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21st century Customer Retention in Business: The Role of Data Analytics in enhancing Customer Retention

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Insert abstract – 200 words  
1.**Research title and topic area aka introduction   
Background and Context:**

The title the author has chosen for this data analytic project is “21st Century Customer Retention in Business: The Role of Data Analytics in enhancing Customer Retention”

Data Analytics has transformed the way everyday business conducts its operations, from the collection of Big data to the utilization of it to align with company goals. The corporate environment has seen an unparalleled boom in data collection and consumption in the twenty-first century, leading to the growth of data analytics as a critical tool for generating insights and driving strategic choices. Among the multiple applications that data analytics has transformed, one that stands out is client retention. Customer retention, or keeping current customers engaged and loyal, is critical to long-term business development and profitability. One of the focal points is not just being able to attract new business but from within the data at a company’s disposal being able to use the full capability of the available information. In this new data driven era, companies have vast quantities of big data for customer information, establishing a huge capability in the use of data analytics implementation in improve customer retention. This data can include purchase history, browsing trends, comments, and interactions, which may give important insights into customer preferences and behaviours when used appropriately. Delving into the branches of information that can be extracted from data to better understand company goals and the wants of the people that pay for their services, in doing so the experience on both sides can be tailored more effectively to benefit both parties to ultimate efficiency while removing the noise to produce clean results. As a result, incorporating data analytics approaches into client retention tactics has become a strategic requirement for organisations looking to gain a competitive advantage in today's volatile industry.

(Background and context)  
The authors interest in investigating into this area of research in the topic area of how data analytics has been tailored in enhancing better customer retention in the 21st century, with the focus being customer acquisition and retention due to data analytics and constructed in the form of customer relationship management [CRM], stems from the Authors own experience of working in business development and key account management roles over the last decade , seeing and working with the transition in multiple fields from being that of non-data orientated business to the ever expanding implementation of data analytics used in driving goals and results, particularly that of customer retention in the highly competitive markets we have in today’s economy.

The author was very interested in this topic as an individual that has witnessed the transition hands on in their own professional career. Comparing the experience to that of other professionals in close proximity the Author showed an interesting insight on the subject matter at 1st glance.  
  
Despite rising acknowledgement of data analytics' potential benefits in improving customer retention, there is still a gap in understanding how data analytics strategies are implemented and how they convert into improved customer retention rates.  
Seeing how a company can invest in this area to transition from more traditional means to that of the data analytic world in such a manner that they can improve overall business goals and in turn improve their own pipeline in gaining and retaining that of their current customers along with that of their potential new customers and, the influence of customer relationship management forming this data analytical approach can be beneficial , be it the before and after of implementing the models has an effect on the company’s performance in this topic area and how the data is analytically processed in the method.

2.**Research Objectives/ Hypothesis problem**

Customer retention is a vital aspect in corporate success nowadays. Businesses in the twenty-first century are embracing data analytics to improve client retention. The practice of studying huge and diverse data sets to extract significant insights and patterns is known as data analytics. Data analytics insights may be utilized to detect client preferences, predict customer demands, and ultimately boost customer retention. The purpose of this study paper is to investigate the function of data analytics in improving client retention in traditional organizations in the twenty-first century.

**Problem/Hypothesis**:

Businesses in the 21st century are more than ever introducing the use of data analytics to improve client retention. Businesses look to enhance customer retention through gathering and analysing customer data, assessing data analytics tools, and acting upon the results of the analysis.

The research question, goals, scope, and assumptions are all related to the study's problem/hypothesis, which is that data analytics may be utilized to improve client retention in conventional firms in the twenty-first century. The study topic is concerned with the function of data analytics, and the aims are intended to give a thorough knowledge of how firms may utilize data analytics to boost customer retention. The study's scope defines what will be included in the analysis, and the assumptions set the stage for the study's conclusions. The problem/hypothesis statement explains the study's core point.

In this case, the statement is that traditional businesses can use data analytics to enhance customer retention in the 21st century. The statement also highlights the three main objectives of the study: collecting and analysing customer

Problem Definition Model:

**Research Problem**:

The primary issue addressed by this research is the challenge of client retention in traditional organizations in the twenty-first century. Many firms struggle to retain consumers, resulting in lower revenue and market share. Businesses now have the chance to obtain significant insights into customer behaviour and preferences thanks to the advent of data analytics. Many businesses, however, fail to employ data analytics effectively to boost client retention. As a consequence, the following is the study's research problem: How might data analytics be used to boost client retention in traditional firms in the twenty-first century? . Determining the precise process, resources, and techniques that businesses employ to effectively utilise customer data is challenging. The causal relationship between data analytics activities and customer retention results is fully understood empirically, notwithstanding the anecdotal evidence that data analytics has a positive impact on customer retention.

Research Question:

The following research questions are what the Author has highlighted in being effective to address the research problem:

1. Does using Data Analytics enhance retention of customers?
2. What data analytics tools are used in enhancing customer retention in traditional businesses?
3. What are the possible recommendations that can improve data analytics in customer retention?

Objectives:

The Following objectives are what the Author has highlighted as being the primary aim of the project in investigating how data analytics used by companies improve customer retention. The are as follows:

1. Collect and critically assess customer data to understand the current state of customer retention in traditional businesses.

2. Assess data analytics tools and techniques used in enhancing customer retention in traditional businesses.

3. Identify recommendations for improving customer retention in a data-driven age in order to maximize customer retention.

The study's goals provide forth a clear path for answering the research issue. The initial goal is to gather and evaluate client information from traditional companies. This is a critical step in comprehending how firms may utilize data analytics to improve client retention. The second goal is to assess the efficacy of data analytics strategies in enhancing client retention. This will entail analysing case studies and previous research to see which strategies have previously been successful. The final goal is to use data analytics to create actionable suggestions for conventional organizations to maximize customer retention. This will include combining the findings from the first two objectives and producing suggestions for businesses to employ in order to retain consumers in a data-driven world.

**How to achieve objectives**:

The research will collect primary and secondary data to meet the first goal of gathering and critically evaluating consumer data. In-depth interviews will be used to acquire primary data. To gain insights on the use of data analytics in customer retention, interviews will be conducted with business owners, managers, and customer service employees. Data on client behaviour, such as purchase patterns, preferences, and complaints, will be gathered via observation methods.

Secondary data will be gathered through a review of academic and industrial publications on the issue. Reading academic papers, journals, reports, and books on the use of data analytics in customer retention will be required. The literature review will give a complete description of existing research on the issue, as well as highlight gaps that the study will attempt to remedy.

The second goal is to evaluate the application of data analytics in improving client retention. This would entail assessing the efficacy of various data analytics strategies in enhancing client retention. The study will explore the link between customer data and retention rates using descriptive and inferential statistical analysis. Descriptive analysis will include summarizing data on consumer behaviour and retention rates acquired. Inferential studies will be performed to determine correlations, causes, and forecasts between various consumer data factors and retention rates.

To optimize client retention, the third goal is to create recommendations to boost customer retention in a data-driven world. The information from the above objectives will be used to provide practical suggestions for organizations to enhance their client retention tactics. Data analytics approaches such as predictive analytics, sentiment analysis, and recommendation engines will be considered in the suggestions. In addition, the study will look into the function of customer service and user experience design in increasing client retention.

**Scope and Limitations:**

The scope of This research will look at conventional organizations in the twenty-first century and how they may utilize data analytics to improve client retention. This research study will traverse a range of industries and sectors, encompassing both B2B and B2C contexts, with the goal of broadcasting a panoramic and comprehensive understanding of the varied methods of data analytics' application in the realm of customer retention, including the gathering and analysing customer data, assessing data analytics methodologies used to promote customer retention, and producing practical suggestions for organizations to use data analytics to optimize customer retention. In order to richly highlight the diverse methods of techniques skilfully harnessed by astute enterprises, the inquiry and inquiry-driven expedition will delve into the intricacies of various and diverse data analytics methodologies, spanning the full spectrum from predictive analytics and machine learning to the scintillating world of sentiment analysis.

The study's scope defines what will be included in the analysis. In this scenario, the research will concentrate on conventional enterprises in the twenty-first century. This implies that the analysis will exclude online-only firms or those that have only recently begun functioning in the twenty-first century. The scope also covers the study's three primary goals: gathering and analysing customer data, assessing data analytics methodologies used to promote customer retention, and producing practical suggestions for business’ to enhance customer retention through the use of data analytics.  
  
The academic trajectory will be secured to the path of existing case studies and observed research, meaning an inherent dependency on accessible artefacts and already mapped paths, restricting the scope of beginning on an adventure of original data gathering and collecting. Second, because technological and business paradigms are unpredictable, chimerical, and incessantly mutable, the resonance of the findings may be subjected to the steady procession of time, potentially necessitating periodic revisits and updates to the findings' expanse and scope. Finally, due to practical and logistical limits inherent in the study environment, the thesis may not thoroughly cover every conceivable industry or sector in the variety of constraints and concerns.   
This detailed investigation covers the research's fundamental components, laying the groundwork for the following: revealing and deconstruction of the complicated relationship between data analytics and client retention. In doing so, the research seeks to go beyond hypothesis and anecdotal evidence to achieve a profound knowledge supported by observed analysis and intellectual investigation. The dissertation seeks to reveal the transformational influence of data analytics on the modern dynamics of customer retention tactics via thorough investigation of industry instances and systematic study of data analytics techniques.

Assumptions:

This conduction of this research analysis requires consumer data is precise and dependable to provide results relevant to the defined queries. It also presupposes that the data analytics technologies employed are current and effective in data analysis. Furthermore, the study believes that the business environment is significant to the findings and suggestions.

1. The study assumes that typical organizations gather and use consumer data to inform client retention tactics.

2. The study implies that data analytics may be a useful technique for improving client retention in traditional firms.

3. The study expects that the suggested recommendations will be applicable to conventional firms in a variety of industries.

As has been stated in the above objectives and hypothesis section of the Authors Research paper the exploration of data analytics in customer retention in the 21st century outlines the main objectives of gathering and the analysis of consumer data, critical evaluation of the data analytics used in pursuing greater customer retention and at the end of the article rich suggestions to then improve this goal.

To meet the research objectives and offer practical suggestions for organizations to enhance their client retention tactics, the study will collect both primary and secondary data. The study's scope includes organizations in various industries in the United States, and assumptions include access to consumer data, the usefulness of data analytics tools, and the applicability of suggestions across industries and sizes. needs to be 1500  
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3.**Literature Review** 5459Customer retention has become a major goal for firms in the contemporary business period owing to the enormous influence that it may have on the company's profitability and sustainability.

Customer retention is the model of retaining current customers through the use of building and maintaining a positive relationship with them for continued loyalty to the company. Companies can do this practice through the use of Data Analytics to enhance customer retention by executing Customer Relationship analytical models. Assembling and Analysis on consumer information to pinpoint patterns within the data to tailor the experience to company key performance indicators.

In the Authors Literature review the importance of using Data Analytics in enhancing customer retention through the use of customer relationship management models will be investigated.

**Customer Relationship Management (CRM)**

The CRM models are used to collect customer information, analyse that information with the goal of giving valuable insight to preferences shown in their data with the intent of redistributing the results in a manner that enhances the customers retention and improves their relationship with a company. CRM, according to Buttle (2004), entails finding, recruiting, and keeping consumers through the development and maintenance of lucrative relationships with them. CRM models are classified into three types: operational, analytical, and collaborative models.

Operational CRM is concerned with the management of customer contacts across multiple channels such as sales, marketing, and customer support. It entails the automation of operations including sales force automation, marketing automation, and service automation. Analytical CRM is concerned with the analysis of customer data in order to get insights into consumer behaviour and preferences. Data mining, predictive analytics, and client segmentation are all examples of this. Collaborative CRM is concerned with leveraging customer data to increase communication and collaboration across various departments inside a company, such as sales, marketing, and customer support.

**Data Analytics in CRM**

Data analytics is analysing data and extracting insights using statistical and computational approaches. In recent years, data analytics has grown in popularity as a technique for improving CRM models. Customer behaviour, tastes, and wants may all be analysed using data analytics. Data analytics insights may be utilized to increase customer interactions and retention rates. Data analytics may be utilized to boost customer retention in four ways, customer segmentation, customer churn analysis, customer lifetime value analysis, and targeted marketing.

Data analytics may help companies improve customer retention by giving insights into consumer behaviour and preferences. To get the full benefits of data analytics, firms must include it into their CRM frameworks. CRM models are the procedures and strategies that businesses employ to manage their connections with customers. Organizations may enhance customer happiness and retention by incorporating data analytics into their CRM frameworks.

Data analytics may also assist businesses in identifying customer churn and taking proactive steps to retain clients. The process of consumers leaving a company is referred to as churn. Organizations may take proactive actions to retain clients by spotting customer churn early. To retain consumers, firms might, for example, offer targeted discounts, tailored offers, or loyalty programs. Data analytics to forecast customer churn can boost customer retention in the e-commerce market.

Another advantage of incorporating data analytics into CRM models is improved customer service. Organizations may utilize data analytics to better understand consumer preferences and behaviour patterns, which can then be leveraged to create individualized customer care. Organizations can, for example, employ data analytics to discover consumer preferences and provide customised suggestions or solutions. Employing data analytics to deliver individualized customer care can boost customer happiness and retention in the retail business.

However, incorporating data analytics into CRM models poses certain difficulties. Data privacy/security being areas of main issues. Large volumes of client data must be collected and stored for data analytics. Organizations must guarantee that this data is safely maintained and that the privacy of their customers is respected. Another difficulty is the complexities of data analytics. Data analytics necessitates specific skills and tools, which can be expensive or difficult to acquire.

Customer segmentation entails categorizing customers based on their behaviour, preferences, and needs. Businesses may now use tailored marketing strategies to target certain groups of clients. Customer churn analysis is examining customer data to identify customers who are likely to leave. This enables firms to take proactive steps to keep these clients. Customer lifetime value analysis entails estimating a customer's expected worth across their lifetime. This enables firms to better deploy resources in order to retain high-value clients. Personalized marketing entails tailoring marketing campaigns to specific customers using customer data. This can boost consumer engagement and retention.

**Data Analytics and Customer Retention:**  
In recent years, there has been increased study interest in the use of data analytics in improving client retention. Many studies have proven that data analytics may help firms enhance customer retention by offering insights into consumer behaviour and preferences. Syaqirah, N. (2014) for example, conducted research on the influence of data analytics on client retention in the hotel business. According to the report, data analytics may assist hotels in identifying client preferences and providing customised services, which can boost customer happiness and retention.  
Khrais, L.T. (2020) investigated the influence of data analytics on e-commerce client retention. According to the report, data analytics may assist e-commerce enterprises in identifying client preferences, predicting customer behaviour, and providing customised suggestions.  
Anderson, J., Jolly, L. and Fairhurst, A. (2007) conducted a research paper that the effect of data analytics has on customer retention in retail trade. That even though data analytics can recognize consumer likings, that doesn’t entail in the implementation to being a success in customer retention due to elements as loyalty to another brand.

**Arguments for the Assumption that Data Analytics Enhances Customer Retention**

There are various reasons to believe that data analytics improves client retention in 21st-century company. According to one perspective, data analytics enables organizations to obtain insights into client behaviour and preferences. Businesses may use this to increase customer interactions and retention rates. Data analytics, for example, may be used to examine consumer input to uncover prevalent pain issues. Businesses may then utilize this data to enhance their products and services while decreasing customer turnover.

Another argument is that data analytics enables organizations to tailor targeted marketing strategies to specific groups of clients. This can boost consumer engagement and retention.

Data analytics can be implemented in the evaluation of consumer data to create a clearer understanding of potential consumers whom are more perceptive to a particular marketing campaign. Once identified companies can then use these as their target market in the creation of personalized marketing to increase customer retention..

In addition, data analytics enables firms to maximize consumer interactions across several channels such as sales, marketing, and customer support. This can boost client happiness and retention. Data analytics, for example, may be used to study client interactions with a firm and find areas for development. Businesses, for example, can utilize data analytics to analyse customer support interactions and identify the most prevalent problems that consumers encounter. Businesses may enhance customer happiness and retention by addressing these challenges.

Furthermore, data analytics helps businesses to maximize consumer interactions across different departments of a company, including sales, marketing, and customer support. This can increase customer satisfaction and retention. Data analytics used to examine customer interactions with a company to improve on areas like customer support , pinpointing problems that customers face and use it resolve the problems.

Another reason to believe that data analytics improves customer retention is that it helps firms to track consumer sentiment and engagement levels. Businesses that analyse customer sentiment can immediately discover unfavourable feedback and remedy it before it leads to client attrition. Furthermore, by tracking customer engagement levels, firms may detect consumers who are losing interest and take proactive steps to keep them.

Finally, data analytics enables companies to improve their client retention tactics by testing and iterating on various ways. Businesses may try alternative retention methods and analyse their efficacy using data analytics. This enables them to discover and optimize the most effective techniques over time, resulting in higher client retention rates.

**Arguments Against the Assumption that Data Analytics Enhances Customer Retention**

Even though theres a vast quantity of research that supports the concept that data analytics enhances customer retention, there is also an argument for the opposite view. One being that using data analytics can be very time intensive. Customer data analysis necessitates considerable resources, such as specialized tools, qualified staff, and infrastructure. As a result, data analytics may become unavailable to small and medium-sized firms with insufficient resources.

Another objection to the premise is that data analytics can be intrusive and may jeopardize client privacy. Customer data collection and analysis might cause privacy issues, especially if the data is sensitive or personal. This can breed mistrust and harm consumer relationships, resulting in greater customer turnover.

Overreliance on data-driven decision making can result from data analytics. As can be seen through the research that data analytics give meaningful insight on consumer data but it shouldn’t be the only driving force of the decisions being implemented.

Data analytics is susceptible to biases and inaccuracies. To give useful insights, data analytics relies on reliable and impartial data. Biases and inaccuracies, on the other hand, can emerge at numerous phases of the data analytics process, resulting in erroneous or misleading conclusions.  
Richard, J., Thirkell, P. and Huff, S. (2007) explored the impact of CRM for customer retention in a business-to-business (B2B) environment. The research resulted in findings that using data analytics in conjunction with CRM has a substantial influence on customer retention in B2B.

However, not all research agree that data analytics improves client retention. Hennig-Thurau, T., Langer, M.F. and Hansen, U. (2001) investigated the influence of customer education on trust and relationship quality in a field investigation. The study discovered that customer education has a long-term beneficial influence on trust and relationship quality. Instead of depending simply on data analytics, the authors suggested that firms should focus on educating their consumers in order to boost trust and relationship quality. These findings imply that data analytics may not be the only way to improve client retention.

Marwa et al. (2019) did a CRM model literature review. The research discovered a dearth of empirical data to support the premise that CRM models improve client retention.

Soltani , Z. and Navimipour, N.J. (2016) did an investigation on using data analytics to improve CRM models for customer retention. Data analytics, according to the assessment, may improve CRM by offering insights into consumer behaviour, preferences, and demands. According to the authors, data analytics is an excellent method for enhancing client retention. These findings provide credence to the notion that data analytics improves client retention.

Akter, S. and Wamba, S.F. (2016) investigated the influence of data analytics on e-commerce client retention. The study discovered that data analytics has a considerable impact on client retention in e-commerce. To enhance customer retention, it was suggested that companies should have a dedicated data analytics section to gain key findings into consumer trends.

In this literature review the following data analytics models are used in Academic studies researched in enhancing Customer Retention:

1. Predictive Analytics: Predictive analytics is a technique that analyses past data and predicts future events using statistical models and machine learning algorithms. Perianez, A.P. et al. (2017) employed predictive analytics to determine the elements most likely to cause consumer turnover in mobile gaming. The authors employed machine learning algorithms to forecast the possibility of customer turnover after analysing data on consumer behaviour and use trends. This enabled the organization to provide targeted offers and services to consumers who are most likely to churn. A multitude of papers used predictive analytics to construct predictive models for consumer churning identification
2. Sentiment Analysis: Using a NLP in combination with Machine Learning to create an analysis of comments be it from reviews and feedback and classify such as being that of a negative, positive or neutral nature, Ruiz, C. et al. (2021) used the technique to create an analysis on how social media impacted customer behaviour through the analysis of comments and reviews on social platforms to identify features that enhanced customer retention.
3. Machine Learning Models: Machine learning models are a set of algorithms and statistical models that use historical data to make predictions and identify patterns through the use of being programmed to achieve targeted results. ML is used throughout the papers in targeted marketing offers. Golbayani, P., Florescu, I. and Chatterjee, R. (2020) all used machine learning in using neural networks, SVM’s and decision trees in evaluation of customer data for customer retention.
4. Natural language processing (NLP): uses algorithms for analysis understand human language. Predominantly used in customer retention through assessment of customer feedback to enhance customer retention. Tarnowska, K.A. and Ras, Z. (2021) assessed customer retention through NLP with the use of social media for consumer feedback.
5. Data visualization: The use of graphical visualization to depict and guide the key evaluation of insights from customer data. commonly used in customer retention to display and analyse patterns and trends in customer data. Many research papers have employed data visualization through the use of techniques as heat maps, scatter plots, and line graphs, such as those by Kitapci, O. et al. (2013)

For the continuity of the readers experience in the literature review, the data analytics techniques used have been segmented into their own headings for the stated techniques by the author in the order they appeared in the above list. They are as follows:

**Predictive Analytics**

Drachen, A. *et al.* (2016) investigated the impact of data analytics on customer retention in mobile gaming using predictive analytics. In the research paper workings, the creation of a predictive model using machine learning to predict the probability of customer retention decreasing. The validation in the model was in showing that customer turnover forecast in showcasing the elements that impacted customer retention. Based on the findings, it was advised that mobile gaming companies use predictive analytics to identify and target players at high risk of churn that occurs at the start of free to play games .

Wassouf, W.N. *et al.* (2020) examined the influence of customer satisfaction on customer retention in the telecoms business using predictive analytics. Using customer satisfaction levels as the focal point the creation of a predictive model was implemented in the probability of customer attrition.  
It was seen that customer happiness was a strong indicator through the model on impacting customer retention, it also through the results was able to effectively identify features that impacted on customer retention. The results for was a correlation between the classified categories and features to maintain customer retention in offering offers and services to targeted customers.

Hapsari, R., Clems, M. and Dean, D. (2016) examined the influence of service quality on customer retention in the airline industry using predictive analytics. The creation of a predictive model using service quality scores to predict customer retention. The report found that service quality had a significant effect on customer retention. The model was effective in the identification of features that influence service quality for customer retention. The results of the report suggested for airline companies to focus on increasing customers service quality using predictive analysis in being able to target customers at risk of churning with personalized offers to maintain customer retention.

WU,S. et al (2021) used logistic regression and random forest in the creation a churn prediction model. The research inspected the features that drive customer turnover, such as demographics, use habits, and service quality, using data from a telecom company. The research in this instance resulted in the discovery that using random forest would outperform logistic regression in forecasting customer attrition.

Tariq, M. *et al.* (2021) used a deep neural network to create a customer churn prediction model. The literature analysed customer behaviour and predicted customer attrition using data from e-commerce. The research revealed that deep neural networks outperformed such as logistic regression and decision trees in forecasting customer attrition.

AMUDA,K. and ADEYEMO,A.(2020) used a Multilayer Perceptron Artificial Neural Network architecture in creating a customer churn prediction model for financial institutions. The research analysed customer behaviour and predicted customer attrition using data from an online education platform. The gradient boosting decision tree resulted in being more accurate in forecasting customer turnover than logistic regression and random forest.

**Sentiment Analysis**

Liu, J. et al. (2020) examined the influence of customer satisfaction on customer retention in the Chinese e-commerce market using sentiment analysis. To quantify consumer pleasure and loyalty, the authors collected data from customer reviews and applied sentiment analysis techniques. According to the study, customer happiness has a considerable beneficial influence on customer retention, and businesses may utilise sentiment analysis to identify and target disgruntled consumers with personalised retention incentives. The result of analysis was 0.7112 of the Area Under Curve( AUC) with the results showing the logistics and transport times should be focused for customer retention.

Díaz,E. Consuegra,D. and Águeda.(2011) examined the influence of consumer emotions on customer retention in the mobile telephones market using sentiment analysis. To quantify customer sentiments and loyalty, the collected data and The results of the research showed substantial findings in the effect emotions have on customer retention and suggested using the technique to identify customers that would have shown negativity towards the business , the areas of satisfaction, loyalty and positive word of mouth showing the influence of impact on customer retention.

Al-Azzam (2022) reported into a range of different industries data analytics and customer relationship management impact can also be seen in the Hospitality sector, found that Data analytical tools as customer segmentation, sentiment analysis and Multiple Regression Analysis for Customer Relationship Management Performance were used to create greater customer retention and service overall. Highlighting once again the need of the combination to increase customer experience and engagement.

Ho, R.C., Withanage, M.S. and Khong, K.W. (2020) employed social media analytics in another study to examine the influence of online reviews on customer retention in the hotel business. To quantify consumer sentiment and loyalty, the authors collected data from online review sites and employed text mining algorithms. According to the study, online evaluations have a substantial influence on customer retention, and businesses may utilise social media analytics to monitor and respond to consumer input in real-time, therefore enhancing customer satisfaction and retention. The results and suggestions of top influence for customer retention was customer service , hotel location near amenities and room cleanliness.

Xianga,Z ,Schwartz ,Z. Gerdes Jr, J. Uysal, M.(2015) conducted sentiment analysis to observe the impact a customer’s experience has on customer retention in the hotel industry. To quantify customer experience and loyalty, the authors collected data from customer online reviews and employed sentiment analysis techniques. According to the study, customer experience has a large positive influence on customer retention, and businesses may utilise sentiment analysis to discover and fix consumer pain areas, hence enhancing customer satisfaction and retention.  
  
Caigny ,A. Kristof Coussement,K. De Bock,K. and Lessmann,S.(2019) performed sentiment analysis on customer evaluations from an online shop using a hybrid method that incorporated machine learning and deep learning approaches. NLP methods used within the study for tokenization of text data, along with the extraction of characteristics, Logistic regression and Convolutional Neural Networks (CNNs) were then used to train the model

Li, Q. *et al.* (2018) performed sentiment analysis on customer evaluations from hotel reviews from the ChnSentiCorp-Htl-unba dataset. Using a deep learning strategy that combines Recurrent Neural Networks (RNNs) and Attention Mechanisms., the text data was pre-processed and tokenized using NLP approaches, and characteristics such as word. Using the BiGRULA model in the workings produced better results to give rich information compared to other traditional ML models as it can assesses sentiment and customer satisfaction for customer retention.

Tusan, T. and Islam, T. (2021) performed sentiment analysis on customer evaluations from a US Airline using twitter data a machine learning strategy that blends Support Vector Machines (SVMs) and Random Forests was implemented. The text data was pre-processed and tokenized using NLP approaches, and characteristics such as bag of words and frequency were extracted.

**Machine Learning Models**

Xiahou, X. and Harada, Y. (2022) used ML models to inspect the impact customer satisfaction has on customer retention in e-commerce. Using customer happiness information, the use of neural networks, support vector machines and random forests were implemented in predicting customer retention. The results showed that it could accurately predict customer retention on satisfaction and suggested that companies use the models in the creation of customer retention campaigns.

Garg et al. (2020) examined the influence of customer involvement on customer retention in the retail business using media analytics. To quantify client involvement and loyalty, the authors collected data from social media networks and applied network analysis techniques. According to the report, customer involvement has a considerable beneficial influence on customer retention, and businesses may utilise social media analytics to identify and target highly involved consumers with personalised retention offers and incentives.

Jain and Pamula (2020) examined the influence of consumer sentiment on customer retention in the hospitality and tourism sector using ML models. Based on consumer sentiment data, the authors employed several ML algorithms, including decision trees, logistic regression, and k-nearest neighbours, to predict client retention. According to the report, ML models can reliably predict customer retention and may be used by businesses to design personalised retention tactics that target consumer pain areas. The process was also able to filter out fake reviews from the samples for more accurate data analytics in use for customer retention

Shah, S.S. (2020) examined the influence of customer lifetime value (CLV) on customer retention in the Telecoms sector using ML models. To forecast customer retention based on CLV data, the utilization of a variety of ML methods, including k-means clustering, decision tree and neural networks. According to the report, ML models can reliably predict customer retention and may be used by businesses to design personalised retention strategies that target high-value consumers.

**Natural language processing**

NLP used in research papers, the following all evaluated results using accuracy, precision and recall :

Abah, J.O. (2021) used a amalgamation of Convolutional Neural Networks (CNNs) and Long Short-Term Memory (LSTM) in order to assess customer reviews for the e-commerce industry. The workings used NLP techniques to extract sentiment features and identify topics connected to customer satisfaction and dissatisfaction. The model was trained on a large Amazon review dataset and optimized using techniques such as GloVe embedding and Va;idateed using accuracy, re-call and F1 score.

Chen, Y. et al. (2022) used Decision Trees to analyse customer responses for hotel booking platform. The study used NLP techniques to extract topics related to customer satisfaction and dissatisfaction, such as room quality, service, and location. The model was trained on a historical dataset and optimized using techniques such as feature selection and parameter tuning.

**Data Visualization**

Kitapci, O. et al. (2013) examined the elements that influence consumer loyalty in the context of the online charts were utilized in the study to investigate the correlations between various factors such as customer happiness, trust, and loyalty. A cluster analysis approach was also utilized in the study to organize clients based on their characteristics, and the findings were shown using a dendrogram.

Shrimal and Patil(2020) visualized the results of their collaborative filtering-based recommender system in the context of a markets and online markets using data visualization techniques. The study employed heat maps to display the product-user interaction matrix and demonstrate markey analysis. The researchers also employed RFM models to display the model's results.

Barbu and Ziegler (2018) (visualized the outcomes of their hybrid recommender system in the setting of a Hotels using data visualization techniques. The study included bar charts to depict the distribution of user ratings as well as the distribution of product categories. A Sankey diagram was also employed in the study to show the movement of consumers and reviews during the recommendation process.

**GAPS IN RESEARCH**

Despite the advantages highlighted throughout the literature review for the combination of Data Analytics combined with Customer Relationship Management the Author has noticed multiples gaps in the Academic research.:

1. Scarcity of experimental studies:  
While there are many conceptual papers on the use of data analytics and CRM to improve customer retention, actual studies that demonstrate the effectiveness of these techniques are wanting. The conduction of further research is needed to expand on the influence of Data Analytics in the enhancement of customer retention in multiple industries.

2. Majority of research focused on Bigger Companies:  
The majority of existing research on data analytics and CRM for customer retention is geared toward large corporations. SMEs, on the other hand, are an essential component of the economy and confront distinct issues in terms of client retention. More study is required to understand how data analytics may be effectively employed in SMEs to improve client retention.

3. Lack of consideration for the ethical consideration when using data: The ethical considerations that are discussed in the Authors paper later on have noticeably been non-existent in the research paper that author read in the compilation of this literature review and the difficulties that come with. Moving forward research papers should address these difficulties in regards to using data analytics in customer retention to give greater understanding to the field on the use of consumer data.

4. Poor consideration of human elements in customer retention: While data analytics may give useful insights into consumer behaviour and preferences, the significance of human variables such as customer emotions and attitudes is sometimes disregarded. More study is required to understand how data analytics may be used in conjunction with human insights to improve customer retention.  
  
The 1st noticeable gap in the lack of research on how data analytics has impacted on customer retention in a multitude of industries, A lot of the studies focused on very particular industries on a multitude of occasions, mainly that of banking. There is a need for data analytics and crim integration to improve customer retention in a plethora of other industries , e-commerce, retail, there is a lack of academic reports on these areas and how to implement the features to impact customer retention in these sectors.

Along with this there is also a very limited amount done of the last impact of data analytics for customer retention in emerging markets available to the researchers. A lot of untapped potential in the possibilities of DA+CRM in ever evolving but current under developed societies, there is need for a conduction of more research in these areas to see if there is a possibility to increase customer retention in these sectors moving forward.

An article that exposes some of these limitations is " Customer Relation Management, Smart Information Systems and Ethics" by Kevin, M. and Ana, F. (2019).  
This academic research paper showed that in relation to CRM there is a disregard to the ethical use of consumer data, and the concerns regarding such are ignored on a frequent basis. Al-Tit, A(2020) underlines the possibility of using data analytics for customer retention but highlights that once again that more investigation into the topic area in factoring in the variable of human involvement in effectively proceeding customer retention In SME’s, Ethical use and distribution of the data involved in the Data Analytics and the considerations that need to be addressed while using customer information for CRM. While there’s noteworthy benefits in using Data Analytics and CRM to enhance customer retention methods and results, the collection, manipulation of that information and use of the customers data does raise multiple ethical concerns- will the data stay private? Is the data safe? Will the data be used responsibly. Companies must ensure that the customers data is used in the most ethical way, as using the data provided by the customer for other means that they have not consented to can and should lead to irreparable damage to the companies’ public image. Such ethical considerations need in-depth research to build a greater universal management for ethical data management in business.

Another publication that shows significant research gaps on this issue is " Big Data Analytics in e-commerce: A systematic review and agenda for future research " by Akter, S. and Wamba, S.F. (2016). As the quantity of literature in regards to using Data Analytics in client retention increases one area that has been noted to have a gap in research from the Authors readings is that of E-Commerce. Long Term Achievement of Data Analytical implementation in this area lacks substance.  
It has also stated that within the piece of work the emphasis in researching the impact that social media has in regards customer retention, along with the previous stated worry of ethical consideration when implementing Data Analytics to enhance Customer Retention.

Another possible gap in the literature is the underutilization of customer segmentation in data analytics and CRM for customer retention. While numerous publications explain how to utilize data analytics to understand customer behaviour and preferences, there is less emphasis on how to segment consumers and customize retention efforts to distinct groups.  
Weinstein,A. (2001) paper " Customer retention: A usage segmentation and customer value approach. " stresses the importance of customer segmentation in business acumen, but, undertaking of more in depth research and analysis is desired to give an apprehensive answer on the use of customer segmentation in Data Analytics in conjuction with CRM to enhance customer retention.

Within the literature reviewed on Data Analytics for enhancing customer retention is the lack of including the importance of consumer happiness. While customer happiness is frequently addressed in conjunction with customer retention, few studies expressly investigate the link between customer satisfaction, data analytics, and CRM. " *Impact of CRM factors on customer satisfaction and Loyalty*." Long, C.L.S. *et al.* (2020) highlights the potential of data analytics for improving customer satisfaction, but more research on how data analytics can be used in conjunction with CRM to improve customer satisfaction and retention is required.

Another gap in the research is the neglect of the function of employee involvement in customer retention when using Data Analytics. As a vast quantity of the importance in using data analytics in combination with a customer relationship management model is dependent on the consumer and company relationships, the importance of personnel in providing top tier customer service is often disregarded The Academic piece " *Business-Unit-Level Relationship Between Employee Satisfaction, Employee Engagement, and Business Outcomes: A Meta-Analysis*." by Harter, J. and Schmidt, F. (2002)stresses the importance of employees providing top tier customer service in combination with the models to achieve goals, but on the face of the entirety of reports researched it is evident that further investigation is warranted in understanding how enhancing customer retention in business through the use of data analytics and CRM can only succeed in the implementation of the results through employee providing the respected quality of customer service.

Another gap in the literature on data analytics and CRM for client retention is the neglect of cultural issues. Cultural norms and values impact customer behaviour and preferences, which differ between areas and nations. The paper " Issues and Perspectives in Global Customer Relationship Management " by Pancras , J. *et al.* (2006) emphasizes the importance of taking cultural differences into account when designing and implementing CRM strategies, but more research is needed to determine how data analytics can be used to identify cultural differences and tailor retention strategies accordingly as through the paper the generalization of global practice rather than tailored cultures.

Another potential gap is a lack of focus on the function of trust in client retention.   
Individuals that have trust in the use of their data from a company are of a higher expectancy to stay loyal. The research article " *The impact of trust, privacy and quality of service on the success of E-CRM: the mediating role of customer satisfaction*. by Dehghanpouri, H., Rostamzadeh, R.R. and Soltani, Z. (2020) gives a define correspondence on the importance trusting the company in relations to customer relationship management is in customer retention, Further learnings into the area of using data analytics can be operated to create and preserve trust in consumers to enhance customer retention.

More study on the utilization of developing technologies in data analytics and CRM for customer retention is required. As more and more technologies continue to implement machine learning and Artificial intelligence (AI) into their applications there is an incredible opportunity to enhance customer retention. As these are currently progressing in the field the research into them is absent, the research article " INVESTIGATING THE EFFECT OF ARTIFICIAL INTELLIGENCE ON CUSTOMER RELATIONSHIP MANAGEMENT PERFORMANCE IN E-COMMERCE ENTERPRISES " by Li, L. *et al.* (2022) observes how AI is used in enhancing customer retention, yet, more research is desirable to states how the emerging technologies in unition with data analytics and CRM in enhancing customer retention.

4.**Proposed Sampling Strategy** 894

Customer Relationship Management (CRM) is a critical part of today's enterprises. It entails managing and analysing customer contacts and data throughout the customer lifecycle using technology and strategy. Data analytics has grown more significant in CRM operations in recent years, as firms attempt to better understand their customers' behaviour and preferences and utilize this knowledge to boost customer retention.

Individuals that control their company's CRM activities will be the population of interest in this suggested study. These people will be familiar with their company's CRM strategy, data analytics methods, and customer retention initiatives. The goal of selecting this group is to acquire insight into how firms use data analytics to improve CRM operations and customer retention.

Purposive sampling will be utilized to find the right population. This is a non-probability sampling strategy that allows researchers to choose participants based on particular criteria. The participants' skill and experience in CRM operations, data analytics, and client retention tactics will be the criterion in this scenario. The objective is to choose individuals who have a thorough grasp of the issue and can contribute significant insights to the research.

Purposive sampling will be carried out in two stages. The first stage will entail finding potential participants who fulfil the eligibility requirements. Industry groups, professional networks, and internet platforms will be used to accomplish this. Potential volunteers will be contacted and told of the study's goal, the time commitment required, and the anonymity of their replies.

The selected applicants will be invited to engage in in-depth interviews in the second round. In-depth interviews are an acceptable approach of data collection for this study since they allow for a deep analysis of the participants' experiences and viewpoints. The interviews will focus on the CRM operations, data analytics methods, and customer retention strategies of the participants' companies.

The interviews will be semi-structured to ensure the quality of the data. This enables the interviewer to ask follow-up questions and investigate subjects that come up throughout the chat. Participants may raise issues that were not initially on the interview guide, thanks to the semi-structured method.

The sample size will be determined by the number of participants who fulfil the population of interest's eligibility requirements. It will be of satisfactory quantity to produce the richness and depth of data needed to satisfy the criteria but confined enough to enable satisfactory management and data analysis. The population of interest will be correctly represented through the sample.

Following the completion of the interviews, the data analysis procedure will commence. Thematic analysis will be used to the data to find patterns, themes, and categories. Thematic analysis is a method for examining qualitative data such as interview transcripts that is widely utilized. It entails systematically detecting patterns and themes in data and categorizing them into relevant groups.

A preliminary evaluation of the data will precede the study. The transcripts will be reviewed in their entirety, and first thoughts and emergent themes will be noted. After that, the data will be coded, which entails marking areas of the text with descriptive words or phrases. The codes will be grouped into categories, and themes will be determined using category analysis.

The topics will be examined and improved after they have been discovered. This procedure will entail checking over the data again to confirm that the themes are correct and full. The themes will then be structured into a cohesive narrative to answer the research questions and give insights into the usage of data analytics in CRM operations.  
  
  
**Limitations of Purposive Sampling one must be aware of in the conduction of this research paper**

When selecting participants for a research project, purposive sampling has various drawback:  
As the individuals selected by the author are done so due to fitting a definite measure, the sample can bring bias into the study and restrict the findings' generalizability. Purposive sampling may provide a sample that is neither varied or representative of the wider population, depending on the selection criteria. This may hinder the study's capacity to collect a diverse range of opinions and experiences.

Potential for the Authors own bias:   
The Author may have preconceived assumptions or expectations regarding the features or attributes of purposive sampling participants. This might have an impact on the data collecting and analysis process.

Difficulty in choosing participants:   
It may be difficult to discover and recruit persons who fulfil the purposive sample selection requirements. This can result in a lower sample size and impair the study's capacity to make significant results.

Time-consuming and resource-intensive:  
Identifying and recruiting participants who match the selection criteria may take a substantial amount of time and resources. This can raise the cost and duration of the investigation.   
  
As can be seen in the report that can through the selection of using purposive sampling that in the selecting participants for the report, it is equally important to understand the limitations that come through the assessment. Purposive sampling can aid in the recruitment of people with relevant expertise and experience with CRM operations and data analytics. In-depth interviews, which allow for a deep analysis of the participants' experiences and opinions, may be an acceptable data gathering strategy for this study. The analysis and interpretation of the findings entail arranging and summarizing the acquired data as well as making sense of the results in order to make conclusions based on the research question and the data collected.

5. **Primary Research Methodology** 1127

The Role of Data Analytics in Customer Retention in the 21st century is a crucial component in a business to be able to effectively use the full scope of a customer’s exchanges in the honing of company goals, that’s why now more than ever Customer Relationship Management systems are becoming more and more prevalent in optimizing the retention of current and future clients in light of the data driven economy in today’s world. The importance of such research to a business is highly valuable and that is why the importance of the primary research chosen to delve into the workings has such importance, that is why conducting in-depth interviews on the subject of data analytics in customer retention with individuals that manage Customer Relationship Management operations within business’ is the best primary research method. In this Research Paper the Author will show as to why in-depth interviews are the appropriate primary research methodology in this scenario to understand the data analytics used within customer retention

Why In- Depth Interviews is the best research methodology for this report:  
There’s a number of advantages that in-depth interviews have with the subject area in regards it being the appropriate means of research for the data analytics within CRM in customer retention in a business when it comes to a data analysis report:  
  
Trust:  
Doing an in depth interview allows the creation of a rapport between researcher and interviewee , this is essential in being able to create a relationship in understanding the level of trust needed to be established with discussing sensitive data, giving both parties a clear scope of the trust needed for the project as there could be hesitation in the sharing of confidential information and understanding the privacy to be maintained within the report.  
In less personal methods it would be more difficult to gain insight from the companies in regards to how they are using data, but conducting the research in this method allows to establish the trust to eliminate any data privacy concerns they may have with the conductor of the research. Creating an environment where trust is mutually accepted within the space enables the interviewer to gain the vital information on the data experience and individual perspective to creating more accurate report results.

Engagement:  
Continuing from the gained Trust in the environment of the in depth interviews , it creates a higher level of engagement to the purposed questions as instead of getting mundane answers it allows the participants share perspectives and experiences in support of the topic area.  
The Level of engagement from participants increases and this is of great importance when conducting research on how data analytics are used in customer retention in todays economy, Giving the Author a better understanding of the attitude towards the data and how it is being used to gain a better perspective of a customers wants and needs and how companies are tailoring the results of the data analytics to achieve their purposed goals.

An example of such would be asking participants how their company takes action in regards customer data privacy and security, or the benefits and limitations when it comes to the use of data analytics in customer retention in company operations. These particular set of questions would enable the insight of attitudes and behaviours from various participants that could establish an understanding of potential barriers across the interviews of the efficiency of data analytics in enhancing customer retention through the implementation of customer relationship management models.

Affluence of Data:  
In-depth interviews allow for a comprehensive and extensive investigation of the experiences, opinions, and viewpoints of the participants. This strategy allows researchers to dive further into participants' comments by asking follow-up questions to clarify and expand on their responses. This enables a more thorough grasp of CRM challenges in a firm for a data analytics research paper.

The chosen of method of primary research In-depth interviews, allow the Author to investigate how organizations use data analytics in their CRM strategy. Creating the possibility to inquire about how data analytics is utilized in customer segmentation, how it is used to gauge customer happiness, and how it is used to follow consumer behaviour over time. Enabling the research to gather a wealth of information by asking these sorts of inquiries.

Flexibility:

In-depth interviews are a versatile research tool that may be adjusted to individual study questions and objectives. The Author can modify their questions and suggestions during the interview based on the replies of the participants. This adaptability enables the ability to gain a more complete grasp of the topics being examined, making it simpler to select the most suited study approach.

For example, if a participant cites a specific tool or program that they particularly use to handle client data, one would be able to inquire about the features and capabilities of their chosen application. This enables the research to have a more complete understanding of the specific tools and technologies utilized in using data analytics in customer retention operations.

Diverse Participant Viewpoints:   
In-depth interviews allow the Author to get a wide range of viewpoints from participants. This is especially true when researching CRM in a business for a data analytics research paper, because various organizations may have varied strategies for employing data analytics in their CRM operations.

The Author, for example, can interview participants from other sectors, including retail, and finance, to acquire a better knowledge of how organizations in various industries use data analytics in their enhancement of Customer retention. This can give academics a more in-depth understanding of the problems and possibilities involved with applying data analytics in CRM operations across various businesses.

Validity and Reliability:   
When performed correctly, in-depth interviews are a valid and reliable research approach. Open-ended questions that allow participants to disclose their own experiences and opinions, rather than being guided by the researcher's biases or assumptions, can help assure the validity of the findings. Using consistent interview processes and procedures can also help researchers verify the trustworthiness of their findings.

As can be seen from the detail discussed in this section, in-depth interviews are the most effective primary research technique for determining the proper research methodology to apply in connection to CRM in a business for a data analytics research paper with a primary focus on personnel directing their company's CRM operations. In-depth interviews provide researchers with rich and detailed data, flexibility, participant engagement, trustworthiness, and participant diversity, all of which are necessary for obtaining an accurate and comprehensive understanding of CRM issues in business for a data analytics research paper. Finally, using in-depth interviews may assist researchers in determining the best research approach for examining CRM in a business for a data analytics research paper, which can lead to more informed decisions and, ultimately, better business outcomes.

6.**Ethical Considerations- add into end of chap 2** 1086

The constant expansion and development of data analytics over recent times also brings with it a multitude of new and developing concerns one may be aware of. Across the different fields of business each company trying to gain leverage on the use of consumer data in behavioural predictions and optimizing campaigns tailored to the results of these behaviours to facilitate growth and reach company targets. This surge of Data Analytical manipulation also increases the potential variety of ethical considerations one must take when collecting, analysing, and using the information in the appropriate manner. In correspondence to conducted a data analysis report there is a number of ethical considerations that the author is going must be aware of to ensure the ethics in the reporting of this project are conducted in a responsible manner. The following are the ethical considerations the author has highlighted for this Research project:  
  
Data Privacy:  
The first key area to be highlighted is that of data privacy for ethical consideration in the Data Analysis Report. Regardless of field all companies must understand the customers rights in their data to remain private and not to be used in any manner that is unsuitable to the consent that was given,  
There are a several means to address any ethical concerns in regards to this matter:  
  
Limited Access:   
Introducing and adhering to controlled access to consumer data , companies enforce that only a limited quantity of authorized individuals have access to the systems containing customer data, in turn reducing the potential mishandling of an individual’s information  
  
Remove Personal Information:   
Taking the data and removing the data such as their address and names from the dataset can help in protection of privacy for those sharing their data with 3rd parties, creating an anomaly of the personnel involved.  
  
  
Along with these measures for assuring the privacy of peoples data gaining consent the individual gives permission to use their data it may not always be clear as to the extent of which a company can use that data, Leaders should inform any persons providing data, when they are collecting that data, of to all means that it can precisely how their data is going to be used, preferably in a form of explanation that would ease subjects into providing more accurate information for further analysis. This explanation of intent should in turn give the data givers an understanding of use and consent to use data given in the means of which the company wants to use shared data without any misconceptions that would arise further down the line if the person was not informed and consented to this form of use. **(**Lukic, 2015)  
  
Transparency  
Being Transparent enables to build trust with those the data is being collected from, doing so enabling them to be aware of how the collection, analysis and use of the data is going to be implemented. Without the transparency those involved may create a distrust and break in relations with the consumer and potential legal consequences, to address this the following actions can be implemented.

Comply with GDPR regulations  
Just as the company abides by laws set upon them from the country, they are established they must also respect the operations and rules of all nations that prospective data providers are given that confidential data from.   
An example of these known regulations is the General Data Protection Regulation, (GDPR).   
GDPR came live on the 25th of May 2018, and affects all Business’ within the EU.  
GDPR gives people the right to know how their information is controlled, that their personal data is stored properly, and can request such information at any point. Personal data is that can identify a person by itself or together with information. The data subjects involved with GDPR is everyone to whom the data belongs to.  
It is of upmost that the Author ensures that these GDPR regulations are abided to as the penalties to Companies if they didn’t abide by the regulations, they face a potential fine of 4% of overall company worldwide turnover. This would be a devastating loss to a company and connects to the previous subject of transparency between provider and user as this would eliminate this possibility of damages. (EU Commission,2023)  
  
Demonstrating to those within the report that the collection and conduction of the data analytical report that their ethics are being taken into account to put them at ease that their rights are being a heard to and their interest is in mind, implementing these it can create an established base to ensure the ethical use of data used within the report is being done so in an ethical manner to eliminate fear of privacy risks.  
  
  
Bias Results  
In Data Analysis reports a major concern of ethical consideration is that of biased results if the analysis conducted does not follow the proper procedures into eliminating those possibilities.  
implementing ethical concepts into the core foundations of the data to make sure that, revaluating algorithms to effectively reach the data’s needs is a massive ethical decision to consider, as machine learning algorithms can only be so limited to its results based on what data it is trained.   
An example of such would be an algorithm could potentially leave out suitable consumers for advertisements if the coding is wrong and it’s important to make sure that these mistakes are quickly found and corrected to assure there’s no biased in the results

To set clear guidelines to for the elimination of discrimination in the results using the data we can that the following approaches for ethical consideration:  
  
Cleansing the Data: Using this technique to remove and reduce the risk of bias ensuring the cleanest data is used for the analysis  
  
Model Revaluation: when using model for customer retention it can be done from an ethical proposition to highlight outliers and variables within the information that could contribute to an over fitted model in training the model in giving specific return of results. Testing the Models on different groups of customer retention data to ensure the impact on one particular outcome is upheld.  
Using the above precautions in regards to monitoring bias implications and elimination of the risk of disruptive data set the standard of what the success of the report will be with the proper ethical use of the information that it is using the right questions to analyse data sets to gain correlations between data sets that will guide the Author to discovering not only the right answers, while following ethical choices, but better, more informative answers.

7.**Conclusion - 578**As can be seen throughout the Research Paper The author has shown the importance of Data Analytics in enhancing customer retention. There is a multitude of substantial benefits to integrating Data Analytics in combination with a Customer Relationship Management model for enhancing customer retention. The insights companies gain into their customers trends provide invaluable feedback to their preferences and calculated decisions. Studies have highlighted that companies can use such information to improve the experience for both the business and consumer through various methods such as improved customer service and offers leading to customer retentions rates to increase.However, the Author also highlighted the gaps in current research literature, such as the limited depth of research on the effect data analytics and Customer Relationship Management has on customer retention in a multitude of industries and emerging markets, along with the need of ethical reports on the use of data analytics and customer relationship management for customer retention. More Research needs to conducted within these areas to address the glaring gaps to provide more guidance on using customer data in relation to data analytics and customer retention to eliminate any concerns individuals have about the security, privacy, and ethical use of their data.Building a model around the customer provides the ultimate customer satisfaction experience but doing so , through the Data Analytics in enhancing Customer Retention, as the author has highlighted, must be done with accountability of proper use of that data in the first place.  
Implementing the use of data analytics to all the customers’ information, to best provide what they want, and what they don’t know they want yet, ahead of time from forecasting shown from customer’s behaviour and using such to do so to the highest Ethical quality standard.  
Ensuring the customer is aware that they’ve agreed to use of their data before executing it into practice, all though, it may be able to provide them a greater service or tailored experience if done so without their consent can lead to major legalities and in return bring a bad stigma towards future workings that would manifest into others not wanting to conduct business with again in the future.   
These Ethical considerations expected within the research project have been clearly addressed by the Author and how they will be undertaken to the appropriate manner.  
Overall, the Research paper can be seen as a success for Justification of the authors choice of Sampling strategy, Research methodology and the need for further research into the topic area of data analytics and CRM combination for customer retention. How businesses decide to interact with their consumers is being directed by customer data giving treasured depth of knowledge into preferences and trends, giving them the upmost possibility to deliver a tailored experience with the notion of a stronger customer retention policy and customer satisfaction. By implementing Data Analytics and Customer Relationship Management customer relationships and retention rates can continue to grow through addressing the gaps in current research. While addressing those gaps the implementation of proper ethical considerations shall be maintained for up most trust of all individuals that shall par-take in the final research papers workings via research methods and sampling acquisition for data analysis as outline in the paper. The correct sampling and research methods have been identified to be able to illustrate , what the author believes as, the richest information pipeline possible for the subject area that will lead to more informed strategy choices for businesses.

**REFERENCES**

Abah, J.O. (2021) “*Sentiment analysis of Amazon electronic product”.* Available at: https://esource.dbs.ie/bitstream/handle/10788/4291/Jemimah\_Abah\_Dissertation\_Report.pdf Accessed on: 7/5/2023  
  
Al-Azzam, Abdel (2022) “The impact of customer relationship management on hotels performance , The Impact of Customer Relationship Management on Hotels Performance in Jordan*”*. Available at: https://www.researchgate.net/publication/363264247\_The\_Impact\_of\_Customer\_Relationship\_Management\_on\_Hotels\_Performance\_in\_Jordan\_1   
Accessed on: 20/4/2023

Alam, M.M.D. and Noor, N.L.M. (2020) “*The Relationship Between Service Quality, Corporate Image, and Customer Loyalty of Generation Y: An Application of S-O-R Paradigm in the Context of Superstores in Bangladesh*,” Accessed at: https://journals.sagepub.com/doi/pdf/10.1177/2158244020924405.  
Accessed on: 8/5/2023

Andiran,B. et al (2022) “*Sentiment Analysis on Customer Satisfaction of Digital Banking in Indonesia*”  
Accessed at: <https://www.researchgate.net/profile/Bramanthyo-Andrian/publication/359684655_Sentiment_Analysis_on_Customer_Satisfaction_of_Digital_Banking_in_Indonesia/links/6247cad68068956f3c61a229/Sentiment-Analysis-on-Customer-Satisfaction-of-Digital-Banking-in-Indonesia.pdf>  
Accessed on: 9/5/2023

Akbar,M (2013 )“*Three Competing Models on Customer Loyalty in the Context of Mobile Subscribers*”  
Accessed from: https://pdfs.semanticscholar.org/204b/ec1a15db5295dd3cbdaa7f38609ccccac68a.pdf

Accessed on: 11/5/2023

Akter, S. and Wamba, S.F. (2016) “*Big Data Analytics in e-commerce: A systematic review and agenda for future research”*, *SpringerLink*. Available at: https://link.springer.com/article/10.1007/s12525-016-0219-0   
Accessed on: 4/5/2023

Al-Tit, A(2020) “*E-commerce drivers and barriers and their impact on e-customer loyalty in small and medium-sized enterprises (SMES)”*  
Accessed at: <https://www.econstor.eu/bitstream/10419/248015/1/1700196405.pdf>  
Accessed on 12/5/2023

AMUDA,K. and ADEYEMO,A.(2020) “*Customers Churn Prediction in Financial Institution Using Artificial Neural Network”* accessed from: <https://arxiv.org/ftp/arxiv/papers/1912/1912.11346.pdf>  
Accessed on: 5/5/2023  
  
Anderson, J., Jolly, L. and Fairhurst, A. (2007) “*Customer relationship management in retailing: A content analysis of retail trade journals, Journal of Retailing and Consumer Services*” Available at: https://www.sciencedirect.com/science/article/abs/pii/S0969698907000161   
Accessed: 11/5/2023

Arik, K. and Gezer,M. (2022) “*The study of indicators affecting customer churn in MMORPG games   
with machine learning models*”

Accessed at: https://www.researchgate.net/profile/Kaan-Arik/publication/366714541\_The\_study\_of\_indicators\_affecting\_customer\_churn\_in\_MMORPG\_games\_with\_machine\_learning\_models/links/63b00ac9a03100368a415f64/The-study-of-indicators-affecting-customer-churn-in-MMORPG-games-with-machine-learning-models.pdf  
Accessed on: 9/5/2023

Barbier, G. and Liu, H. (2011) *“Data Mining in Social Media”*  
Accessed at: <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=8a60b082aa758c317e9677beed7e7776acde5e4c>  
Accessed on: 9/5/23

Barbu, C.M. and Ziegler, J. (2018) “*Designing interactive visualizations of personalized review data*.” “”Available at: https://www.researchgate.net/publication/328334662\_Designing\_Interactive\_Visualizations\_of\_Personalized\_Review\_Data\_for\_a\_Hotel\_Recommender\_System   
Accessed: 7/5/2023

Ballester,M. Grau-carles,P. Sainz, J.(2017)  
“*Customer segmentation in e-commerce: Applications to the cashback business model”*  
Accessed at:  
<https://fardapaper.ir/mohavaha/uploads/2018/07/Fardapaper-Customer-segmentation-in-e-commerce-Applications-to-the-cashback-business-model.pdf>  
Accessed on: 11/5/2023

Caigny ,A. Kristof Coussement,K. De Bock,K. and Lessmann,S.(2019)  
“*Incorporating Textual Information in Customer Churn Prediction Models Based on a Convolutional Neural Network*”   
Accessed from:  
https://pdf.sciencedirectassets.com/271676/1-s2.0-S0169207020X00045/1-s2.0-S0169207019301499/am.pdf?X-Amz-Security-Token=IQoJb3JpZ2luX2VjEKP%2F%2F%2F%2F%2F%2F%2F%2F%2F%2FwEaCXVzLWVhc3QtMSJIMEYCIQClrJZ2sr7iJfxrG9aFP05EFdcjDKNmVWNYCOiVaMj0KwIhAPuXcYlcYBfV67mnLItVvAeA8ABqcYW4nd%2FEd3EwKLS5KrwFCLz%2F%2F%2F%2F%2F%2F%2F%2F%2F%2FwEQBRoMMDU5MDAzNTQ2ODY1Igy9LvDtU4RFDx83LxAqkAURAj2gtiTxWrwBAQ5U5l7kcTeeF34F6XmoMjf4woTrzG%2Bel7X0kJst58W63a7SLyZ3gtvtPsAwlxgsoq5rQhWbVL0WvoZYr7HPht57IlrutbMYDdq4KcZYRHwPxZ5wKxq1WltcI73x%2BY01DBndFJz%2FzFayelvm3ENNDPqgAqOKjUUgwzTFiuyOa8VgGM5n0wKJuvbozOWhYL7ui5%2F%2B7FjDtGWslyANvG7tiWp1vuhqAQgF3UWPiXD09vaF0JOhtbdChS%2BKm7tuA6q2E25RJ4cm6g9dKiaVZYRAbK%2F6cMZ%2F0N87OYGQkaxPTMAOa4l1kEznQ1XoF%2B95eLajxYQt%2Fnv1c%2F1n27J6DqCPUpdWYaNs7l1jf1dTlMxpyWeJOqJo7STLoHxQh6Ut5h84PnB%2BpbR0JPpcEaoHhHroYinRLM%2BMMv1QjUIXNkjYM6IuTHWBQQOV9S9uCE%2Bs5OhnVudIcmmOw7Sws0ECzb3QrfFhg2kjDqKlRa9xLEj7A5BVWiEkZVPbOFwgsebfn1bEsGUcoUO54hjQNVwUGZlEYEvZLr%2B2Qn2oKTYeO9lEk90xngxYl0l519YQ7q5Prq6np0B%2BajN8bIJCguWtSZgIxPsDTaLVyGH%2FuvtcgxYIS9qwKRRBbHEC8NA%2FkuBIgd29cEQT6YbDKzmF%2F5bQ3%2BkWUXvRuNe49C4yxxFZQ9nVe7xDdy8rFS4Kam5E0l6xdVa9QGBpVjirGHBQczeesEjBvt1UBfp1wjMkixE404fRNb1dhDuvQUej7U34leeGkiQmw9wqSvH0z1VfVeFw%2BLdR3tCUyfqS6IodLwPo9aFljRlLycTjfO4niL659Boie62YmzFnVMLD%2Fd9zoppgcliGTaPZPO%2FhljDBuPiiBjqwAYKjCx7zQW8FvhCsV5bkiDkg9Ghu%2B4Oq236VSpy31SUn06vXb9IwORFjjxWSBEpX2jCNgRu4oVLmHkBZ6mQiIui6aHfw5wI%2FTIjwlY3pq0T%2BdS5SdE%2FOA1VxjVNuoY44VOErZi2n3gnFkUXSvU%2FRhLhQSnVlqwiUFGdHum47XNkB1wSNneReOoZH5xI%2BrldjUYESsBto3pC4%2Bs%2BVM4B0oMmjBn%2FipcoOvXj%2FtfIHLImX&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Date=20230512T114246Z&X-Amz-SignedHeaders=host&X-Amz-Expires=300&X-Amz-Credential=ASIAQ3PHCVTY64GGDWON%2F20230512%2Fus-east-1%2Fs3%2Faws4\_request&X-Amz-Signature=d538194d651a12dbf363f47f7a7cb4f14a567a0adbe3daca06586e01d2f47234&hash=37140724c61f67115f22853879373acadaa750d9f236ccb47bdaff552601da1f&host=68042c943591013ac2b2430a89b270f6af2c76d8dfd086a07176afe7c76c2c61&pii=S0169207019301499&tid=pdf-4811b512-ed39-417f-b918-54925321af0a&sid=0693944158fca74d1c6b062359aa8b428a62gxrqb&type=client  
Accessed on: 6/5/2023

Caruana,A. (2003)” *The impact of switching costs on customer loyalty: A study among corporate customers of mobile telephony*”   
Accessed at:https://link.springer.com/content/pdf/10.1057/palgrave.jt.5740113.pdf

Accessed on: 8/5/2023  
  
Chen,A.(2019) “*Steam Games: Factors that Drive Customer Retention*”  
Accessed at: <https://mmss.wcas.northwestern.edu/thesis/articles/get/1010/Chen.Athena.MMSS%20Thesis.pdf>  
Accessed on:7/5/2023

Chen, Y. et al. (2022) Exploring bidirectional performance of hotel attributes through online reviews based on sentiment analysis and Kano-IPA model, MDPI. Available at: https://www.mdpi.com/2076-3417/12/2/692   
Accessed on: 7/5/2023  
  
Chitturi,R. (2009) “*Emotions by Design: A Consumer Perspective*”  
Accessed at:https://www.researchgate.net/profile/Ravindra-Chitturi/publication/275952326\_Emotions\_by\_Design\_A\_Consumer\_Perspective/links/554a6f360cf29752ee7c19ce/Emotions-by-Design-A-Consumer-Perspective.pdf  
Accessed on:8/5/2023

Dai, Y. and Huang, J.-H. (2021) “*A Sales Prediction Method Based on LSTM with Hyper-Parameter Search,*” Available at: <https://www.researchgate.net/publication/349111600_A_Sales_Prediction_Method_Based_on_LSTM_with_Hyper-Parameter_Search>  
Accessed on 10/5/2023

Dam,N. Dinh,T. and Menvielle,W.(2019) “*Marketing Intelligence from Data Mining Perspective — A Literature Review*”  
Accessed at: <http://www.ijimt.org/vol10/859-MK033.pdf>  
Accessed on:9/5/2023

Dehghanpouri, H., Rostamzadeh, R.R. and Soltani, Z. (2020) “The impact of trust, privacy and quality of service on the success of E-CRM: the mediating role of customer satisfaction.” Available at: https://www.researchgate.net/profile/Reza-Rostamzadeh-2/publication/340840032\_The\_impact\_of\_trust\_privacy\_and\_quality\_of\_service\_on\_the\_success\_of\_E-CRM\_the\_mediating\_role\_of\_customer\_satisfaction/links/618c08423068c54fa5ca2396/The-impact-of-trust-privacy-and-quality-of-service-on-the-success-of-E-CRM-the-mediating-role-of-customer-satisfaction.pdf   
Accessed: 13/5/2023

Díaz,E. Consuegra,D. and Águeda.(2011) “*Consumer loyalty in mobile telephony*” Accessed from: https://d1wqtxts1xzle7.cloudfront.net/29318970/diaz\_et\_al-libre.pdf?1390875975=&response-content-disposition=inline%3B+filename%3DConsumer\_loyalty\_in\_mobile\_telephony.pdf&Expires=1683893558&Signature=SLzMtOMfrNQUP3IC6~x2GAzaHj5d2~nklZB7PbKxeOrbD-KWfO1pXNNs5epzUKt0fxkmqEIn8mAylg~96VwwpQJmj-VN6TuKzQZQ8DX-AkOlaAhUXgECD93A24oq7W-Bd55QPg7-gmNC6HwqmvSGHq0HnYYU-9UPPFkqTNVQXzk3TFGZ5tm3rZ34plCQ4ZXm3Q7n~H8lwH7Cj5GyV1yIsUQCFWvPqmy8xmW6DjCyTkQC3jjBJrGgoicz~ux1Ax4svtSXbnOgjwbITgRXE2SpTb1YySSMFDdJCRh4YOXyF16i7FBHk9Ov7~K6qNkhW4cbLNO-wR7EnUTWiS75~rcgiw\_\_&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA   
Accessed on 6/5/2023

Deloitte (2023) ‘*Data-Driven Change Management Using Transformation Intelligence,* Deloitte Online  
Available at: https://www2.deloitte.com/content/dam/Deloitte/us/Documents/human-capital/us-data-driven-change-management-using-transformation-intelligence.pdf   
Accessed on: 20/3/ 2023

*Dilini, Kulawansa and Perera (2018) ‘A review of Big Data Analytics for customer relationship management ‘ online* (no date). Available at: https://ieeexplore.ieee.org/abstract/document/8736131   
Accessed on: 20/3/2023

Drachen, A. *et al.* (2016) “*Rapid prediction of player retention in free-to-play mobile games”*. Available at: https://arxiv.org/pdf/1607.03202.pdf   
Accessed on: 5/5/2023

EU Commission (2023) “*New standard contractual clauses - questions and Answers Overview*, *European Commission*.” Accessed at: https://commission.europa.eu/law/law-topic/data-protection/international-dimension-data-protection/new-standard-contractual-clauses-questions-and-answers-overview\_en   
Accessed on: 13/5/2023

Gao,Y. Liu,H. and Sun,Y (2023) *” Research on customer lifetime value based on machine learning algorithms and customer relationship management analysis model*”  
Accessed at:https://www.cell.com/heliyon/pdf/S2405-8440(23)00591-1.pdf  
Accessed on: 9/5/2023

Garg et al. (2020) “*Examining the relationship between social media analytics practices and business performance in the Indian retail industry: The mediating role of customer engagement*”   
Available from :https://pdf.sciencedirectassets.com/271677/1-s2.0-S0268401220X00028/1-s2.0-S0268401219305493/am.pdf?X-Amz-Security-Token=IQoJb3JpZ2luX2VjEKH%2F%2F%2F%2F%2F%2F%2F%2F%2F%2FwEaCXVzLWVhc3QtMSJHMEUCIQDMmBKkLMZbcpc7yXI7jXMy0YCAo06fkbPGsLjj7EC7VAIgPG16c%2Biz73KtqFq%2FHEkBOF15jOazD1EXXEqh2EX%2FwWQqvAUIuv%2F%2F%2F%2F%2F%2F%2F%2F%2F%2FARAFGgwwNTkwMDM1NDY4NjUiDMHnrMAeILdfAP6rYSqQBay41%2FeGRgEUK%2ByB2cLxdlINS5YFhhJs0yX1MwXOWTRruTYFxBACkB1%2BAjppnZFVf8mPgGqYQwEbCb1PGJwH%2FsTJH%2BPud88ObZ9wyQy%2BcMgPMVBs3IlbQw5nGUEDkFZuAUrZh9mHS2ib84hyS3NNlJ8EdEAi5gqJK4GYope3BZfbNkZB2pSDrjhMvViNaerpZ6v3YweQ5lam0cJNM7uDQlFJufM%2BU0ZHVsZmPHNrl2JtuBAliecOrl%2BoFr2Q2bBp%2Bqpe5vgJoSOIjwSmI2b2BpybsFAbS%2BKQinu49W7uqCRgtw8MZCGFsJWgivWVqMjXs4L6T46or9%2FiWKEX9RYBmX%2BaSBTV%2FLgUpC37qdW7rkpGI7nSy%2ByM9ZeGzBeuZLpK1X6iRCC7EBV6U5rUMpoHV8HtfvLdWay9tYafDzyj6Hy89vj7G1LEy%2FIyWROoqUQyiz81wF6dLyreYqQ8vcIgNkBwSJ1WDys59kmOkln9tbvlJSxRMquprEtwGOCwnSTCZuqFng1XZzNAVOJMfRSKk5bVY4cJvgJtRlBPMurIQupGqeoLSqv%2FKVt3VDG%2F8gKCDvZleUCuPxzbSM34k6cwsCLvP6A8BtFjDQP9U82hb0nkWOPH4vMOdv1mQTECEkVvqgHbL5%2BDVf8MkQiTPxAtGUCutlXRFEirS3hpSijs9VunKzaZXaHGPmEN%2BzHjuuF4JdB6Kwg4Jnnet%2BbnLoksmyfqo6ROweNyzQEs%2BiHx26LeXRHCJ5JGPt%2Fx7FEO4SXpx9Z23TVlD21M1wrEnLD1%2FgnuTG%2B0llz3wc6zLFJaPjpWosrPUEptlIU525j%2BrmgZsitHqe7S62HiNw5wZx1ZdI8qephptmEkhcWojieHExmHMND%2F96IGOrEBqXqTdtdv0Z0UoYnOjcr0sbli52ex9c9Sjc6snhzVqDhzYJ3TYeuGAaOOZYt8BsxFCfNQh4Xp2MtNHM9MW7T8BMK7tKaSEl%2FJzQiaU6DSGGfQp%2F9wxdayjwwXsdUS3jgTUD8J8QSa7%2FCD6Oydwqv4Rd9y2jTRPJgHYXeDS6uwelHdfPt%2BtbujC7gR9j9lOngTbmDQl8VxzK1yVnqsCmN4lnvIFu4YhKw9nD2I1oSiVbrU&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Date=20230512T093123Z&X-Amz-SignedHeaders=host&X-Amz-Expires=300&X-Amz-Credential=ASIAQ3PHCVTYVVPGBHEY%2F20230512%2Fus-east-1%2Fs3%2Faws4\_request&X-Amz-Signature=881300f592382dc9484b49ad5821c00656d152a6bca35ea479286dd8d93b62df&hash=98815dc6480df829138420e62280751891a16a68c611bf15952960d18f8bfa65&host=68042c943591013ac2b2430a89b270f6af2c76d8dfd086a07176afe7c76c2c61&pii=S0268401219305493&tid=pdf-918216fd-5b08-4e73-8cf8-442eee9fb8f6&sid=0693944158fca74d1c6b062359aa8b428a62gxrqb&type=client  
  
Accessed on : 6/5/2023

Golbayani, P., Florescu, I. and Chatterjee, R. (2020) “*A comparative study of forecasting corporate credit ratings using neural networks, support vector machines, and decision trees*”, arXiv.org. Available at: https://arxiv.org/abs/2007.06617   
Accessed on: 4/5/2023

Goutam, D (2020) “*CUSTOMER LOYALTY DEVELOPMENT IN ONLINE SHOPPING: AN INTEGRATION OF E-SERVICE QUALITY MODEL AND THE COMMITMENT-TRUST THEORY*”  
Accessed at: <https://idr.nitk.ac.in/jspui/bitstream/123456789/16885/2/158041SM15F08.pdf>  
Accessed on: 11/5/2023

Hapsari, R., Clems, M. and Dean, D. (2016) “*The mediating role of perceived value on the relationship between service quality and customer satisfaction: Evidence from Indonesian airline passengers, Procedia Economics and Finance*. “Available at: https://www.sciencedirect.com/science/article/pii/S2212567116000484?ref=pdf\_download&fr=RR-2&rr=7c6326284b197535   
Accessed on:5/5/2023

Harter, J. and Schmidt, F. (2002) “*Business-Unit-Level Relationship Between Employee Satisfaction, Employee Engagement, and Business Outcomes: A Meta-Analysis*.” Available at: https://members.bestbusinesscoach.ca/wp-content/uploads/2022/11/Business-Unit-Level-Relationship-Between-Employee-Satisfaction-Employee-Engagement-and-Business-Outcomes-A-Meta-Analysis-1.pdf   
Accessed: 12/5/2023

Hennig-Thurau, T., Langer, M.F. and Hansen, U. (2001) “*Modeling and managing student loyalty “*. Available at: https://www.marketingcenter.de/sites/mcm/files/downloads/research/lmm/literature/hennig-thurau\_et\_al.\_2001\_jsr\_modeling\_and\_managing\_student\_loyalty\_an\_approach\_based\_on\_the\_concept\_of\_relationship\_quality.pdf   
Accessed on: 11/5/2023

Hidayat,A. Saifullah,M. and Ishak,A. (2016) “*Determinants of Satisfaction, Trust, and Loyalty of Indonesian E-Commerce Customer”*  
Accessed at: http://www.ijem.upm.edu.my/vol10noS/11)-VOL\_10(S)2016\_Anas%20Hidayat(Determinants%20of%20Satisfaction...)Pages%20151-166.pdf  
Accessed on:8/9/2023

Ho, R.C., Withanage, M.S. and Khong, K.W. (2020) “*Sentiment drivers of hotel customers: A hybrid approach using unstructured data from online reviews.”* Available at: https://expert.taylors.edu.my/file/rems/publication/100069\_7543\_2.pdf   
Accessed on: 12/5/2023

Hussain,R. Al-Nasser,A. and Hussain,Y (2014) “*Service quality and customer satisfaction of a UAE-based airline: An empirical investigation”* Accessed at: https://www.researchgate.net/profile/Rahim-Hussain-3/publication/267454805\_Service\_quality\_and\_customer\_satisfaction\_of\_a\_UAE-based\_airline\_An\_empirical\_investigation/links/59e7162aaca2721fc2304e3e/Service-quality-and-customer-satisfaction-of-a-UAE-based-airline-An-empirical-investigation.pdf  
Accessed on: 7/5/2023

Hwang, J., Park, S.-G. and Kim, I. (2020) *“Understanding motivated consumer innovativeness in the context of a robotic restaurant: The moderating role of product knowledge*,” Accessed at: <https://www.sciencedirect.com/science/article/abs/pii/S144767702030156X>  
Accessed on 5/5/2023

Jahanzeb, S., Fatima, T. and Khan, M.B. (2011) “*An empirical analysis of customer loyalty in Pakistan’s telecommunication industry,*”  
Accessed at: https://link.springer.com/article/10.1057/dbm.2011.2  
Accessed on:8/5/2023

Jain, H., Khunteta, A. and Srivastava, S. (2020) “*Churn Prediction in Telecommunication using Logistic Regression and Logit Boost,*”  
Accessed at: https://www.sciencedirect.com/science/article/pii/S1877050920306529?ref=pdf\_download&fr=RR-2&rr=7c6465632ddd413c  
Accessed on:9/5/2023

Jain, P.K. and Pamula, R. (2020) “*A systematic literature review on machine learning applications for consumer sentiment analysis using online reviews*,” arXiv.org. Available at: https://arxiv.org/abs/2008.10282   
Accessed on: 6/5/2023

Jiang,H and Zhang,Y (2016) “*An investigation of service quality, customer satisfaction and loyalty in China's airline market*”  
Accessed at: <https://isidl.com/wp-content/uploads/2017/06/E4077-ISIDL.pdf>  
Accessed on: 7/5/2023

Jiang,L. Jun,M. and Yang, Z. (2015) “*Customer-perceived value and loyalty: how do key service quality dimensions matter in the context of B2C e-commerce*?” Accessed at : [https://www.researchgate.net/profile/Zhilin-Yang-9/publication/276398835\_Customer- perceived\_value\_and\_loyalty\_how\_do\_key\_service\_quality\_dimensions\_matter\_in\_the\_context\_of\_B2C\_e-commerce/links/56a1dd3f08ae27f7de26e415/Customer-perceived-value-and-loyalty-how-do-key-service-quality-dimensions-matter-in-the-context-of-B2C-e-commerce.pdf?\_sg%5B0%5D=started\_experiment\_milestone&\_sg%5B1%5D=started\_experiment\_milestone&origin=journalDetail](https://www.researchgate.net/profile/Zhilin-Yang-9/publication/276398835_Customer-%20%20perceived_value_and_loyalty_how_do_key_service_quality_dimensions_matter_in_the_context_of_B2C_e-commerce/links/56a1dd3f08ae27f7de26e415/Customer-perceived-value-and-loyalty-how-do-key-service-quality-dimensions-matter-in-the-context-of-B2C-e-commerce.pdf?_sg%5B0%5D=started_experiment_milestone&_sg%5B1%5D=started_experiment_milestone&origin=journalDetail)

Accessed on: 11/5/23

Kaur, H. and Soch, H. (2012) “*Validating Antecedents of Customer Loyalty for Indian Cell Phone Users*,” Accessed at: <https://journals.sagepub.com/doi/pdf/10.1177/0256090920120404>  
Accessed on:8/5/2023

Kevin,M and Ana , F(2019 )“*Customer Relation Management, Smart Information Systems and Ethics*”

Accessed on: https://pdf.sciencedirectassets.com/778421/1-s2.0-S2515856219X51007/1-s2.0-S251585622030016X/main.pdf?X-Amz-Security-Token=IQoJb3JpZ2luX2VjELr%2F%2F%2F%2F%2F%2F%2F%2F%2F%2FwEaCXVzLWVhc3QtMSJHMEUCIQD6E0R4%2FK5YUKk%2F2jfBYJvLw7M4%2BtaxvR2%2BoR5RYN%2Bd1wIgROTZ3LfrwR5%2BoRcHsrqh5lL6vRHJnxvDrwqAHWy%2B2HwqvAUI0%2F%2F%2F%2F%2F%2F%2F%2F%2F%2F%2FARAFGgwwNTkwMDM1NDY4NjUiDMC5eFOXPR6x210V8SqQBeSEy3%2FSDNn2%2B%2B3njLBENWFNd%2F18bTUmZ2umLmz3eIoRfP4%2BWEejzTiA1RAvlsw0eN7dNDhsv2g0xXXRB9XbZoXOKJBpR%2F%2FPdF%2FyUl%2BK91BR4s9OTyBt8qEY%2FIUZnjeZs88joBvsUCKkHSWeguIQxBdHstRHTq9eJQDCNr%2FxrRYXiqbsrkT9sFOFL4BQweAVAqe5h3zfPyCp7YVe2S3OBdgCtVrqTzg3d1um7PgqJsh%2FlxZkiJOV84tspmGJJb59Umgc%2B6OC%2B6tENl09J3T0UyA8CCpiyrGJFCOtFrqpgU6ZR9K%2BQnHvcu8QwV7ceozyrOdx2KmLr%2FfUv2oySPJnzYAuUSLFl6Kn1jd9DhR5cbRuncLknUmrL525yBP%2F3sbKA2NvQV%2BnEUXUpvSmuynaIlZ1DKkt27KbSbOMuEtIZQT5%2FfDaGytZE3Z9tQViV4LTp4N4Kk5eZoWPx42Xq5wuQXrm5LRPcw9h3zJvC%2FXpbijZLb%2FLts73egqnJvKOGe0Y2xstZrnBeU8%2FC8N6miZM2HKqP1ydOZx5groETUAPrBuJgUpnJcc0W7F%2BfGDb6jsN0oIdCy%2F3CvFdBJRP4Uttt8vjGpT2%2BIzLm2ARqSCgeS%2Bu7wFpCLWaMXj8I8mTt4EF7%2FdRJOhugYoS8x9QxRR%2BXoNwdGjgtKBM40di03y6abhrbV%2FSe14ZYXKtrBze2NjQNCTBIN9BlU6K55rL9XtWAH8mIfcqnjb%2FcRtBN8xVx9GImqOKv9PXZ9DBsXbRpR9V%2BOGqZCoGMPbe878humpy%2FDhLjIokiWN%2Bm0LGxppI%2B4ctKcJq7reFc2mRiPCk3awd9txohOFglvzU4dxLduWpUK39apHQ5kTrFY3AUa9k3U5CMK%2B%2B%2FaIGOrEB6%2FL8b64wLjUw%2FHaBpSAtkwaQNAepe4mREQvf0UWHT5D1rzFAK3Opvaa5kXV%2BzfhpLhIipkKMgebS6i9eR9Sc%2FrkxNNaGKf%2B6kdZEEtN%2B6us%2B85UG0JIPVfcIt%2FMWS7aOw3EyrvH57RflImu5bKrt6HpK0xU3Wq1yi791b5F0O%2FXDL1qIlEAWhtlMHQXW3OIN5tOUa5qy2N0uUDfF12owa4G%2F7nkxHhNtHHCr3vdEwK6E&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Date=20230513T103610Z&X-Amz-SignedHeaders=host&X-Amz-Expires=300&X-Amz-Credential=ASIAQ3PHCVTYRL3UFEJS%2F20230513%2Fus-east-1%2Fs3%2Faws4\_request&X-Amz-Signature=445b0102d4534a5155002c25cc19c512910d4d2d57d421d3f61d33204e23ee49&hash=4dc85e675622a0b4becd144a06c0546cc6ecdbee96bd459cb32718b5b04a7741&host=68042c943591013ac2b2430a89b270f6af2c76d8dfd086a07176afe7c76c2c61&pii=S251585622030016X&tid=spdf-6f5990c5-1f9e-4bae-926b-005c8deed6e2&sid=0693944158fca74d1c6b062359aa8b428a62gxrqb&type=client&tsoh=d3d3LnNjaWVuY2VkaXJlY3QuY29t&ua=0a02550152045a5655&rr=7c6a42471d5c7539&cc=ie  
Accessed on: 12/5/2023

Khrais, L.T. (2020) “*Role of artificial intelligence in shaping consumer demand in e-commerce*”, MDPI. Accessed at: https://www.mdpi.com/1999-5903/12/12/226   
Accessed on: 4/5/2023

Kim,J. and Hastak, M (2018)” So*cial network analysis: Characteristics of online social networks after a disaste*r” Accessed At: <https://e-tarjome.com/storage/panel/fileuploads/2019-03-02/1551517800_E11862-e-tarjome.pdf>  
Accessed on:9/5/2023

Kim, W.H., Lim, H.J. and Brymer, R.A. (2015) “*The effectiveness of managing social media on hotel performance*,” *International Journal of Hospitality Management*, 44, pp. 165–171. Accessed at: <https://www.sciencedirect.com/science/article/abs/pii/S0278431914001704>  
Accessed on: 5/5/2023

Kim, S.-L. and Lee, H. (2022) “*Customer Churn Prediction in Influencer Commerce: An Application of Decision Trees*,”. Available at: <https://www.sciencedirect.com/science/article/pii/S1877050922001703?ref=pdf_download&fr=RR-2&rr=7c6465633de2413c>  
Accessed on 9/5/2023

Kitapchi,O et al. (2013)“*The paths from service quality dimensions to customer loyalty: An application on supermarket customers*”  
Accessed at: <https://www.researchgate.net/profile/Ibrahim-Dortyol/publication/263039992_The_paths_from_service_quality_dimensions_to_customer_loyalty_An_application_on_supermarket_customers/links/55dc286108aed6a199ac7a86/The-paths-from-service-quality-dimensions-to-customer-loyalty-An-application-on-supermarket-customers.pdf>  
Accessed on:11/5/2023

Kohavi, R. et al.(2004) “*Lessons and Challenges from Mining Retail E-Commerce Data*”  
Accessed at: <http://mail.im.tku.edu.tw/~cjou/bi2009/DM-lessons.pdf>  
Accessed on: 11/5/2023

Li, L. *et al.* (2022) “ *INVESTIGATING THE EFFECT OF ARTIFICIAL INTELLIGENCE ON CUSTOMER RELATIONSHIP MANAGEMENT PERFORMANCE IN E-COMMERCE ENTERPRISES”*. Available at: http://www.jecr.org/sites/default/files/2023vol24no1\_Paper5.pdf   
Accessed: 13/5/2023

Li, Q. *et al.* (2018) “*Tourism review sentiment classification using a bidirectional recurrent neural network with an attention mechanism and topic-enriched word vectors”*, *MDPI*. Available at: https://www.mdpi.com/2071-1050/10/9/3313   
Accessed on: 6/5/2023

Liu, J. *et al.* (2020) “*Consumers’ satisfaction factors mining and sentiment analysis of B2C Online Pharmacy Reviews - BMC Medical Informatics and Decision Making”*, *BioMed Central*. Available at: https://bmcmedinformdecismak.biomedcentral.com/articles/10.1186/s12911-020-01214-x   
Accessed on: 6/5/2023

Long, C.L.S. *et al.* (2020) “*Impact of CRM factors on customer satisfaction and Loyalty*.”  
 Available at: https://pdfs.semanticscholar.org/387f/a6baa9b571e8ba49a7de3aa5d224c7700300.pdf   
Accessed on: 13/5/2023

Lukic,J (2015) ‘*Leadership challenges for the big data era’* Research gate [online]  
Accessible from: https://www.researchgate.net/publication/317174920\_Leadership\_Challenges\_for\_the\_Big\_Data\_Era  
Accessed on: 12/5/2023

Mahajan, V., Misra, R. and Mahajan, R. (2017) “*Review on factors affecting customer churn in telecom sector,”* Accessed at: <https://www.researchgate.net/publication/319023470_Review_on_factors_affecting_customer_churn_in_telecom_sector>  
Accessed on: 8/5/2023

Marwa *et al.* (2019) “*The effect of customer relationship management practices on airline customer loyalty*” Available at: https://www.econstor.eu/bitstream/10419/215629/1/5-2-2.pdf   
Accessed: 4/5/2023

Mirzaei, T. and Iyer, L. (2014) “*Application of predictive analytics in Customer Relationship Management: A literature review and classification”*, *AIS Electronic Library (AISeL)*.   
Available at: https://aisel.aisnet.org/sais2014/23/   
Accessed on: 20/3/2023

Misra,R. Mahajan,R. Mahajan,V (2017)“*Review on factors affecting customer churn in telecom sector”*Accessed at:https://www.researchgate.net/profile/Richa-Misra-2/publication/319023470\_Review\_on\_factors\_affecting\_customer\_churn\_in\_telecom\_sector/links/5dc535da92851c818036faf7/Review-on-factors-affecting-customer-churn-in-telecom-sector.pdf  
Accessed on:7/5/2023

Ostrowski, P., O’Brien, T.P. and Gordon, G.J. (1993) “*Service Quality and Customer Loyalty in the Commercial Airline Industry,*” Accessed at: <https://journals.sagepub.com/doi/abs/10.1177/004728759303200203?journalCode=jtrb>  
Accessed on:7/5/2023

Pancras , J. *et al.* (2006) “*Issues and Perspectives in Global Customer Relationship Management*.” Available at: https://www.researchgate.net/profile/Joseph-Pancras/publication/42428087\_Issues\_and\_Perspectives\_in\_Global\_Customer\_Relationship\_Management/links/5bfed90292851c63caafb01d/Issues-and-Perspectives-in-Global-Customer-Relationship-Management.pdf   
Accessed: 13/5/2023

Peng, J., Quan, J. and Zhang, S. (2013) “*Mobile phone customer retention strategies and Chinese e-commerce,”*Accessed from: https://www.sciencedirect.com/science/article/abs/pii/S1567422313000409  
Accessed on:8/5/2023

Perianez, A. et al. (2017) “*Churn prediction in Mobile Social Games: Towards a complete assessment “* . Available at: https://arxiv.org/pdf/1710.02264   
Accessed on: 11/5/2023

Razin et al.(2021)“A *Long Short-Term Memory (LSTM) Model for Business Sentiment Analysis Based on Recurrent Neural Network*”  
Accessed at: <https://www.researchgate.net/profile/Bapayya-Kommula/publication/348748584_An_Efficient_Energy_Management_of_Hybrid_Renewable_Energy_Sources_Based_Smart-Grid_System_Using_an_IEPC_Technique/links/60586be8a6fdccbfeaf8b25e/An-Efficient-Energy-Management-of-Hybrid-Renewable-Energy-Sources-Based-Smart-Grid-System-Using-an-IEPC-Technique.pdf#page=18>  
Accessed on:8/5/2023

Richard, J., Thirkell, P. and Huff, S. (2021) “*An examination of Customer Relationship Management (CRM) technology”* . Available at: https://www.researchgate.net/profile/James-Richard-3/publication/232863119\_An\_Examination\_of\_Customer\_Relationship\_Management\_CRM\_Technology\_Adoption\_and\_its\_Impact\_on\_Business-to-Business\_Customer\_Relationships/links/55dbc6cc08aed6a199ac6924/An-Examination-of-Customer-Relationship-Management-CRM-Technology-Adoption-and-its-Impact-on-Business-to-Business-Customer-Relationships.pdf   
Accessed on: 4/5/2023

Ruiz, C. et al. (2021) “*What drives the helpfulness of online reviews? A deep learning study of sentiment analysis, pictorial content and reviewer expertise for mature destinations, Journal of Destination Marketing & Management*.” Available at: https://www.sciencedirect.com/science/article/pii/S2212571X21000184   
Accessed on: 4/5/2023

Sabbeh,s (2018)|”*Machine-Learning Techniques for Customer Retention: A Comparative Study*”  
Accessed at: <https://pdfs.semanticscholar.org/2a9f/505e1ab148aa3d91810f509ee133272be554.pdf>  
Accessed on 5/5/2023

Saha, L. *et al.* (2021) “Amalgamation of Customer Relationship Management and data analytics in different business sectors-A systematic literature review,” *MDPI*.. Available at: <https://www.mdpi.com/2071-1050/13/9/5279>  
Accessed on: 20/3/ 2023

Shah, S.S. (2020) “Developing promotional model using customer lifetime value score “  
Available at: https://norma.ncirl.ie/4417/1/shreysanjayshah.pdf   
Accessed on: 6/5/2023

Shobana, J.V. and Murali, M. (2021) “*An efficient sentiment analysis methodology based on long short-term memory networks*,”, Available at: <https://link.springer.com/article/10.1007/s40747-021-00436-4>  
Accessed on: 10/5/2023

Shrimal,D and Patil, H(2020)”*A Qualitative Approach to Customer Segmentation and Customer Churn Application”* Accessed from: <https://ijaem.net/issue_dcp/A%20Qualitative%20Approach%20to%20Customer%20Segmentation%20and%20Customer%20Churn%20Application.pdf>  
Accessed on:7/5/2023

Soltani , Z. and Navimipour, N.J. (2016) “*C*omputers in human behavior , Customer relationship management mechanisms: A systematic review of the state of the art literature and recommendations for future research.” Available at: http://modir3-3.ir/article-english/ISI/isi1-9785.pdf   
Accessed on: 11/5/2023

Stieglitz,S. and Dang-Xuan,L (2012) “*Social media and political communication: a social media analytics framework”*Accessed at: <http://cloud.politala.ac.id/politala/Jurnal/JurnalTI/Jurnal%2020/10.1007_s13278-012-0079-3.pdf>  
Accessed on:9/5/2023

Syaqirah, N. (2014) “*Managing customer retention of hotel industry in Malaysia, Managing Customer Retention of Hotel Industry in Malaysia*.” Available at: https://www.sciencedirect.com/science/article/pii/S1877042814029553?ref=pdf\_download&amp;fr=RR-2&amp;rr=7c5d1f412a810752   
Accessed on: 4/5/2023

Tariq, M. *et al.* (2021) “*Distributed model for customer churn prediction using convolutional neural network*.” Available at: https://www.researchgate.net/profile/Muhammad-Usman-Tariq-2/publication/351813838\_Distributed\_model\_for\_customer\_churn\_prediction\_using\_convolutional\_neural\_network/links/60c082baa6fdcc512816d582/Distributed-model-for-customer-churn-prediction-using-convolutional-neural-network.pdf   
Accessed on: 5/5/2023

Tarnowska, K.A. and Ras, Z. (2021) “*NLP-based Customer Loyalty Improvement Recommender Syste*m” MDPI. Available at: https://www.mdpi.com/2504-2289/5/1/4   
Accessed on: 4/5/2023

Toivonen, T. *et al.* (2019) “*Social media data for conservation science: A methodological overview*,”   
Accessed At: <https://www.sciencedirect.com/science/article/pii/S0006320718317609>  
Accessed on:9/5/2023

Tusan, T. and Islam, T. (2021) “*A comparative study of sentiment analysis using NLP and Different Machine Learning Techniques on US Airline Twitter Data*.” Available at: https://arxiv.org/pdf/2110.00859.pdf   
Accessed on: 12/5/2023

Ullah,I et al. (2019) “A *Churn Prediction Model Using Random Forest: Analysis of Machine Learning Techniques for Churn Prediction and Factor Identification in Telecom Sector*”  
Accessed at: https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=8706988.  
Accessed on:9/5/2023

Wang,A. and Marikannan, Booma. (2020) “*Optimising e-commerce customer satisfaction with machine learning”*Accessed at: <https://iopscience.iop.org/article/10.1088/1742-6596/1712/1/012044/pdf>  
Accessed on: 9/5/2023

Wassouf, W.N. *et al.* (2020) “*Predictive analytics using big data for increased customer loyalty: Syriatel Telecom Company Case Study - Journal of Big Data”*, *SpringerLink*. Springer International Publishing. Available at: https://link.springer.com/article/10.1186/s40537-020-00290-0#Sec29   
Accessed on: 20/3/2023.

Weinstein, A. (2001) “*Customer retention: A usage segmentation and customer value approach”.* Available at: https://link.springer.com/content/pdf/10.1057/palgrave.jt.5740051.pdf   
Accessed: 12/5/2023  
  
WU,S. et al (2021) “*Integrated Churn Prediction and Customer Segmentation Framework for Telco Business”* Accessed from: https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=9406002  
Accessed on: 5/5/2023

Xhema,J. and Metin,H. (2018) “*Switching-Costs, Corporate Image and Product Quality effect on Customer Loyalty: Kosovo Retail Market*”  
Accessed at: <https://www.researchgate.net/profile/Hasan-Metin/publication/329149878_Switching-Costs_Corporate_Image_and_Product_Quality_effect_on_Customer_Loyalty_Kosovo_Retail_Market/links/5e05f94b4585159aa49e4ddd/Switching-Costs-Corporate-Image-and-Product-Quality-effect-on-Customer-Loyalty-Kosovo-Retail-Market.pdf>  
Accessed on:11/5/2023

Xiahou, X. and Harada, Y. (2022) “*B2C e-commerce customer churn prediction based on K-means and SVM”,* MDPI. Available at: https://www.mdpi.com/0718-1876/17/2/24   
Accessed on: 6/5/2023

Xianga,Z ,Schwartz ,Z. Gerdes Jr, J. Uysal, M.(2015) “*What can big data and text analytics tell us about hotel guest experience and satisfaction?*” Accessed from: https://d1wqtxts1xzle7.cloudfront.net/52936232/What\_can\_big\_data\_and\_text\_analytics\_tel20170502-5855-afbm80-libre.pdf?1493767258=&response-content-disposition=inline%3B+filename%3DWhat\_can\_big\_data\_and\_text\_analytics\_tel.pdf&Expires=1683894610&Signature=HtaLhF7Gkpi7x~7WlX6HS25eh6I3kK5voKY0mU8js1LtRJEimzKPsXtMTZK~Zdhy8-AdwuXSYP6ALzb9yvgIiAV7xoUVfVIoTq7vHy37a7UwidIGJR8fSrSylqhQtPiTTqHx9lMKbruOC3l82NP74Yk1z9WdP-5aB21G6NBNP7PtGGkvU36d0fpDerS7fl6SVYQlsuZTipfI6LLM2mfhihx4XVc10~FjAjH8pJz8BXtgUYIY9fWV6~vOgVUfVIOkF10YsIEpHaPhr5ti8SNUSexuGWFxkYyhjgs7aGjg66gJLfFLNWP9bUUQW94a30NoQzut~TKkyqFGsT14RZnpTQ\_\_&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA  
Accessed on: 6/5/2023

Yang,K. Kim ,J. and Yu,B. (2020) “*On Analyzing Churn Prediction in Mobile Games*”  
Accessed at: <https://arxiv.org/ftp/arxiv/papers/2104/2104.05554.pdf>  
Accessed on: 10/5/2023

Zahran,H. (2022 ) ”*Graph-based knowledge modeling and analytics for capturing and prediction of customer behaviou*r”  
Accessed at: <https://curve.carleton.ca/system/files/etd/c55f1a9f-8dca-4b42-bcac-13e7a6f526d6/etd_pdf/b2999586fe931e47723ca99c7199bce9/zahran-graphbasedknowledgemodelingandanalyticsfor.pdf>  
Accessed on:9/5/2023

Zhao,Y.(2018) ”*Employee Turnover Prediction with Machine Learning: A Reliable Approach*”  
Accessed at: <https://www.researchgate.net/profile/Yue-Zhao-70/publication/328772915_Employee_Turnover_Prediction_with_Machine_Learning_A_Reliable_Approach/links/5dec49f34585159aa46ba991/Employee-Turnover-Prediction-with-Machine-Learning-A-Reliable-Approach.pdf>  
Accessed on:9/5/2023