every individual. Buttle (2009), emphasizes that the customers' loyalty increase when they get desired products or services.

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Fig 1. CRM Implementation within a Retail Firm



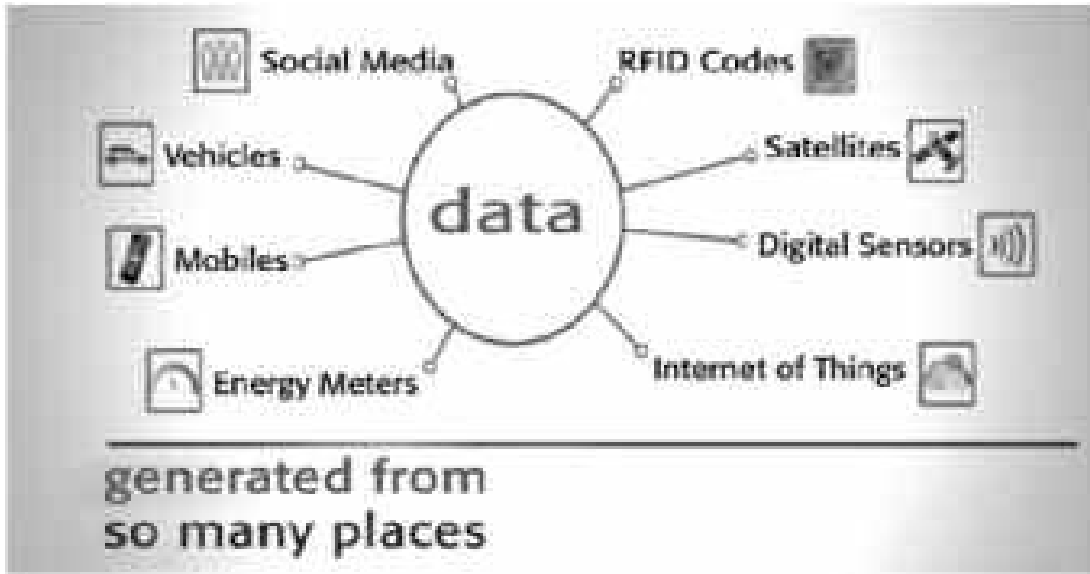
Source: Verhoef et al., 2010

The above figure 1 Shows, how CRM is implemented in the Retail Industry. First, the data is collected from various sources including the customers, point of sales and the supply chain. The data obtained from these sources is then utilized, and the patterns of customers buying behavior are developed, which tells the managers as to what steps for marketing they should choose to alter the product according to customers need. After the selection of the medium through which marketing activities are carried out, the customer responses are then observed. Whether the customer is satisfied? Did the retail store manage to identify the issue accurately? Whether the right market segment is selected? All these concerns are checked through the responses of the customers. The increase in the number of sales and the revenues will dictate the level of value the firm has generated through this procedure (Ngai, Xiu, & Chau, 2009).

Big Data

The flaws in the CRM processes became the reason for a revolution which could resolve the issues of CRM and efficiently manage the large volumes of data to process it smoothly. Eventually, the concept of big data evolved, but according to research studies, it is vital for the organizations to understand their current market and data handling situations and realize that how Big Data would help them in their business endeavors (Wang, Po Lo, Chi, & Yang, 2004). Big Data is all about managing the data and analyze the information provided to it. Big Data system is to collect large amounts of data from various resources which are then analyzed to formulate generalized results, which could help the organizations to know more about their customers and to enhance their revenue generation (Chen, Chiang, & Storey, 2012).

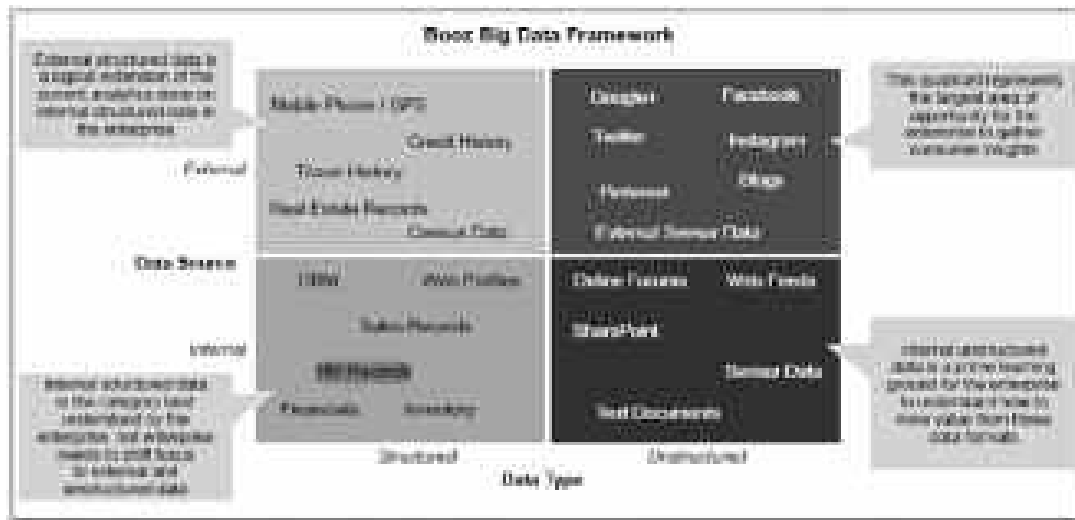
Fig 2. Big Data Information Sources



Source: Lemon, White, & Winer, 2002.

In the above figure 2 the authors show that Big Data gather information from a variety of sources including Images, RFID (Radio Frequency Identification) codes, satellites, digital sensors, social media, internet, and so forth. The data gathered from these sources is later analyzed and converted into meaningful graphs which can help organizations to gauge future demands. It also helps the organizations to create new and valuable opportunities to analyze the market and industry trends, as well. Big Data is observed to be ideal for a place or organizations where data flow is in excess, and the organizations have to deal with a diverse group of stakeholders including suppliers, customers, and (Russom, 2011).

Fig 3. Booz Big Data Framework

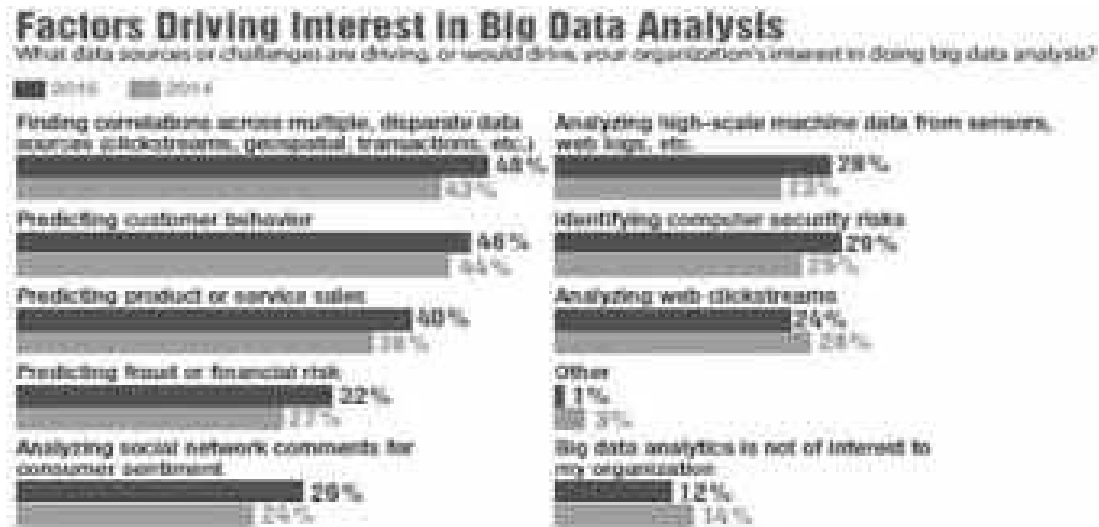


Source: Narayanan, 2012

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The above figure 3. shows the Booz Big Data Framework, which illustrates various sources from where the data could be collected. These include External and Internal data sources and collaborating them with two different data types, i.e., Structure and Un-Structured Data.

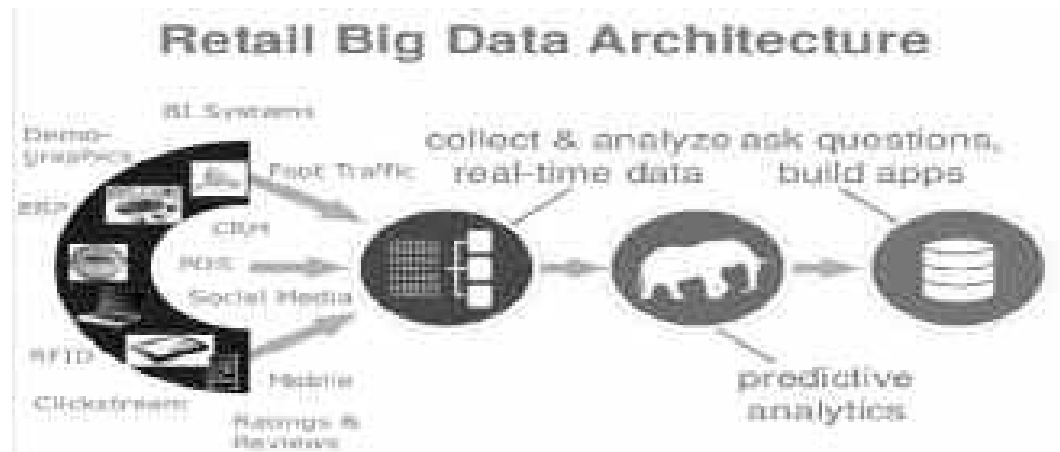
Fig 4. Drivers of Big Data Analysis



Source: Fisher, Deline, Czerwinski, & Drucker, 2012.

The above figure 4 shows the factors which drive the interest of organizations in the big Data Analysis. These factors include predicting of consumer behavior, prediction of financial risks, analyzing social networks, finding correlations and analyzing high scale machine data. Information Management Survey of Business Technology Professionals obtained these responses by analyzing the responses of 297 respondents, who were using the big data or were planning to use it in the near future.

Fig 5. Retail Big Data Architecture

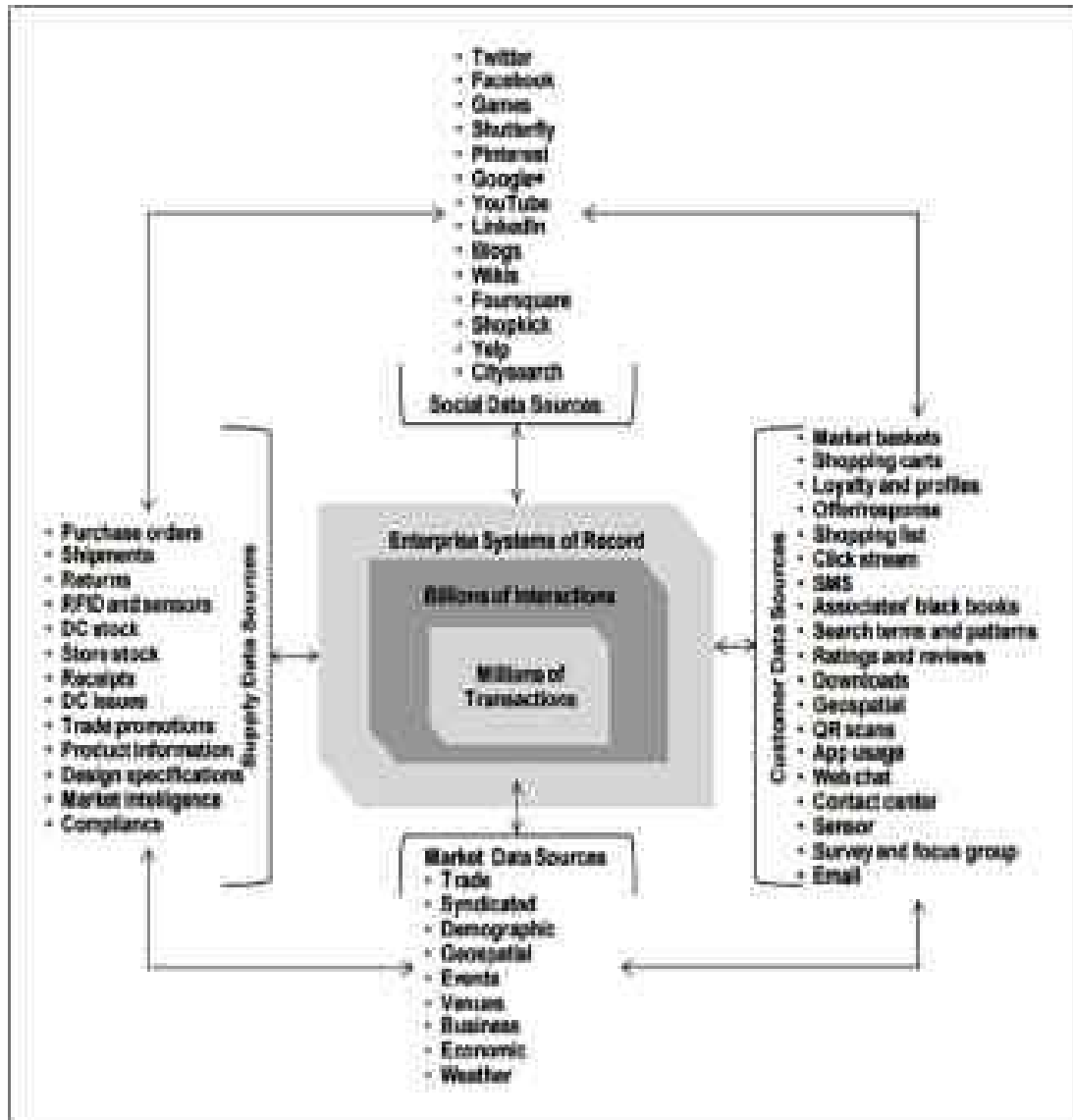


Source: Gupta, Gupta, & Mohania, 2012.

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Figure 5 describes the big data and its implementation in the retail sector. The figure portrays that data is collected through various resources and then analyzed. The research has thrown light on the fact that big data is instrumental in retail sector because it helps the retail stores get an overview of the customers' behaviors and their buying preferences, whether they are involved in online or physical shopping (Zikopoulos & Eaton, 2011). The new system could be implemented in existing one by introducing technical tools which may help to efficiently analyze the customer's buying behavior, and enhance the sales volumes (Siemens & Long, 2011). The comments the customers give on the social media sites also give an insight of their thoughts and are recorded and interpreted by the Big Data in a way which is beneficial for the organizations (Sathi, 2012).

Fig 6. Retail Big Data Typology



Source: Narayanan, 2012

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Figure 6 illustrates the topology of big data in the retail sector. It describes the sources from which the retail sector gets their data. The data sources include the supply data sources, the social network data sources, customer data sources and the market data sources. Moreover, all this data is stored in the system which later organizes the raw data into meaningful information.

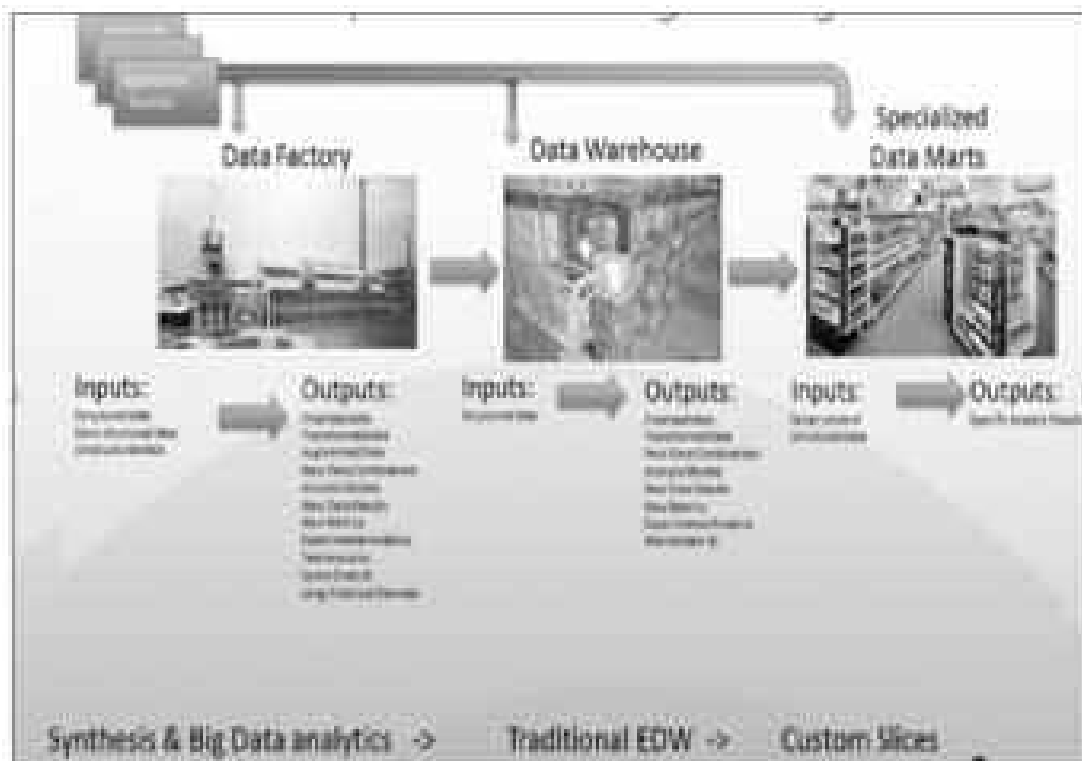
Fig 7. The Big Data System



Source: Talia, 2013.

The collected data is in unstructured form, which is then extracted to separate the useful and waste data information. The data extracted is then converted into a structured form, which is then stored for using it at the time of need or query. The structured data is then analyzed and compared with the past practices of the retail stores. The structured data which is analyzed is mostly in the form of graphs and metrics. The retail stores thus note down the changes and act upon it accordingly. This is then delivered to the customers in the form of their required products.

Figure 8. Integration of Big Data Analytics with CRM

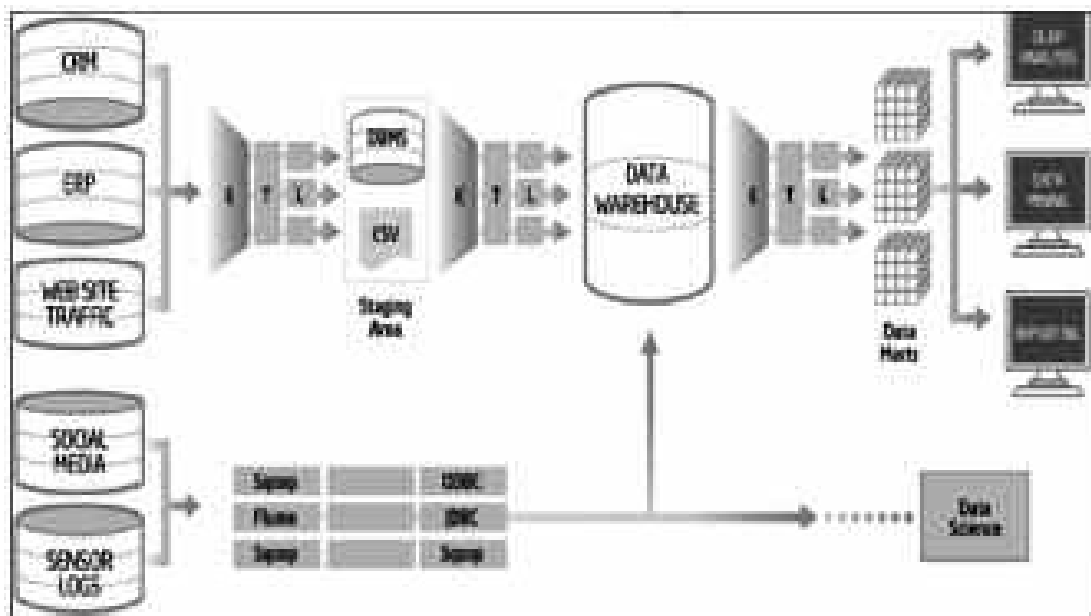


Source: Business Analytics 3.0, 2012.

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The above figure 8 describes the steps which are involved in the integration of CRM and Big Data. Moreover, it shows how data is collected, stored and how it changes the way retail stores deal with their customers. The past researchers have analyzed the needs of the retail sector and then suggested the integration of the Big Data and CRM. They were of the view that through the integration of CRM with Big Data, organizations, especially the retail stores would be able to perform better and can enhance all the stages of customer dealings as well as the other relevant processes (Kambatla, Kollias, Kumar, & Grama, 2014).

Figure 9. Offload ETL with Hadoop



Source: Cohen, Dolan, Dunlap, Hellerstein, & Welton, 2009.

Figure 9 is an Offload ETL with Hadoop. ETL is known as Extract Transform Load which extracts data from multiple sources, and then transforms it into structured data, to align them according to the needs of the retail stores. Which is further loaded into the warehouse for further analysis. The demand for Hadoop is increasing day by day because it is a useful initiative designed for capturing high volumes of data.

RESEARCH METHODOLOGY

This study has used cross-sectional hybrid research in which both qualitative and quantitative approaches have been used. The literature is reviewed, and a questionnaire-based survey is conducted, to access the impact of integration of CRM and Big Data Analytics. The data in this study was collected from the two top and largest retail stores in Pakistan,

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i.e., Hyperstar and Metro. A questionnaire-based survey was conducted through which the responses of managers and middle-level employees were taken. The sample of this study is 48 retail managers who handle large data in retail stores in Hyperstar or Metro, Pakistan.

Research Instruments

Peppard (2000), has established a scale of 8 items to measure the importance of CRM. The same scale has been used in this research with a context modification on 5 points Likert scale. Cavoukian and Jonas (2012) indicated seven items through which Big Data Analytics and its integration can be checked which have been utilized for investigation in this study.

RESEARCH FINDINGS

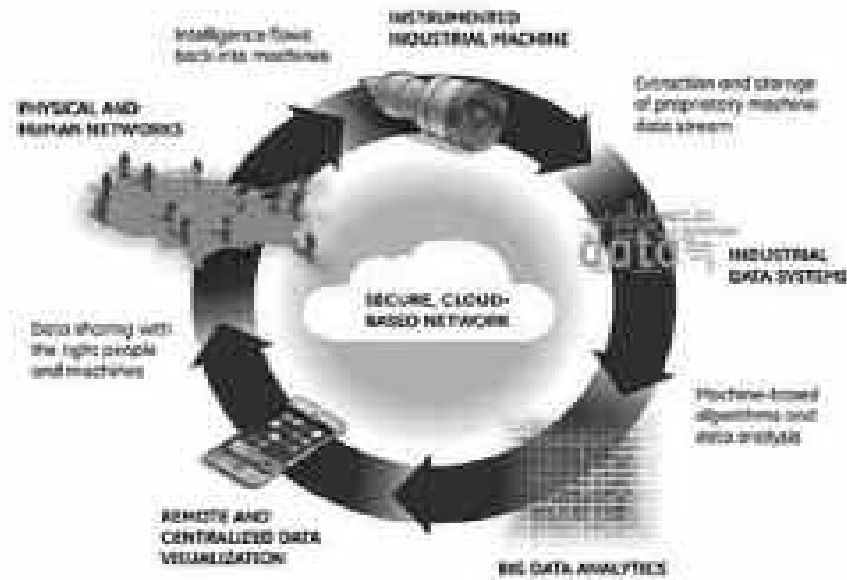
The primary data in this study is collected from a questionnaire-based survey, and the secondary data is extracted from the past literature. The analysis was done in two phases: Phase I highlighted the importance of integration of CRM and Big Data which was construed through an extensive literature review on the subject matter; Phase II, however, analyzed the primary data findings from the questionnaire-based survey.

Phase I. Integration

Big data can alter the way organizations manage their relations with their customers by offering specific powerful tools, which can identify new sale opportunities, analyze responses of customers and combine the data from social networks. From the integration of Big Data and CRM, retail stores would be able to identify customer buying patterns and emerging market trends, which will help them to shape up their strategies accordingly, which would lead to generate higher revenues (Tene & Polonetsky, 2012). The top players of CRM that include Microsoft and Oracle have already started investing in Big Data so that more value can be brought into the lives of people (Chen, & Popovich, 2003).

The most important aspect of the integration is that the predictive analysis could be carried with this integration, as it helps the retail stores to predict and forecast as to how the customers would respond in the future (Ghazal, Rabl, Hu, Raab, Poess, Crolotte, & Jacobsen, 2013). This prediction is based on the patterns of their past behaviors as well as their demographics. Moreover, it allows the retail stores; to measure the store's own performance as compared to its competitors. The areas, which can be benchmarked include, customer satisfaction, customer retention rate and the revenues of their own as well as the competitive stores.

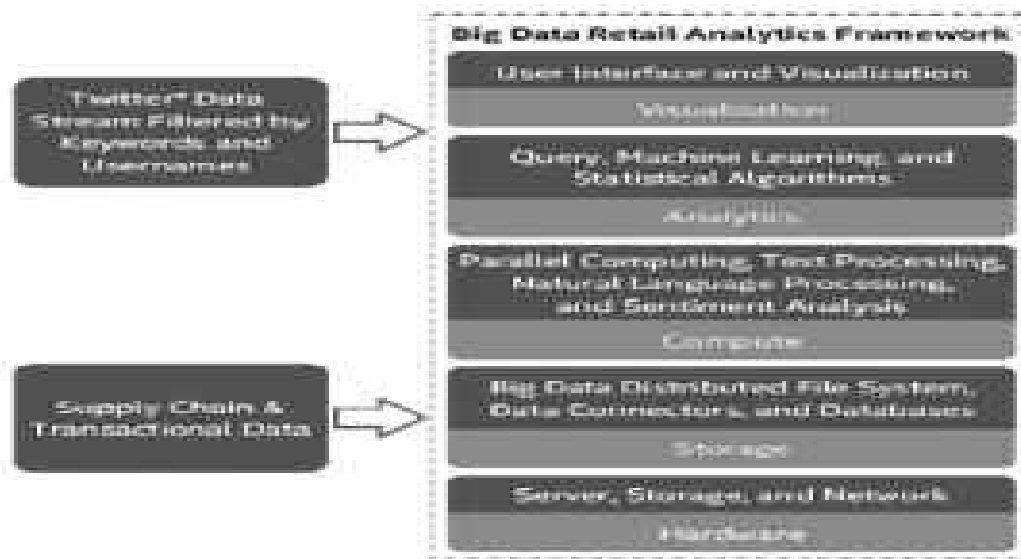
Fig 10. Framework for Integration



Source: Gantz & Reinsel, 2012.

The above figure 10 explains the working of a secure cloud-based network. Nowadays, there are cloud-based networks which help in the measurement of the analytical solutions. This network helps in fetching the data from different websites including Facebook, Twitter, etc. (Moniruzzaman & Hossain, 2013). The studies assert that the cloud-based networks provide meaningful insights based on the received data, and through the usage of instrumental machines extract the data stream, keeping in focus the areas like security and costs. The practical usage of this data is to provide value to the customers and the retail stores.

Fig 11. Big Data Analytics Implementation



Source: Ames, Abbey, & Thompson, 2005

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Figure 11 is a framework developed for the implementation of Big Data Analytics which uses the Cloudera Distribution for the platform of Hadoop. Through this framework, data can be processed in large volumes, with more considerable velocity, and consider numerous sources. According to this framework, the supply chain and social media channels are thoroughly examined, and the relevant data is extracted. Moreover, this framework also caters additional sources which include sensors, weather feeds and also IOT (Internet of Things). The first key to success in retail is to identify the relevant processes from marketing, sales, and e-commerce which can benefit the stores and provide more significant insights.

Phase II. Questionnaire based Survey

A questionnaire-based survey was conducted through which the responses of managers and middle-level employees were taken and analyzed. The sample of this study is 48 managers or middle-level employees who belonged to either Hyperstar or Metro.

Table 1. Correlation

		Big Data	CRM
big data	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	48	
CRM	Pearson Correlation	.774**	1
	Sig. (2-tailed)	.000	
	N	48	48

** . Correlation is significant at the 0.01 level (2-tailed).

In the Table 1 correlation results illustrate that there exists a positive relationship between the CRM and Big Data integration. As the value of Pearson correlation is 0.774, it indicates that the integration process and sales have some alignment with each other and can affect each other in broader contexts.

Table 2. Regression Model Summary

Model	R	R Square	Adjusted Square	Std. Error of the Estimate
1	.774 ^a	.600	.591	.71050

a. Predictors: (Constant), Big Data

Results suggest that regression results support the primary objective. The value of R square confirms the positive impact of CRM & Big Data integration in the retail stores of Pakistan. The table further reveals the value of R square as 0.60 which depicts that the integration of CRM & Big Data would be very beneficial for the retail stores.

Table 3. Regression ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	34.785	1	34.785	68.908	.000 ^b
	Residual	23.221	46	.505		
	Total	58.006	47			

a. Dependent Variable: CRM

b. Predictors: (Constant), Big Data

The F value designates that Big Data and CRM are significantly correlated, and their integration would be very beneficial for retail stores which involves handling of a significant amount of data. Moreover, .000 is the value of significance which is less than 0.05, so it also supports the systems integration.

Table 4. Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.365	.328		1.111	.042
	Big Data	.819	.099	.774	8.301	.000

a. Dependent Variable: CRM

The beta values of research variables described in the results show the impact of CRM on Big Data. The beta value is 0.774, describing that integration of CRM with Big Data will improve retail stores' productivity by 77%. The table further explains that t value is more than two, so both CRM and Big Data are significantly correlated.

DISCUSSION AND CONCLUSION

The current research found that as the retail stores need to handle a massive bundle of data, the integration of Big Data with CRM will help organizations to handle data efficiently. Also, the retail stores would be able to increase their sales volumes, as through this integration, they can easily identify the unsaid needs of the customers, and target those needs effectively (Sun, Zhang, Chen, Zhang, & Liang, 2007). Due to this modification, they can increase the customer loyalty and retain them for a more extended period of time (Cohen, Dolan, Dunlap, Hellerstein, & Welton, 2009).

Examining the literature, it was construed that initially, the retail stores did not have right people to operate the system, but eventually, the need forced them to train their people accordingly. Literature supported the

findings of this study and indicated that more than 50% of the retailers are using Big Data analytics and are satisfied with its outcomes because the sales of the retail store have been increased due to it (Barton & Court, 2012). As Moore's Law describes that data doubles every year for retailers, thus retailer managers have to handle bundles of information and data of so many years (National Instruments, 2015). Big Data Analytics can combine the data coming from various resources and analyze it in such a way that would be useful for the retail stores (Raghupathi & Raghupathi, 2014).

This research found out that due to the integration of Big Data with CRM, the retail stores could have many benefits. Those benefits include long-lasting relationships with customers, increased sales volume, and revenues and better insight of the operations of the retail store. Moreover, the risk for the retail stores would also be minimized because the investments made would be according to the data collected from the customers, so the chances of errors will be least. This study defines that the customer's data reaches the retail store from many sources which they organize and give the shape of real-time data. The managers of retail stores who can get a better insight of their customers and base their strategic decisions on this information then interpret this data. Literature has described Big Data Analytics as a way of getting a competitive advantage over the competitors.

The purpose of this study was to check the prevalence and the integration of Big Data and CRM in retail stores of Pakistan. This study can be beneficial for Retail Stores in knowing how their services can be made better due to the adaption of Big Data Analytics. As Big Data is relatively a new term, yet many retail stores are not familiar with the benefits of it, but this study can be a guideline for them and can help to know the importance of integrating Big Data and CRM. Though CRM has been instilled in their system, but CRM lacks the capability of handling and organizations tons of data, thus the organizations dealing with vast bundles of data, Big Data Analytics would be the perfect solution (Mycustomer.com, 2014). The term Big Data is still new in Pakistani perspective, and many people are unaware of it. Even though the managers of Hyperstar and Metro responded to the questions appropriately, but they did not know much about Big Data. In most of the retail supermarkets, Big Data Analytics is conducted by IT department, but the management and working employees do not have any idea about

the clarity of this concept. Therefore, the true essence of this concept has not been achieved so far.

LIMITATIONS AND FUTURE RECOMMENDATIONS

The constraints of the present study can only be eliminated by having a lengthier duration to carry on the research so that it can be conducted in a broader perspective and to overcome its numerous limitations. As it is a new dimension that Big Data and its aspects need to be analyzed thoroughly. The primary data in this study is hand collected from two renowned retail stores of Pakistan, leaving scope for other researchers to conduct future researches on the other retail stores as well. This is a case study of Pakistan so further researchers can conduct the same research in other countries and sectors other than retail supermarkets. The concern of focus for selection of organizations for future study should have substantial involvement of data and its analysis.

D R A F T

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