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

Word count: 10774

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**

In the ever-changing world of company operations, client retention has emerged as a critical component of organisational success. Companies are increasingly concentrating on harnessing data analytics to improve customer interaction, create loyalty, and, as a result, raise retention rates as digitalization and globalisation transform market dynamics. While the promise of data analytics is clear, a thorough assessment of its actual impact on customer retention is required.  
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. The fundamental issue addressed in this study is deconstructing and grasping the complex interaction between data analytics and client retention tactics in the twenty-first century. This study tries to disentangle the approaches, obstacles, and accomplishments of incorporating data analytics into customer retention practises. By investigating this interaction, The study aims to give a more in-depth knowledge of how data analytics is changing the customer retention environment.

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.  
  
  
**2- Research Design**  
**1. Primary Data:**

**Data Collection Method:**

A well-rounded primary data gathering technique was used to explore the influence of data analytics on customer retention in the twenty-first century. The basic data collecting process consisted of two major components: gathering a solid dataset from multiple e-commerce websites and conducting in-depth interviews with industry specialists.

The first stage was to collect a dataset from a varied group of e-commerce businesses that use data analytics to improve client retention. Customer behaviour patterns, purchase histories, user engagement indicators, and personalised marketing attempts were all included in this dataset. The data gathering procedure adheres rigorously to ethical concerns, while also respecting the websites' terms of use and privacy policies.

Simultaneously, three industry experts with extensive expertise in both data analytics and client retention methods were interviewed in-depth. The participants for these interviews were chosen via judgement sampling, which picked individuals with broad expertise and perspectives on the research issue. This approach ensured that the interviews produced useful insights and opinions

**Proposed Sampling Strategy** 894 move to chapter 2 (done)

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.  
The use of judgement sampling for participant selection was based on the assumption that the experiences and views of these experts would give a thorough knowledge of the complexities and subtleties of data analytics in the context of customer retention. The sample technique sought to include individuals from various industries in order to capture a varied variety of opinions and approaches.

Judgement sampling will be utilized to find the right population. This is a non-probability sampling strategy that allows researchers to choose participants based on 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.

Judgement 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.  
  
**Data Collection Instruments:**

This procedure entailed obtaining essential data points from the identified e-commerce websites while complying to strict ethical norms. To address privacy concerns, personally identifiable information was cleaned from the acquired data, guaranteeing compliance with data protection standards.

The interviews were carried out utilising a semi-structured interview methodology, which allowed for a more balanced approach to data collecting. The interview questions were carefully developed to cover a wide range of topics, including the respondents' responsibilities in using data analytics, problems encountered, effective tactics employed, and opinions of the influence of data analytics on customer retention. The semi-structured format of the interviews allowed for open and frank replies while still ensuring that the primary study objectives were met.

**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. 2000  
  
**Validity**

The 2 types of validation that where applied in this research project where that of relevant and accuracy.  
The reliability referencing the data collected being directly compatible to the problem identified in the topic area hypothesis , assuring that the validation in the process being confirmed when the Author asks the Primary Research question with respect to the primary research.  
As an overview of the data collection the process and means of which the collection and analysis is conducted in a manner that was something the business owners want the author to conduct and the goal of the exercise to report back the tailored requirements of helping them understand the objectives from the point of view of other professionals in serving the data analytics of business practice for growing a company’s customer retention, to fit a company’s intellectual strategy and how it could improve the business customer retention and goals moving forward. If the feedback enabled a different point of view in implementations of data analytics in a customer retention management aspect that may arise through the data analytic project.  
The accuracy conducted through the data analytic test and training models to assure that the catalogue of data within the process can be conducted in such a fashion to demonstrate that the data is indeed accurate to the process.  
To reduce possible biases and confounding variables, rigorous techniques were used in both the dataset collecting and the interviews. Stringent quality control processes were used for the dataset to discover and correct abnormalities, assuring the data's integrity. The semi-structured style of the interviews enabled consistent data collection while allowing for spontaneous ideas. with a balanced viewpoint, recognising the limits of a qualitative technique and the restricted number of interviews done. The study attempted to include a wide spectrum of expert viewpoints and experiences, therefore the sample size was modest due to the in-depth nature of the interviews. The dataset, acquired from several e-commerce websites, intended to increase the generalizability of findings within the constraints of qualitative research.  
Through these forms of validation the Author believes the will be able to give credible insight into the data analytics throughout the process and guide business’ to optimal performance in gaining and retraining their customer base.  
  
**Ethical Considerations**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 conduct 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:  
  
Informed Consent:

Each participant's informed consent was carefully acquired before the interviews began. The objectives, procedures, and potential ramifications of the research were thoroughly explained to the interview subjects.  
  
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.

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.

**Limitations of Judgement 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 (change to methodoglogy section)  
This section describes the detailed research methodology, data gathering methodologies, and data analysis techniques utilised in the study "How Data Analytics Has Improved Customer Retention in the 21st Century."

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  
  
**Research Design:**

This study's research strategy is a mixed-methods technique that combines qualitative interviews with quantitative analysis of website data. This methodology allows for a holistic study of the research subject, integrating industry specialists' ideas with empirical data to improve the findings.This section describes the detailed research methodology, data gathering methodologies, and data analysis techniques utilised in the study "How Data Analytics Has Improved Customer Retention in the 21st Century."  
  
A mixed methods research design incorporates both quantitative and qualitative research methodologies into a single study or research effort. In essence, it entails gathering, analysing, and combining numerical and textual data in order to get a thorough grasp of a study subject. This methodology enables researchers to leverage the capabilities of both quantitative and qualitative methodologies, addressing research problems from different perspectives and presenting a more comprehensive picture of the phenomena under investigation.  
A mixed methods study plan must include the following characteristics:

1. Methods Integration: Mixed methods research is the purposeful use of quantitative and qualitative approaches. Instead of conducting separate quantitative and qualitative investigations, researchers combine the methodologies to answer specific study questions or aims.

2. Dual Focus: A mixed methods approach emphasises on both in-depth investigation of a phenomena (qualitative aspect) and the assessment of patterns, correlations, or trends (quantitative component). The qualitative component investigates the "why" and "how," whilst the quantitative component gives statistical data and generalizable outcomes.

**Implementation Methods: A mixed methods design can be implemented in two ways: sequentially or concurrently.**

1. **• Sequential:** In a sequential design, one technique precedes the other. Qualitative data gathering and analysis, for example, might come before quantitative data collecting.
2. **• Concurrent:** A concurrent design collects and analyses both qualitative and quantitative data at the same time.

**Data triangulation:** Researchers can improve the validity and dependability of their conclusions by utilising several forms of data. To guarantee consistency and robustness, triangulation includes comparing and contrasting findings from several approaches. (add in here)

**Complementary and Expansion:** Mixed methods designs are frequently used when one approach alone cannot adequately address a research subject. Quantitative data may help to supplement qualitative discoveries by offering a broader perspective, whereas qualitative insights can help to extend understanding of complicated processes that quantitative data alone may not capture.

**Different Data gathering Techniques:** Depending on the nature of the research topic and the type of data required, mixed methods designs may employ a range of data gathering techniques, such as surveys, interviews, observations, content analysis, and statistical analyses.

**Theoretical Framework:** A theoretical framework is frequently used in mixed methods research to facilitate the integration of quantitative and qualitative data. Theoretical lenses assist researchers in understanding the relationships between various data sets and drawing useful findings.

Methods that combine Research may be especially useful in sectors where complex social phenomena are being investigated, or when researchers wish to thoroughly investigate a topic. It enables researchers to transcend the limits of a single approach and provide a more comprehensive picture of the study subject. However, creating and carrying out mixed To guarantee that both quantitative and qualitative components are well-integrated and contribute significantly to the study objectives, mixed methods studies require careful design.

**Research Approach:**

Inductive research methods were used in this study. Inductive research is the process of developing hypotheses and insights based on particular observations and experiences. This technique is ideal for delving into the intricate link between data analytics and client retention in the twenty-first century, as it allows for the formation of new views and patterns from the acquired data.

The following is a breakdown of the statement that the research technique is inductive and tries to establish a knowledge of how data analytics has affected customer retention in the twenty-first century based on observations and insights from both professionals and quantitative data:

**Inductive Research Approach:**

Moving from individual observations or instances to bigger generalisations and hypotheses is an inductive research strategy. In other words, it begins with data collection, analysis, and identification of patterns, trends, or themes that emerge from the data. These patterns and themes are then utilised to create theories or explanations for the event under investigation.

An inductive method in the context of data analytics and customer retention study implies the collection of a range of data, including qualitative insights from experts and quantitative data on customer retention rates. Through thorough examination of this data, a discovery of common patterns, trends, or insights that can assist in developing a full grasp of how data analytics affects client retention.

**Developing an Understanding:**

The study's major purpose is to obtain a better understanding of the link between data analytics and client retention. You want to let the evidence lead your thinking rather than starting with a pre-defined premise or idea. You'll put together information about how data analytics practises have effected customer retention plans and outcomes by analysing data obtained from professionals and quantitative sources.

**Observations and Insights:**

The study was based on both qualitative observations and insights from industry specialists, as well as quantitative data on client retention rates. These observations and insights serve as raw information for analyse and develop conclusions from. During interviews with experts, for example, we learned about specific narratives, instances, issues, and tactics for applying data analytics for client retention. These qualitative insights contribute to your research's "observation" component.

**Quantitative Data:**

Quantitative data, on the other hand, is made up of numerical information that may be statistically analysed. In this instance, it was looking at past customer turnover rates, changes in retention rates over time, and other quantitative measures. Detecting correlations, trends, and statistical linkages by quantifying these patterns, which gavefurther proof and context for the studies results.

**Integration of Insights:**

The research technique is unusual in that it incorporates both qualitative and quantitative data. These two sorts of data sources work well together. Insights from interviews may give information on the "how" and "why" of certain data analytics and customer retention practises, issues, and tactics. In turn, quantitative data may help you generalise and confirm the trends and patterns discovered through statistical analysis.

In summary, inductive research strategy emphasises gathering data from experts and quantitative sources and developing ideas or explanations based on the patterns and insights that arise. It gave a complete grasp of how data analytics has affected client retention in the twenty-first century by integrating observations with data-driven analysis.  
  
**Data Collection:**

1. **Qualitative Data Collection: Interviews**

A series of in-depth semi-structured interviews with industry professionals with substantial knowledge in data analytics and client retention tactics were used to acquire qualitative data. Participants were chosen on the basis of their jobs and experiences at organisations that have exhibited strong customer retention practises. To circumvent geographical restrictions, the interviews were done through Microsoft teams video conference and audio-recorded with participants' permission.

The interview procedure covered a variety of subjects, such as the significance of data analytics in customer retention, problems encountered when adopting data-driven initiatives, significant success stories, and emerging trends in the sector. The views and viewpoints of the participants will be useful in developing a full grasp of the study issue.

1. **Quantitative Data Collection: Website Data**

Secondary data was gathered to supplement the qualitative observations from multiple industry-related websites recognised for releasing customer retention and churn figures. These websites are trustworthy sources of historical data on customer attrition rates and other pertinent contextual elements. To maintain consistency and comparability across multiple times, data points will be gathered over a set period.

Customer turnover rates were collected, as well as information on variables such as pricing adjustments , promotional efforts, and external market circumstances. This quantitative information gave empirical evidence to confirm and corroborate the qualitative ideas gleaned from the interviews.

**Sampling Strategy:**

1. **Qualitative Sampling:**

Three industry people with varied backgrounds and positions are included in the qualitative sample. Judgement sampling was used to guarantee that the chosen participants reflect a diverse range of industries and opinions within the business environment. Maximum variation sampling will be employed to collect a diverse range of experiences and perspectives.

1. **Quantitative Sampling:**

The quantitative sample included information from a variety of industry-related websites that are renowned for providing trustworthy and up-to-date client retention figures. The websites will be chosen based on their repute, relevancy, and historical data availability. The objective was to integrate a wide range of sources in order to improve the generalizability of the quantitative findings.

**Data Analysis:**

1. **Qualitative Data Analysis:**

The qualitative data gathered from interviews was rigorously analysed in order to uncover major themes and trends. The transcribed interview data will be rigorously evaluated, coded, and categorised using (insert reference) theme analysis methodology. Identifying reoccurring themes relating to the function of data analytics in customer retention, obstacles encountered, tactics utilised, and future directions will be part of this approach.

The carried out utilising qualitative analysis software, which will help in data organisation and synthesis. The themes that emerge will give detailed insights into how data analytics has changed client retention tactics.

1. **Quantitative Data Analysis:**

A number of analysis were performed on the quantitative data obtained from the websites. To begin, data cleaning and preparation was carried out to guarantee correctness and standardisation. To summarise customer churn rates over different time periods, descriptive statistics such as mean, median, and standard deviation had been generated. Line charts used to show patterns and variances in the data.

Correlation analysis used to investigate potential links between customer attrition rates and external factors. This entailed determining the degree and direction of relationships between customer attrition rates and factors such as pricing adjustments, marketing initiatives, and industry trends.

**Primary Research Methodology**  
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.

**Predictive Analysis:**

PredictiveAnalysis is a data-driven strategy that employs historical data, statistical algorithms, and machine learning approaches to forecast future events based on patterns and trends identified in the data. By projecting potential situations, it goes beyond descriptive analysis and gives actionable insights.

**How it Works:**. (insert more here) The models are trained on previous data and then validated against new data to verify correctness.

**Role in Customer Retention Accuracy:** Predictive Analysis is critical in identifying consumers who are likely to churn in the future in the field of customer retention. Predictive models may identify clients at danger of churning by analysing previous customer data such as purchase behaviour, interaction frequency, and engagement patterns. This helps firms to enhance client retention accuracy by taking focused activities such as delivering personalised incentives or interventions.

**Sentiment Analysis:**

Sentiment Analysis, often known as opinion mining, is a text analysis approach that extracts and interprets the emotional tone, attitudes, and views conveyed in text data. It gives businesses insights into customer sentiments and impressions, allowing them to assess sentiment about products, services, or experiences.

**How it Works:** Sentiment Analysis works by processing text with Natural Language Processing (NLP) methods. These algorithms examine the text at several levels, from individual words to whole phrases. They recognise emotional cues, contextual cues, and language nuances that indicate whether a sentiment is good, negative, or neutral**.**

**Role in Customer Retention Accuracy:** Sentiment Analysis is a useful technique for increasing the accuracy of client retention. Businesses may acquire insights into how customers perceive their experiences by analysing customer reviews, comments, and social media posts. Positive sentiment implies contentment, whilst negative feeling indicates opportunities for development. This data helps organisations customise retention tactics to address particular pain spots and improve overall customer happiness.

**Natural Language Processing (NLP):  
Put in Overview**

**How it Works:**. (insert more here) This entails breaking phrases down into basic elements, recognising items (such as names and dates), and extracting meaning from context.

**Role in Customer Retention Accuracy:** NLP allows the extraction of valuable information from customer feedback, reviews, and comments in customer retention. NLP can discover reoccurring themes, feelings, and worries by analysing consumer language. This data helps firms adjust retention efforts to individual client wants and pain spots, improving customer retention accuracy.

**Machine Learning:  
Put in Overview**

**How it Works:** (insert more here) When exposed to fresh data, these algorithms learn from it and use the insights obtained to produce predictions or classifications.

**Role in Customer Retention Accuracy:** Machine Learning is an essential component of customer retention accuracy. Machine learning models may predict future behaviour, such as customer turnover, by using previous customer data, purchase history, interactions, and demographic information. These predictive models enable firms to take proactive efforts to increase customer pleasure and loyalty, such as targeted retention programmes..

**Data Visualization:**

**Overview:** Data visualisation is the use of graphics to portray complicated information in a clear and straightforward manner. It converts raw data into easily understood and useful visual components like as charts, graphs, and dashboards**.**

**How it Works:** Data visualisation works by representing data patterns, trends, and correlations with various visual components. It improves understanding by utilising the human visual sense to swiftly grasp information that would otherwise be difficult to comprehend in its raw numerical form.

**Role in Customer Retention Accuracy:** Data visualisation acts as a tool between analytical findings and decision-makers. Stakeholders may obtain a comprehensive picture of data-driven insights by visualising churn projections, sentiment trends, and customer feedback patterns. Visualisations improve communication by allowing organisations to make more educated decisions that improve client retention tactics and accuracy.

In summary, each technique—Predictive Analysis, Sentiment Analysis, Natural Language Processing, Machine Learning, and Data Visualization—plays a unique yet interrelated role in improving customer retention accuracy: Predictive Analysis anticipates future behaviour for targeted interventions.

• Sentiment Analysis elicits consumer sentiments and directs experience enhancement.

• Natural Language Processing (NLP) gleans useful information from client input.

• Predictive models for proactive retention methods are generated by machine learning.

• Data visualisation transforms complicated information into usable insights.

When these tactics are carefully combined, they enable organisations to use the power of data to optimise their customer retention efforts, resulting in increased accuracy and long-term client connections.

**Ethical Considerations:**

Throughout the study process, ethical issues were critical. All interview participants had been asked to provide informed consent through describing the aim of the study, their rights, and the confidentiality of their replies. Participants had the choice of remaining anonymous or using a false name in data analysis and reporting.

To guarantee the ethical usage of secondary data sources, correct reference and referencing shall be used when utilising website data. Any potential conflicts of interest or links with the websites being used will be reported openly.  
  
**Justification:**

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**

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

Brownlee, J. (2020) “*Support Vector Machines for machine learning”*, Available at: https://machinelearningmastery.com/support-vector-machines-for-machine-learning/ Accessed on: 11/9/2023

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  
  
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

Cornell (2023) “*SVM*, *Lecture 9: SVM*. “Available at: https://www.cs.cornell.edu/courses/cs4780/2018fa/lectures/lecturenote09.html   
Accessed on: 11/9/2023

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

Damsten, E. (2023) “*The role of data analytics in effective CRM*”, *Omnitas Consulting*.   
Available at: https://www.omnitas.se/the-role-of-data-analytics-in-effective-crm/   
Accessed on: 25/7/2023

Dang, T. (2023) “*The role of Data Science in Digital Marketing*, *Top Software Outsourcing Company in Vietnam” - Orient Software*.   
Available at: https://www.orientsoftware.com/blog/data-science-in-digital-marketing/   
Accessed on: 10/7/2023  
  
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

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

Evidently (2023) “*How to explain the ROC AUC score and Roc Curve?*”Available at: https://www.evidentlyai.com/classification-metrics/explain-roc-curve   
Accessed on: 11/9/2023

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

Fleetwood, D. (2023) *Non-probability sampling: Types, examples, & advantages*, *QuestionPro*. Available at: https://www.questionpro.com/blog/non-probability-sampling/   
Accessed on: 3/7/2023

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  
Glen, S. (2019) “*Comparing model evaluation techniques part 2: Classification and clustering”*, *Data Science Central*. Available at: https://www.datasciencecentral.com/comparing-model-evaluation-techniques-part-2/   
Accessed on: 11/9/2023  
  
Gupta, S. (2018) *Sentiment analysis: Concept, analysis and applications*, *Medium*. Available at: https://towardsdatascience.com/sentiment-analysis-concept-analysis-and-applications-6c94d6f58c17   
Accessed on: 11/7/2023

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

Hachcham, A. (2023) “*The KNN algorithm - explanation, opportunities, limitations”*, *neptune.ai*. Available at: https://neptune.ai/blog/knn-algorithm-explanation-opportunities-limitations   
Accessed on: 11/9/2023  
  
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

IBM (2023) *What is predictive analytics?*, *IBM*.   
Available at: https://www.ibm.com/topics/predictive-analytics   
Accessed on: 15/7/2023

IBM (2023) “*What is Random Forest?”*Available at: https://www.ibm.com/topics/random-forest   
Accessed on: 11/9/2023

Insight. (2023) *How big data and Artificial Intelligence Are Transforming Business*, *Insight*. Available at: https://www.insight.com/en\_US/content-and-resources/2021/how-big-data-and-artificial-intelligence-are-transforming-business.html   
Accessed on: 23/7/2023

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  
  
Joby, A. (2023)” *K nearest neighbor or KNN algorithm and it’s essence in ML*. “Available at: <https://learn.g2.com/k-nearest-neighbor>  
Accessed on: 11/9/2023

K, G. (2020) “*Machine learning basics: Decision tree regression”*, *Medium*. Available at: https://towardsdatascience.com/machine-learning-basics-decision-tree-regression-1d73ea003fda Accessed on: 11/9/2023

Khandelwal, R. (2020) “*Quick and easy explanation of logistics regression”*, *Medium*.  
Available at: https://towardsdatascience.com/quick-and-easy-explanation-of-logistics-regression-709df5cc3f1e   
Accessed on: 11/9/2023

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

Leachmann, L. and Scheibenreif, D. (2023) *Using technology to create a better customer experience*, *Harvard Business Review*. Available at: https://hbr.org/2023/03/using-technology-to-create-a-better-customer-experience   
Accessed on: 2/9/2023

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  
  
Liddle, J. (2023) “*The Real Big Data Gold Mine is unstructured”*, *Nasuni*.   
Available at: https://www.nasuni.com/blog/the-real-big-data-gold-mine-is-unstructured/  
Accessed on: 7/7/23

Logunova, I. (2022) “*K-Nearest Neighbors (KNN) algorithm for Machine Learning”*, *Serokell Software Development Company*. Available at: https://serokell.io/blog/knn-algorithm-in-ml   
Accessed on: 11/9/2023

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

Marx, A. (2021) “*Customer retention analytics: 5 strategies to Reduce Churn*, *Thematic*.”   
Available at: https://getthematic.com/insights/5-ways-data-and-text-analytics-improve-customer-retention/   
Accessed on: 4/7/2023

Mcafee, A. and Brynjolfsson, E. (2014) “*Big Data: The management revolution*”, *Harvard Business Review*.   
Available at: https://hbr.org/2012/10/big-data-the-management-revolution   
Accessed on: 25/7/2023

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

Narkhede, S. (2021) “*Understanding confusion matrix”*, *Medium*. Available at: https://towardsdatascience.com/understanding-confusion-matrix-a9ad42dcfd62   
Accessed on: 11/9/2023

Navlani, A. (2019) “*Scikit-learn SVM tutorial with Python (Support Vector Machines)”*. Available at: <https://www.datacamp.com/tutorial/svm-classification-scikit-learn-python>  
Accessed on: 11/9/2023

Nolis, J. (2020) “*You’re relying on Data Too Much*”.*Medium*.   
Available at: https://towardsdatascience.com/youre-relying-on-data-too-much-250d4edc70c3   
Accessed on: 27/8/2023

Olson, S. and Writer, S. (2023) *Customer retention basics, 8 strategies, and metrics*, *Zendesk*. Available at: https://www.zendesk.com/blog/customer-retention/   
Accessed on: 28/8/2023

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

Pai, A. (2023) *What is tokenization in NLP? here’s All you need to know*, *Analytics Vidhya*. Available at: https://www.analyticsvidhya.com/blog/2020/05/what-is-tokenization-nlp/   
Accessed on: 8/4/2023

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

Qualtrics (2022) *Customer retention: Strategic plans & tactics to improve*, *Qualtrics*. Available at: https://www.qualtrics.com/uk/experience-management/customer/customer-retention-programmes/   
Accessed on: 11/7/2023

Qualtrics (2023) *What is customer sentiment and how do you measure it?Qualtrics*, *Qualtrics*. Available at: https://www.qualtrics.com/experience-management/customer/customer-sentiment/   
Accessed on: 11/7/2023

Raquib, S. (2023) “*Tracking customer behaviour and preferences with Data Analytics*, *ARS Analytics*”  
Available at: https://www.arsanalytics.com/post/tracking-customer-behavior-and-preferences-with-data-analytics   
Accessed on: 10/8/2023

Raschka, S. (2023) “*Confusion Matrix: Creating a confusion matrix for model evaluation*, *creating a confusion matrix for model evaluation*.” Available at: https://rasbt.github.io/mlxtend/user\_guide/evaluate/confusion\_matrix/   
Accessed on: 11/9/2023

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

Ross, B. (2023) “*How customer expectations are changing digital strategies*” *Linchpin SEO*.   
Available at: https://linchpinseo.com/how-customer-expectations-are-changing-digital-strategies/   
Accessed on: 1/7/2023

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, D. (2021) “*Google cloud brandvoice: How the world became data-driven, and what’s next*” *Forbes*. Available at: https://www.forbes.com/sites/googlecloud/2020/05/20/how-the-world-became-data-driven-and-whats-next/   
Accessed on: 17//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

Salon, D.S. (2023) *Using NLP to analyze customer feedback*, *DSS Roundtable*. Available at: https://roundtable.datascience.salon/using-nlp-to-analyze-customer-feedback   
Accessed on: 15/8/2023

Sarib, M and Mashuri, S. (2022)  *“Semi-structured Interview: A Methodological Reflection on the Development of a Qualitative Research Instrument in Educational Studies”*. Available at: https://www.researchgate.net/publication/358893176\_Semi-structured\_Interview\_A\_Methodological\_Reflection\_on\_the\_Development\_of\_a\_Qualitative\_Research\_Instrument\_in\_Educational\_Studies   
Accessed on: 23/7/2023

Sayad, S. (2023) “*Logistic Regression*“Available at: https://saedsayad.com/logistic\_regression.htm Accessed on: 11/9/2023

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

Sharma, N. (2022) “*Logistic regression “*, *Brainalyst*. Available at: https://learning.brainalyst.in/logistic-regression/   
Accessed on: 11/9/2023

Shobana, J. (2023) *E-commerce customer churn prevention using machine learning-based business intelligence strategy*, *Measurement: Sensors*. Available at: https://www.sciencedirect.com/science/article/pii/S2665917423000648   
Accessed on: 6/9/2023.

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

Siddique, A. (2023) “*Exploring KNN with Different Distance Metrics*.” Available at: https://blog.devgenius.io/exploring-knn-with-different-distance-metrics-85aea1e8299   
Accessed on: 11/9/2023

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

Tibco (2023) “*Probability calculation using logistic regression”*, *TIBCO* Available at: https://docs.tibco.com/pub/sfire-dsc/6.5.0/doc/html/TIB\_sfire-dsc\_user-guide/GUID-C4D05ED0-3392-4407-B62A-7D29B26DC566.html   
Accessed on: 11/9/2023

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

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

Vaidya, D. (2023) “*Decision tree - what is it, uses, examples, vs Random Forest”*.   
Available at: https://www.wallstreetmojo.com/decision-tree/  
Accessed on: 11/9/2023

Vivekanandan, M. (2023) “*Random Forest - a multitude of decision trees”*, *LinkedIn*. Available at: https://www.linkedin.com/pulse/random-forest-multitude-decision-trees-madhavan-vivekanandan Accessed on: 11/9/2023

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

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>  
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APPENDICES- A - WorkflowSource Data set available from <https://github.com/IBM/telco-customer-churn-on-icp4d/tree/master/data>

APPENDICES- B - Interview TranscriptsFor the sake of keeping previous places of work anonymous, when mentioned in the transcript the place of work has been replaced with “company” in all interviews. This has been implemented to ensure the privacy of places of work.  
  
**Interview-1**Interviewer  
To the very first question , is going to be, could you introduce yourself and your background in data analytics on CRM?

Speaker 1   
Yep. Cool. I have worked in data analytics, across supply chain CRM ,customer certification, which is it's kind of related CRM, and now customer support. So you have kind of all the user spectrum, because then in terms of the customer lifecycle,

Interviewer  
Very good. And with regards to data analytics, what drew you into working in the realm of data analytics?

Speaker 1   
So my background was in software engineering. But I didn't want to work with Java, essentially just working on giant mainframe problems. So instead, I took a couple years out, went into business. And I discovered that working with data was kind of an unavoidable part of it. And yeah, just gradually got more and more interested and find more more ways to apply it. And here we are.

Interviewer  
Now the next couple of questions are going to be specifically on the impact of CRM and data analytics. So the first question I'll put to you is, from your experience, what is the function of CRM in corporate operations.

Speaker 1   
So in my experience, CRM is essentially a way to pull people down the acquisition funnel, and keep them. So I mean, let's say you have someone who browses a web page, you have the cookie, you potentially have your email address dependent login, and OS, that gives you opportunity to engage with them, I'm putting down from acquisition to I forgot to bring down to actually make the purchase. And then once you have to make the purchase, then they become a customer, and then you try to get more value out of them. So essentially, having someone not know you, to get to know you to keep you. And then for you to become a brand ambassador, that's kind of the overall goal in my experience.

Interviewer  
Now, that's a that's a lovely way of describing the pipeline of the customer lifecycle. And so moving into that, how has the use of data analytics from your experience, impacted CRM practices.

Speaker 1   
So I worked in “company”, a couple of years. And “company”, it's obviously it's high end, luxury, retail. But a lot of the historical CRM, if you will, has been having people sending someone a letter saying, here's the discount, bring them into the store, and actually schmoozing them and talking to them for a while to get them to come in and spend time in the store. And then walking around actually, literally holding their hand helping to shop as a personal shopper, and learning more about them that way. Once you start to look at data, then you start to identify people who you may not have identified using clienteling or are using that kind of approach. So immediately broadens your scope in creating different segments that you can target segments differently. So we did a project where we looked at about 900,000 different customers over the course of 14 years. And we segmented them into about 14 different categories. We use those to drive marketing campaigns, we used to overlap that with website usage to present discounts or present quotes when people come on to the website. So yeah, essentially, it gives you much more opportunity to engage with a vast amount of people and a much more personalized and specific and direct way.

Interviewer  
Yep, lovely, your answer there actually went into the next question I have, which is providing a real world scenario in which you've seen analytics influence CRM operations and outcomes. And you mentioned how “company”, bring people in and be able to tailor their you know, their experience while they're there, Do you have another example of how Analytics has influenced the operation and the outcome?

Speaker 1   
Yeah, so you know what's Salesforce?, Our role was to try to figure out how to get people to recertify MBSR technologies, then, just pretty much doing pretty basic calculations on when certifications will lapse. And, you know, due to the volume of people who will be affected and when to be affected. We went back to both departments of the admin teams, the customer success teams, and back to the advocate, but the guys who went and created training plans for customers. And we gave them very specific dates about when these people are going to lapse. So even rudimentary calculations and looking at data in a different way, then people have previously looked at it. It can drive kind of interactions with multiple different teams and stakeholders, and have like real concrete effects on how the customers, first of all experienced the product, but also feel like they're valued, because you're telling them Oh, we know that we're, we're aware of what you're doing. We think we can add value here by pointing you in this direction. Here you go. Here's some suggestions on here's how you can leverage them to make your business better. So yeah, that's kind of another fairly recent example.

Interviewer  
That's perfect. I'm going to talk about the analytical side of say, like, the different software's that you have used. And on the CRM section with the next question, what have you seen, through your experience, the most prevalent analytical approaches, or procedures in the CRM setting?

Speaker 1   
In what sense, so you're doing like, which tools people use the most or kind of

Interviewer  
Yes, if you can talk about the tools, or if you would, like if you'd like to talk about, say, if one case, if it was predictive modelling, if you had use any sentiment analysis, to obtain customer insight in the CRM sphere?

Speaker 1   
Well, okay, so sounds good analysis, we kind of use it right now, my current position. So in “Company”, we've launched a new bot called ‘fin’. It's like the, it's probably the most advanced support tool known to man, just. So yeah, we use GPT for a lot. So what we do is we pull out the ticket information, and we pipe it through GPT. And then it helps us to summarize conversations with people. And we can really drill down into figuring out where people's issues are, where their pain points are. For example, we had a spike in volume over the last few weeks, we did this exercise that we pulled out that a lot of people are coming in through a specific kind of workflow them that we use kind of automations. And we figured out that we can actually improve their experience by giving them a slightly different kind of outcome. So let's say they come in and they have an issue with how the semester separate website, instead of saying, oh, here comes you go into a general inbox, we can ask them about things to more different questions to figure out where not to do with latency or where it's due with them setting up some of the settings in indirect channel messenger. And then it gets them to specific person, I guess the response faster, I guess, logic conversation faster. So what's one example using some kind of sentiment analysis now, in general, CRM, at least in the roles I have been in has been less concerned with using fancy tech, I'm more concerned with using effective tech. So a lot of AV testing a lot of kind of small scale, kind of iterative experimentation. We just brought up Thomas we did a lot of work with website, just doing T testing to figure out which groups react better to eat or getting through shopping baskets, or how to day we react to carousels and on the website, Premier Clinton products. Same deal with actually working with in store customers looking at us which customers have lapsed or what their timeframe has been since last purchase. And then again, just setting up experiments to say what works better, giving them a discount given them a cheap pre product, giving them a free product, giving them a buyback. So when they come back next time to get discount, but it's all hypothesis testing and experimentation. Fancy tech. I mean you can use it for segmentation. We did segmentation model was built in our that was kind of it was a big project. It was gross predictive modelling. Not a whole lot really, I mean a lot of work with association rules, so building out kind of typical products that you would expect people to use, but that was used to inform experimentation more so then, kind of driving anything into website, I think we use Salesforce a lot. And a lot, the Einstein analytics tools are built in there which do a lot of primary product recommendation. So Salesforce, it's a big, clunky, horrible thing. But it's quite powerful in terms of actual day to day leveraging of analytics that is more or less just testing.

Interviewer  
Perfect, and from all those different varied technologies and software such as ‘Fin’, as you mentioned, or sales force and your new bot that's going to take over the world. Have you discovered? Hopefully, we're using all these have you discovered any issues or limits when using these analytical methods on data?

Speaker 1   
Probably the most salient is in trying to determine going to churn rates trying to figure out a way to predict who's going to leave you. A lot of I don't accept marketers, but a lot of people that I've worked with, they've been on the assumption that we can use the data we have in our little silo to predict where people leave, but you're a little square, or you're a couple of tables in a database only to help you so much. And customers have a lot broader scope than just your use your your platform, for example, we're trying to figure out, does the amount of support tickets someone opens? does that relate to how they churn? And you know, I mean, you can make the argument, yeah, I mean, if you're happy with the product, you'll open less tickets, or if you're engaged product more, but at the end of the day, if a company is making money doesn't matter how many sports tickets to open or close your account. So there are a lot more kind of macro effects that you need to take into account. Maybe this departure factor analysis are going to be a bit deeper with customer interviews. But quantitative data is not enough to really understand the full picture of what a customer's situation is, that's probably been the most probably the hardest one to explain to people as well, because everyone thinks their data is gold, and they want to really leverage it. And I mean, for the most part, you can, but you need to talk to people as well.

Interviewer  
100% true my use of the CRM systems when I was working with “company”, I was contacting in one instance, 400 people in one week. And what I found a lot of the time was, while the, the CRM system that “company”, had created was basically just going by what their previous car model was, through talking to a lot of people, there was information that wasn't in the database, from the say, if they changed area, do they need to drive more, drive less if they've increased family, you know, if they have kids come on, along the way, they were taken about all those different parts that weren't actually down on paper. So, 100% agree with everything that you've said there.

Speaker 1   
So, that that's a part of the segmentation process. So if you have clever modelling, you can figure out which kind of people are most similar to norm and which ones are most different than then they can have, you can zone in on them for more personal touch.

Interviewer  
I'm just going to talk about customer retention strategies now for the next couple of questions. And from your experience, how have you seen if so, how good data analysis helps design and strengthen client retention strategies.

Speaker 1   
So not sure if you have been involved with like email marketing before, but there's kind of a general expression, which is spray and pray. So you take your whole database and you send an email to everyone. And you see what sticks. It works sometimes. It's difficult to get analytics because everything's so general, it's hard to drill down and find out who worked best for. So probably the most effective way has been in more specific segmentation. And in when you're designing kind of whatever campaign you're going to use, like some kind of activation campaign. You don't look at everyone what you do is you look at people who are either buying a different brand you want to reactivate into a brand, people who were buying like to say you're buying Foundation, what is the average? short distance between purchase a foundation. You can also support this by quality by go and talk to people in the store to find out what did how long it is, but how long a bottle of financial would last and use that designing but the segmentation and avoiding Senator everyone is the most effective way to retain people because you make it specific to them. You're not just going to spam your email address or their inbox.

Interviewer  
Yep. during my time working at ‘company’ , the good portion of the casino we found ended up not responding to emails, and were actually more effective if we sent out letters. And we found that they much prefer that to we would dare within the letter, we would have a promotional piece. And they would be more susceptible and open to returning via that method, then an email.

Speaker 1   
broke down was your high value people, you give them something they can hold in your hand, and they come back. Great.

Interviewer  
next one is can you provide instances of effective customer retention that was established or improved? Using data analytic insights?

Speaker 1   
Yeah, so go back to the example of from “company” do is in that case, we looked at like I look at works your person A, you certify as developer for “company”. Generally, if you certify, as a developer, we did about two years, you let it lapse and you look back because you only want certification that then you get your job, you don't care anymore. What we noticed was that for partners like your “company” utilize that kind of stuff, they were letting people lose to certifications, which is not ideal, because we want to make sure make sure that we have high certification volumes. So we can prove usage and kind of show that we're the most using the second heard of the vertical. By looking at the amount of time people had certified during engagement with self paced learning, with classroom learning, we were able to go to these things, run four or 5000 different accounts and say, Come here, we want you to recertify here this time right now. So working with again, work cross functionally, because they're the best projects, we worked with partner “company”, to work in sales and the portfolio team to extend these people's certification limits manually by about eight months. And then in doing that, we all signed them up to use free training tokens. So we gave the tokens, but then they actually went back to learning and they booked two certifications, I don't know how it ended up because I left after that period of time. But by all accounts, in the time, where we gave tokens, the uptake was, like 60- 70%, because people were again, it was getting back to the personal touch. So when coming to you and saying, Here you go, here's an opportunity for you. We know you pay us a lot of money, we want to make sure you get value. So really delivering the message that to people by using data, very specific data on who was losing it and where and divide that we can drive for that customer by having the certification command. So I think it's, it's kind of used it to deliver the story to people.

Interviewer  
As you say, the more personalized touch leads into the next question and how we kind of have to tread lightly upon that. In regards to ethics, from your, from your experience, what are some ethical concerns to consider when using customer data and retention strategies?

Speaker 1   
It's interesting question. I'm not sure if I classed as ethical, but I'll let you kind of make that determination because maybe two examples one was most of my CRM comes from our domicile, I can see it from there. First one is. So “company”, it's this customer base is kind of has a wide demographic. And what we've tended to happen, at least with mailing campaigns and going to form campaigns is that people who would have been previous customers may have passed in time sensitive last been contacted. So again, once GDPR came in, and people started realizing this data shouldn't be there, there was a lot of issues, whilst a lot of issues, there was numerous issues where people were being contacted. And do his emails and letters come and say in “company”, combine this and that person, sadly, no longer with us. And it led to kind of stress for families. So in that case, the comments, we're going to need to do it, do it, do it, delete it, or we're going to purged. But in that case, it's kind of difficult to automatically know this. So be aware that this is a factor as part of any retention campaigns you're running. And making sure that when you do get any feedback that it is taken on these accounts are destroyed. That's obviously on top of any kind of standard procedures you have for keeping data. Last thing we kept nothing less than three years, I believe. Or at least anything beyond three years, we anonymized, if I remember correctly, but anyway, that's one the other one was that, again, “company”, luxury, high end retail. And some of the customers spend outrageous amounts of money, like numerous years of my salary per year. How would that information I've been able to send that around and having people access to that information. Or people who are very much in the public sphere, like certain MMA people, or people from TV, having that information behind closed doors, or only like, X amount of people can access that with certain privileges is very important. Like, we could go in and see anyone's personal home address, because we are working to data, people in the store could not, which is important because you never know who to come in and say, Okay, here's 10 grand give me X person's email or actual home address, so I can go and find them. So yeah, more, maybe more probably long blend security, but obviously has some ethical ramifications also.

Interviewer  
100%. I touched on that a couple of times in my workings, is the fact that who has access to information is very much an ethical consideration for departments, as you say, you can't just have the people in the store have the information and then someone comes in off the street after seeing such applicant go in and say Here I'll pay it to find out like where it is because that could handle to burglaries and all different sorts of issues. So for the last couple of questions, we're going to be focusing more on kind of future or trends, weight analytics. So I'm going to start off by asking you, How do you envision the relationship between the analytics and customer retention changing in the next couple of years?

Speaker 1   
What I'm seeing, at least from our point of view, in my current position is how easy it is to get information about people. Does that tie into other information like not sure how familiar you are with like Google Analytics or like how website links works, but in some cases If someone comes in, and they start a ticket, for example, but you're logged into different accounts, we can then link that account to someone. Once we did, the accounts are linked, we potentially then go on buy information and go wider. So what I see coming is lots more data sources and sources of information. I mean, it will tie people back from work accounts to social media accounts to let's say, you have your “company”, has agreements with lots of different companies that they have CRM data, they can pull it in, they give you awards based on working here, they're everywhere, our test code where they work with certain or they work with different companies that you can earn points. Bigger, bigger, wider data, I think is going to be where everything comes and ridiculously specific recommendations. It's already here. But I believe it's going to get more and more ridiculous, like I've read recently that Google now has records of where advertisements are placed in roadsides, them, like stands, they can track where you have been, where you're driven, and they can surface knowledge relating to that letter to you today. So just the fact that advertising is now is never off, you're on its Minority Report, you're going to be the person to wherever you go, you're going to see personalized advertisements for you. That's what I see happening. How do I achieve it? Probably some, like step forward and transformer technology are making neural networks a lot more efficient, or do something with like, really clever embeddings in super large language model type things. But that's ultimately, I think, where it's going to go. Yeah.

Interviewer  
that's very interesting. I hadn't heard about the the billboard one. But as you say, if they're being able to track, say, from one location to another, which is probably linked with, say, you use Google Maps, and you go on a journey, and they're able to see you travelled from certain points, but they'd be able to tailor different ads, it's, it's definitely going to be an interesting time. In regards to that, and you're kind of touching on a near the end of your answer there. What advice would you provide to businesses, looking to use analytics to improve their client retention efforts?

Speaker 1   
In my experience, people tend to go big, they go big, because the ones kind of do one on one hand, and they wanted to everything worked perfectly. My experience doesn't work. Everything has to be tailored, smaller, specific. So yeah, small scale experimentation that can be generalized. But starting small and building upwards, don't start from the very, very top and try and go wide straightaway. Because it, it doesn't work. And it makes people unhappy, at least in my experience.

Interviewer  
That goes back into the whole implementing it. But you know, the specifics of the CRM to each individual, it's a tailored effort for their experience, instead of as you say, the just the wider scale of a will put this plan in operation and hopefully catches many.

Speaker 1   
Yeah, I mean, it goes when you have to assume that the company is smaller. I mean, it depends on what segment you're in. If you're Google, you're not going to do small, you're going to go broad, you're going to a big, if you're a mom and pop restaurants down in the side of the road, and you just happen to have like a free instance of HubSpot. Anyway, a little bit of CRM. Keep a tailor to keep specific

Interviewer  
100%. Last thing on the future trends, What recommendations would you give to businesses wishing to implement more data driven operations?

Speaker 1   
I would say invest in people. technology comes and goes, but people come and go as well. But what I have learned over the last couple of years is that in learning technology, it's essentially trivial. I mean, anyone can learn to use spreadsheets, anyone can learn to do a bit of modelling with RMD. You have a data frame and you run an algorithm overnight to give it something close to the truth. The difficulty is getting people to tie the analytics to business outcome, trying to figure out what this work is actually going to drive in decision making and what problem you're trying to solve with it. You can do cool things with data, but you can also spend a lot of time wasted just chasing that rabbit holes. Be specific about what you want to achieve, and be able to tie it to what is going to happen because of it. That'd be probably the best piece of advice that I can give.

Interviewer  
Lovely. And to finish off, finally, is there anything further, you'd like to say or discuss about the influence of data analytics on customer retention?

Speaker 1   
I probably say that, that analytics is it's a tool. I mean, ultimately, it comes down to I mean, I, I have a personal pet peeve when people say I want to be data driven. I don't like to say their job is to say is be data informed. Ultimately, people are going to use your intuition at various different levels, given them the data to kind of inform and give the extra nuance and subtlety to that intuition is what really helps. So yeah, I mean, ultimately got to get them out to people and data analytics is a tool so use it carefully.

**Interview-2**

Interviewer   
Perfect. Thank you for joining today. We'll start with a couple questions on the introduction and background. So for First off, could you please introduce yourself your background, your background in data analytics on CRM?

Speaker 2   
Yeah, so i've been working with CRM for about 10 years and I on that involved, analytics, both data and business. And I started off in California and the wineries and that was looking at financial analytics, tax information, crush reports. And so it was a lot of yield and operational data that I would have been processing, then I moved back home to go kind of sabbatical off and went into the hospitality industry. And it was just one of those jobs to, you know, not have to think about. Then I came back into the, the industry or business as you would, and through the e cigarette company. So I was working with a lot of operational and data analysis in terms of chemical breakdown, and toxicity, stuff like that. And then I moved up to Kildare to work in Dublin. And I was with a company called “company”, that manufacturer paints, so I took over their supervisor and their CRM division. But alongside of that, I was doing production analysis, and hazardous goods data, export import analysis, financial analysis, sales analysis. So there's a lot of different data points to work with. And I am with “company”, I'm their CRM executive. So I deal with the full CRM database. We incorporates analysis of the not just the database, but the interactions between the clients and the partners and solicitors and matters in terms of the financial end of it, I do reporting and analysis on that based on frequency distribution maps, geo locations, some heat mapping. And most recently, we been rolling out an integration project, which will bring CRM and financial all together as oil as some with an automated mailing scraper. So it'll pull all of that contact data and frequency each charts and things like that some of the kind of more simpler aspects of it. Oh, and I did work for a little while for nonprofits. And then analysis of public education in the UK, Ireland. Then a bit of marketing on the side as well, SEO.

Interviewer   
It's an amazing experience to have like the repertoire where needlessly it speak for itself, and the longevity in the fields, which brings me on to what drew you to work in the realm of data analytics?

Speaker 2   
And I kind of fell into it. So when I started off in the States, I was college doing night classes, and I needed a job. So I applied to a winery and it was an Office admin job. What they didn't tell me was it was it was turning into a not a reconstruction job. But basically, the job was reconstructing income tax and large volumes of data over it was a four year period I was there. But it was a 15 year period that the data existed on it was transforming that from handwritten notes, to digital, and then analyzing reporting on those trends, etc. So I kind of fell into it. And then it's just been part of every job I've had since then it just kind of comes with the territory. But what drives me to stay in it is it's it's a puzzle that needs to be solved. But it's an ongoing puzzles, that never ends. So you don't get the end of it. You just keep going and there's new bits and pieces. So it's kind of like a big treasure hunt.

Interviewer   
That's a perfect analogy for the next couple of questions that I'm going to ask is going to be on the topic of the impact of CRM on data analytics. So I'll start off with what is the function of CRM in current corporate operations.

Speaker 2   
CRM is very misunderstood in corporate. So you hear CRM and people think, oh, it's customer service. There's a little bit of that. But CRM can be categorized into two external and internal, internal CRM is about dealing with your internal stakeholders, ensuring that they have the data to make the business decisions that drives progress. And that your data and your information is up to date. And obviously queries external is dealing with customers or other businesses, external third party businesses. And, again, it's about keeping those people happy, and updating your information, all of that stuff. And data analytics, again, incorporates they hear that and they think, almost like accountancy in terms of data points, they're the they assume that you're just looking at sales numbers and volumes, and tracking that. But in reality, sir, CRM it has, it's a multifaceted job. And, for instance, in my last position, I was CRM supervisor, I dealt with internal customers, external customers, suppliers, third party auditors, and my, the data I had to analyze was everything from in house manufacturing, to weather trends, and logistical routes based on you know, is there a strike in France, are the ports going to be closed in Denmark due to a storm that's coming in this week. So it's a global look at everything the business is doing. And then using the information you've gathered, to actually bring it together and produce something that's usable for the business to drive forward. And if I know that a product is under selling in a region, based on the information, I can then get my sales reps to hit that region in a specific way that will round it out. The world of CRM is not just oh, this is your job. And this is all you do in the world to CRM is you have to be able to do everything and put your hand to everything. For people that come into this kind of business, if they're not. If they're not multitasking and multi thinking and problem orientated, they won't last too long. Because it gets frustrating.

Interviewer   
You've touched on the next couple of questions, with your answer there. So I'm just going to split them into two. How as I say you've you've given a couple of examples there, on another one, how has the use of data analytics impacted CRM practices in your experience?

Speaker 2

Well, it's greatly enhanced it. And when I started out, as I said, it was paper, pen and paper. And it was notes that somebody had kept in a drawer. And all the information was in the business lead or sales or whoever it was in their head. It wasn't in a document that everybody could see. There was a very big, there's a very big disconnect in a lot of organizations where this department does this. But that department doesn't know that it crosses over. So with data analytics, and CRM, now we can say, Yeah, your department focuses on x. But these three departments are touching on your area, and have an add a new lead into that area. Do you want to maybe have a chat with them communicate over? Or I can say, okay, well, you know, this region isn't doing so well, why don't we take a look at what's happening there, and I can give that to business leads. And it also advise us to demonstrate our day service, okay. So traditionally, companies or management will look at financial figures, and they'd say, Oh, we're up 10%. This quarter, that's great. But by looking at the data, we can say yes, or, or our profits are up. But our costs are also up. So, we're not hitting those or there's these hidden costs that you're not seeing in your cogs because those are those are being offset. So a lot of companies won't count temps from agencies as a headcount. So, they could have 10 permanent staff and 50 temps but in their returns that 10 per month. and staff. So, they count that as a one-off service. They count them as service charges. But it has to go into the cogs, but it usually set off against another business center. So you're able to pull it all all that information together and say, yes, your profits are up. But the service charges are killing your margins. So, you're going to have to either reduce your margin, you're reduce your margins, sorry, increase your margins, reduce your your costs, or you're going to have to transform it a little more, expand your range, things like that. And within the service industry for data, data use in particular, where we're not offering any particular product, but an actual service. And it's less about pricing and more about utilization of people and departments, how can we, you know, have two departments work as a cross in a cross matrix rather than, you know, a stagnant form. And so it does open up a whole world of understanding. And I think one of the things for CRM, it's fine, because we're learning as we go. But for the business side of it, they need to be educated, to be able to understand what we're seeing. And because obviously, we speak different languages.

Interviewer   
You are a leader, it's great. You know, as I say, for someone that has so much experience across so many different spheres within these systems. Because as you keep leading into what I'm going to ask next. I don't want you to I don't expect to use up all your wealth of experience on these. Otherwise, we'll be here all day. And I'd want to be very particular on your time. So next up, could you provide a real world scenario in which data analytics had a substantial influence on CRM operations and those outcomes?

Speaker 2  
I'm trying to think of one. Okay, so I was working for a company, previous company, the paint manufacturer, their structure is a bit different than most in terms of the manufacturing industries. So they have a large, what they call internal manufacturers in Sweden and one in Italy, or Europe. And then the plants and say, Ireland, they buy the material from them. And so we obviously have that internal cost. Now, it's all under one company. So it's, it's just moving the funds about to pay off those costings. And a few years ago, we were doing an implementation on an Oracle project at Oracle, our 12. Basically, we had to break down every single product we had in the company, this corporation is global. 95 billion turnover a year one of the biggest manufacturers of paint in the world, if not the biggest, contracts with everything from military to civilian, you name it. So at six sites that I was managing on the implementation, what we had to do was basically recode every single product. And but during which we find that there were several project products that we were getting from these other sites that were overpriced. And our finance team had put that down to a currency discrepancy. Well, I went in and I wrote a sequel, program script, to track the currency fluctuations over the last five years. And then I took the data that they had sent on the pricing and sent put thought into it and ran it against each other while it was 40% higher than the current function fluctuations would allow for so what was happening was, they were meant to call charge those costs plus 5%. They were charging this cost plus 40%. And then the fluctuations were coming in on top of it. Now these are not for profit centers. These are manufacturing internal call centers so they shouldn't be doing that. So I highlighted it and brought the finance director for Europe the whole lot and basically what had happened is then it opened a can of worms on the head to price restructure pricing across your all plants and on it See, there was multiple questions. Why was this? but the data was there the data showed, this is what happens when there's so much cost for them to produce and your or, and seek this so much we are charged, this is transport, but we had all the information, we're able to transfer it all over. Basically, it was a legacy issue. And before a restructure back in 2005. Their plant managers had been on margins onto the products. And then when the structure came in, they were low data, but then obviously, it was already in the price. So the plant manager just didn't bother removing it. So the price just kept going up every year, because the cost of goods went up every year. So it was 40%. And top of all the costs, good increases, and etc, etc. And the interesting point, though, about that oracle system was, so I was covering six sites across Europe, it was fairly good, big team. And so we recoated nine and a half 1000 products, with six different variants of each products. And on the six different sites, that was six different languages, six different pricing structures, across 10,000 customers, and six months to recode. That and it was it was down to the historical data, we were able to centralize into a system, that data lotus, like I said, we will SQL scripts and once we had those, it was able to transform everything. But the data, the data and it allowed us to not just identify an issue with the pricing but alias to and then produce a solid database or post to our knowledge. So that whenever we implemented there was a point 01 deviation on the data. So it was fairly solid. I again, you know, yourself with data, it takes a long time. And it's the cleaning, that's the most important part. But you know, it is it was very important. And we had really good results. So we're very happy with that.

Interviewer   
In such a short turnaround, or six months is remarkable feature that really stands out of what you said there with the quantity and to be able to find such a problem within it. And being able to highlight it and create that system in six months is remarkable. You mentioned SQL, going to now go into the analytic methods in CRM, based on that. First one is going to ask is what are some of the most prevalent data analytic approaches or procedures that you've used and CRM settings?

Speaker 2   
Yeah. So, in terms of relating the techniques, it's a bit hard, but I would do depend on the situation. And I work a lot in Excel and SQL and Power BI and stuff like that. And so in terms of tools, Excel is always my base model. I use that for differentiating data, removing any kind of junk as they call it, cleaning the data. And then I'd use SQL for my loading tables into the systems that I'm working with at the moment that I'm working with LexisNexis at the minute, so I can do a direct edit that way. And but I haven't done any of the kind of deep dive data analysis, a lot of it is on the fly custom or bespoke analysis that's needed, just due to the nature so for instance, utilization of equipment in the last position, so we had X number of machines, we pumped out X number of gallons per our which Probert died per minute. And then I did a cost analysis based on a head kind of utility bills product called you know, etc, and broke down in cost per minute. And then we got a utilization ratio from that. And at the minute, the system I'm using is more about networks and contacts. So I do things like touch base contact analysis. So how often is such an this partner and touch with X number of clients per month? What's a bill biller mind. What's her data house or data health is based on an algorithm that was written by the company. So we're sitting at 83. We're doing you know, so it's a very, there's no approach, one approach fits all. It depends on what's been asked. And then within the job I can be asked to do to run analysis on attendees for events in the last year. No problem that's very simple. By doing analysis on attendees and events, people that have read these emails, people that have contacted people that have given us work, you know, so goes on and on. And then you have to kind of design around that. So in terms of theoretical methods, I wouldn't be overly up on that. But it's more of the practical side and, okay, working on the fly, if that makes sense.

Interviewer   
Being on so many different projects, have you seen or been able to explain some machine learning techniques such as predictive modelling, sentiment analysis, being used in those areas to obtain customer insight into CRM scenarios,

Speaker 2   
It's been more crm based software, it was always something that would have encompassed those so trend analysis customer, like, what you said predictive customer trends or behaviour, and sales analysis. And there may have been like, with the logistical side, it was weather patterns and road conditions. And then we threw in some cultural stuff as well. And there, there was the visualization aspect of it, but a lot of it is. A lot of it's kind of depart from the theory. I mean, you do things, your simple stuff, like your root cause analysis and all that for problems rather than your problems or whatever. And so why is why is it costing us x amount to do this service, when it costs us half the amount for the same service in a different location, things like that, that's fine. And trend analysis in terms of sales or services, or anything like that. I've done those before for clients. And we had so I had a client, maybe seven years ago, it was a natural gas car manufacturer out of Oregon. And they were looking at the trends for the use of natural gas. And I was able to produce a decent report based on the Madrid Metro lines and some other uses of it. But where I am now, in the last job as well, we did it wasn't really something that was needed, because the software was already there, that would pull that information straight out for yo And then because the last position was segmented, you had finance and then you had it was a multitier corporation where, you know, you had managers of managers and managers of managers and meetings about meetings about meetings. It did take a while to get through any of it, but I wouldn't have used any real deep, deep learning stuff.

Interviewer   
that's 100%. When it comes to data analytics, have you discovered any issues or limits when using data analytics on data?

Speaker 2   
I have come to some, some limits in terms of maybe the size of the data sets. And or maybe if well, you'll find for a lot of the databases similar to what I'm working on. There's missing information. So there's always going to be some kind of miss and missing information. And then one of our aspects of our software also is that People, the Public can sign up for, say, events, but they don't always fill everything in. So you have to go and manually find out what's going on. So updating that. And then with GDPR, as well, you're very restrained, you're very constricted in terms of what contacts you can make and how you use that data. So I could have 500 contacts or 500, data point contacts today. 200. But I do not consent anymore. Into the preference centre, all of a sudden, you've lost 200 of your data points, and you can't hold them, you have to remove those. So that is a big problem, because then you've lost all of that historical data.

Interviewer   
Yes. Do you think about it? GDPR has really changed the game when it when it comes to data. So one during my time with “company”, and the finance and insurance, and it was, it was all still very much keeping all the customer information and all the documents on folders. And then as soon as GDPR came in, everything had to be torched. And because the way that they had used the was anytime they'd bring someone back in for planned, it was like, Oh, don't worry, you put the customer at ease, we've got the information here, we've just got it all through again. But it was torched all that and then bred the talent, the customer, they need to bring it in, like fresh every time. So I can understand the limitations when it comes to GDPR.

Speaker 2   
And the problem with GDPR is because it was a one fit all solution, it was accustomed to industries. I mean, you go to your barber, and your barber knows what your haircut is, and knows your phone numbers and has that on records. Now you have to bring that in with that, or I'll give the marketing permission to hold that. You know, that industry doesn't need GDPR industries where your mass marketing Yeah, that needs it, no problem. But, again, it wasn't suitable for all industries. And like you said, the automotive especially where you've been with the same place for years. And all of a sudden, oh, no, we don't know who you are, we need to get all this. It knocks customers off. So it can be it can be very restraining, especially if you're working with historical data that you need his key points for your analysis, but they're gone. And then you have to speak with the business management team going, we did have this last month, but it's completely different this month, because you've lost all these people. And we lost these people because you didn't get consent. Or they're in Germany, and they needed double verification consent. So not only do they have to physically sign up, you have to send them an email to verify that they signed up. Where in Ireland, it's an uptight, it's not, you know, it gets a bit crazy when you're looking at different countries as well. So and that's the other thing that geographical restrictions on the data stuff, or the privacy stuff can get a bit a bit confusing as well. So I think in terms of restrictions or limitations on data, trying to run I mean, a simple like, I run Power BI off a lot of different our data, our sql base and Excel to all this stuff, even down to the technology end of it, the amount of technology or processing part it takes to run something like that. You know, it's called it's cost a bit of money to run them. I mean, we were looking at upgrading one of the SQL servers, and I think they were looking 20 grand upgraded. You know, so your crawl cost prohibitive, the limit of data, being able to process, and it's simple CSVs. And you can run that fairly straightforward, but it was more complex. If it has, you know, live links and geo locations and whatever other data you need. It can it takes time. It's not as straightforward. Oh, yeah, I'll have that in two minutes for you.

Interviewer   
The conversation we just had there perfectly runs into the next action on customer retention strategies. And in your opinion, how can good data analysis help design and strengthen client retention strategies?

Speaker 2   
Well, I mean, I've always been a big believer that your attention for customers is a personalized thing. You have to be a gardener with customers. You have to stand and take care of them and make sure that you can spot any kind of RSA that's coming in or fungus, that being competitors. With analytics, we can take a look at you know the purchase and trend and we can take a look at the marketplace that they're actually in as well. So not only looking at their what that customer has done, but look at what their competitors in the area has done on bespoke those reports. And we can even say listen to sales or business reps or whoever it is, we can say, Here's a report for your, you know, customer that brings in X million a year, here's a competitor analysis for them. So we're doing the work for them. We're giving them the information, and it's freely available, but it may be we are seeing something different from what they're seeing Am I did have in the market, and I keep going back to manufacturing plus, because I can't get too much into where I am now. The manufacturing place, one of the analysis we had to do was colour trends in terms of what the marketplace was calling for, on colour, paint colours, and kitchen colours. And then we had to do a spectral analysis based on I think it was a 64 data point rating, infrared rating of the colours. And the very deviate the variations between batches. So we did that for a customer across three year period. And we find that the deviation was point two, five per batch, which wasn't too bad, the industry standard was point seven, five. So this is as close as we could get. And they were very happy with that, because what was happening was up to a certain point, they didn't have the machinery to read those variations. And then after that the calibration of their system was different from ours. So, by doing that, I was able then to say to their sales guy or account manager, you need to get somebody in to calibrate their system to our system. So they're seeing what we're seeing. So we can prove that that information is there. And the customer appreciates that, you know, it's an extra step, the data allows us to see these things that they may not, not see but may not be obvious. And then again, you know, speaking purely from the sales side of it, or the customer, the CRM sales side of it, if I can see a customer is buying X amount of a specific product a month, and I can see the cost of goods have gone down, I can offer them a deal straightaway. And I have access to that straightaway. It were my sales guys might. And so you know, it allows us to see that. But in terms of retention, the more information we have on the customer, the better trends we can see, or the better information we can see on them. And then we can adopt our, our approach to retain them on to provide a service that is beyond what they're actually used to doing CRM for external bodies. I spoke to clients every day in the last job, and I could tell the mood of the client By the way they said hello, you know, so I can tell what I can do for them or what I can't do for them. By the data I had before the call is what allows us to prep for everything as well.

Interviewer   
That's a wonderful answer. And actually, you as it's been the common theme throughout this call so far, I ran into my next question, so I don't even need to ask that one. And we had we had touched on GDPR. So which brings me to the ethics side, what are some ethical concerns to consider when using customer data to update retention strategies.

Speaker 2   
I try to keep it , it’s a an overall retention strategy or information data. I tried to keep it as anonymous as possible. So obviously names and values stuff like that set aside because I know the business development, they want to know how many cases or how many, how many products we sold that week. And where are they sold to? I can say this chain bought this or this? You know, without giving the specifics. If it's for specific clients, obviously, there's a high requirement to be very cautious with the data. So we're not sharing anything that doesn't need to be shared. We're not sending documents we're sending links with expires on non-downloadable. Everything is cloud based it's not on this, the actual computers, or laptops. It's all we have in our in-house servers that we keep our most sensitive things on that are securely locked down in a locks server room. out in premises. So, it's not cloud based for that stuff. So, we're very hypervigilance, that we're I am now, because it's a legal practice very, very hyper vigilant about data privacy. We have some of the leading data privacy attorneys globally in this firm. So everything gets passed by them in terms of policy on what we can what we can share. On they have to sign off on it. And it does, though, again, it's, it's kind of inhibited in terms of, we can't go oh, here, look at all the information we've gathered and look at all these good numbers that we have, because we can't share that with specific areas. But in terms of the ethical, the only thing I'd say, again, it would be hard, it's hard to have to remove X number of data points from a system. Because you know, you need that data, but you can't actually do anything with it. So one of the things I do that I will do a report a complete anonymous report, and Joe on just numbers, no date, no personal details, nothing in it, it'll be X number of clients did this. And that's all it is, I'll have that before I delete information off the system. And then when it's deleted, it's completely it's shredded and cleansed. But it's the closest thing I can do to keep some kind of data from it.

Interviewer   
Yep, perfect. I'm moving on to future trends. And how do you envision the relationship between CRM and data analytics changing in the next few years?

Speaker 2   
I think it's going to become a bigger part. As I said, before, CRM has misunderstood job or position. A lot of people believe it's it's just customer service under a different name, I think what's going to happen is you're going to see a lot more data analysts, and business analysts going straight into CRM, and CRM becoming its own system. And it's not only it's not only data analysts, it's going to be your business development within the CRM, your retention specialists. And you may even see some of the HR people transfer into CRM for internal CRMs. Because that's a huge thing. At the minute, there's a big trend there, it's, you know, it's about, obviously off of COVID. Everybody's realizing now, they can work from home. And they can have a bit of a better life and a better balance, and HR driving that for a lot of companies. So, you'll start to see that I think. And I also think there be, there is enormous push to outsource a lot of this stuff to other countries. But similar to what you've seen where the production circle or cycle during the 80s. The countries that are being this has been pushed to are going to be over capacitated. On the hill. Basically, what happened during the 80s was manufacturing went to Africa. There was too much there wasn't enough people, it went to China, there wasn't enough people, it went to Eastern Europe, it was enough people came back. And we ended up you know, it was being made here anyway, so it was a full circle. So you'll see that being cycled through and then there'll be another big Porsche, but that that's a normal cycle. One of the things that you'd have to be worried about, though, is the sophistication of the scams that are occurring at the moment on the development of those, especially now that AI has kind of become easily accessible to the public. And your scripts are getting more intelligence. And large data sets are being uploaded to that and databases are being hacked from that. So that's another kind of area that's to be watched is how we interact. I mean, I heard I know that Microsoft are to bring out an AI, Oracle are bringing out one , Alexa snake, like most of the CRM companies are bringing out AI to accompany their systems, and it will ease a bit of the heavy lifting. But we're still going to have to make sure everything's 100% or as accurate as we can get because with the hallucinations or the AI are having at the moment it's, it's a bit worrisome.

Interviewer   
Again, which was what advice would you provide to businesses looking to use data analytics to improve client retention?

Speaker 2   
Just be careful in terms of what you're looking for. And if you're looking to know the history of your clients for the last 10 years, what the most popular products are and services, all of that stuff, that's fine, that's easy to do. No problem, I can give you that. I can, yeah, all of this. But if you're looking to know what the next big thing is, well, whoever's analyzing your data, if they have anything to do with your sales side of it, they're going to be influenced, whoever's presenting the data, they're going to be influenced. So what you want is you want to roll point, you want a non-expert , expert in the room. And what I mean by that is, take somebody from, you know, the warehouse. So, they're shipping every single day, they know what that's they know what's going on, right? They don't need to see the data to tell you they've shipped X number of pallets of stuff in the last three weeks. Take somebody there and present, give it a presentation, tell them and say to them, what do you think, Is this accurate to you, because they'll be able to give you a bit more insight. And on a great example of that was the Disneyland and Tokyo, where they brought a janitor in when they were designing the restaurants and said draw a restaurant. And the chefs and the executives all drew a standard, you know, slope, slope, roof, etc, well, the janitor drew sushi, and said, This is what a restaurant in Japan is. It's, it's sushi. So that's how they designed it. So, it's an known expert expert that you need to look at the data. And but in terms of use an AI, yeah, it's the idea behind it of being able to process such huge amount of information and produce those analysis is great. But you have to be very careful on what you're asking it. If you ask it to give you a trend analysis on this customer over these number of years, based on this product and purchase history. That's what it'll give you but it won't give you you know, any information moving forward. All AI is taking the information you're giving and it's re jigging it to present it. It doesn't have intuition. So, if you know that I'm trying to get. Yeah, so if you know that you're solvent base materials are your best sellers. But because of the push for environmental controls, water base is what you're going to be selling more next year. Ai doesn't know this, they only know the numbers you've given it. So, you have to be very, very, very careful with using any of the intelligence tools. And but in terms of human interpretations, there's a better you've a better reliability on that, I think, for intuition. And I think with the way the trends are going at the moment, and data analytics, and you're going to see deep learning AI, they're all going to be merged into one system. Which, you know, obviously, your machine learning is one level, your deep learning is another and then you'll have your AI to interpret everything that you've learned from those systems. And but I'd say just watch the space and maybe take a cautious approach to using any of those tools.

Interviewer   
Perfect. Finally, on the future trends aspect, What recommendations would you provide to organizations wishing to implement more data driven CRM operations?

Speaker 2   
Get the right people in place, get people that are naturally inquisitive people that can and are not, don't bring in people that are yes, people. Yes, people will say yes, that's no problem. Yeah, I agree with your data. Yes, no, but we'll get people that will actually look at something and say, oh, there's something not right here. Something needs to be tweaked. Or they'll actually look in deeper. You want an inquisitive mind behind data analytics, you want somebody that is looking at the whole puzzle, but looks at the fine details as well as your people or your base. So have them in place. First, have the right people there. Next, invest in the technology, invest in the crack software. If the software is not good, if the technology is not good, your people can't do their jobs. And then the third point, be patient with the data , clean, training, data cleaning is 90% of the job, and 10% is processing. Because we all know that most of the time the data is not clean, and it's out of date as soon as it goes in the system. So that to gather with knowing what you're looking for, it may take time to understand what you need. But go in knowing what you want. And then develop work with your team and develop at odds. Because at the end of the day, your analysts, your CRMs, they'll give you whatever you need, or sorry, give you whatever you want. But they don't know what you need until you tell them what you need. So there's a bit of a, there's a bit of a gap there where you may get a director or whatever business lead saying, oh, I need x. Grant, CRM data analysts gives him that Oh, no, that's not what I need. I want this Oh, that's not what you asked me for. So, it's all about we're going to communicating with CRM, because at the end of the day, that's where your information is coming from

Interviewer   
100%. And I recently had an interview for a data analyst position, and in that interview process, They asked me, well, what would I do? And the first question I asked them was, what are you looking for? It's like I can do all these different processes that from feature segmentation, you know, processing everything, unless you're going to tell me what specifically you're looking for. While I could do a time series or sentiment, but it's not going to lead towards the answer that you would like. And as you say, once you get that information about what they're actually specifically looking for, and being able to work from there, that is such an important feature of it.

Speaker 2   
Well, that's it, I mean, you can make it look as fancy as possible and apply all the techniques in the world. And, but at the end of the day, it doesn't result in what they're looking for, they may want a little pie chart showing the differences between three segments, no problem. But if they tell you, you want an analysis of three different segments across this time period, and you, you're going to produce that when all they want to do is see the percentages of sales or whatever it is, you know, so it's all about the communication and understanding what they want, understand what they want or need, and then explaining it to you. And then you can go and do whatever you need to do. There's not a big not a big difference in the vocabulary. I mean, you can talk about data analytics in the simplest form possible. That's no problem. Because at the end of the day, it's a filing cabinet. Each file is a folder, each folder contains spreadsheets. But in that spreadsheet, it's all your data. How do you want me to show you that on the board like this, this is kind of part of it? And what would you want me to present to you and give you the information you need. And it can be a bit frustrating for anybody on the business side when they're looking this information, because obviously there's always urgency, etc, etc. That's another thing that companies need to watch out for is they don't need to be overly patient, but they need to understand that it's not a click of a button to produce the results that they want. It's not a phone call, it takes hours and hours of prep and processing to get the data correct. And if they put the work, you know, the company or agency puts the work in, then they're going to get the results they want. And they're going to get them very clean very quick once everything's in place. But until it's in place, there's a lot of barriers there for the teams.

Interviewer   
Finally, as we reach the end of the questions, I'd like to ask is there anything further you'd like to say or discuss about the influence of data analytics on client retention?

Speaker 2  
And I think it's underestimated in terms of what you can achieve with data analytics with the data points on retention. And not just on sales, but on personal personalities, etc. I mean, data while you have to be inquisitive, and well you have to be able to problem solve. You have to be intuitive as well. You have to know say for instance, you have I'm a big CEO, that is splitting their time, 15 minutes a meeting a day. That's all they can do. Well, their data analysts can look at. And this sounds very strange, but can do a social analysis of that CEO that you're approaching with this pitch, that pitch could be worth 100 million quid on the information you're going to get from a data analyst, is going to be very important. Because does that CEO prefer? Coffee? Tea? Does that CEO prefer to come in through the west side or the east side of the building? Does that CEO refer you to finish a 1430 or 1439. And that's not easily accessible, but the data is there in, you know, in this sphere of information, that we live in that kind of social engineering for data analytic analysts is very easy. As long as we have the information, we can break that down. And you see that with a lot of intelligence organizations, and that's what they do, they take all this data, give it to analysts, who then break down a social trend, to approach new, you know, new people, or whatever they do. But in terms of retention, I think it's good to see, you know, if you're approaching large company, or you have large clients, large company, and you're able to say, right, I need to see how many people are letting go or I need to see how much of the market these people actually have? Well, you're able to offer that client, you know, a better deal based on their marketing position. So if they have 30% of the market, and you know that they're going off to the next 10%, you're able to get in the ground floor, and the data analysts can give you them the market positioning, and then give your competitor analysis and the demographics of the area and, you know, words, the most likely location for their next site based on sales, and you know, all the rest. It brings in spherical plan, and it brings in a multitude of different things. But I would say that for retention, don't only look at the sales numbers, look at the whole picture. Look at what they've done, who they've spoke to in the newspapers. You know, if you had last year, if you had somebody that was from Twitter approaching Musk about the deal? Well, I am 100% certain that he had analysts working on everything to do with Twitter. And that's why he kept saying No, I don't want to buy, I didn't want to buy, because his analyst was saying, Yeah, reject, reject, reject, oh, go for it. It's, you know, it's all about the numbers. It's all statistics at the end of the day. But it can be used in so many other ways that and I don't think businesses see it, to appreciate it or kind of understand what it can actually be done or what can be done for it. Because a whole profile can be built around clients. And it's it doesn't even it's not just the business end of it. It's the public appearances. It's everything else as well. And that might be outside of the scope of it, but that's just kind of my opinion on what can be done.

Interviewer   
exactly, that's exactly what that question was for was opinion because it's such a vast amount of experience behind the opinion is priceless. We've come to the conclusion of all the questions.

**Interview-3**

Interviewer   
Thank you. And the last thing i I'm sure you're aware from looking over these masters that I will give the college the email address, which they obviously already have, just because they're going to pick someone not random to say that these interviews weren't fabricated.

Speaker 3  
You know, and I'm happy to support you if it's necessary. So yeah.

Interviewer   
Perfect. Thank you. Well, thanks for joining me today, it really is appreciated. We'll start off with just a quick introduction and background. So could you please introduce yourself and your background in data analytics? And CRM?

Speaker 3  
Yeah, so I am actually an engineer, I work in a consulting company called “company”, and my background is mainly software development DevOps. But lately, I'm leaning towards data engineering and data analytics. So right now I'm working on an ESG information system for investment funds and investment banking, like money management, finance, and investment banking. So I'm doing a lot of data transformation and data analysis for them. So

Interviewer   
What drew you to work in the realm of analytics?

Speaker 3  
Actually was almost like natural, like there was a gap in my team, and we didn't have any budget to hire anybody else. So I kind of like ended up doing the work myself.

Interviewer   
Okay. The next set of questions are going to be the, on the impact of customer relationship management and data analytics. The first one is, what is the function of CRM and current corporate operations?

Speaker 3  
Yeah. Well, at the moment, I'm not working with any CRM. But I can tell you, I've been a consultant for many years. Like one post I've noticed is that all the companies that were operating open an Excel spreadsheet, they have stopped doing so. And now they're operating over a CRM. The reason behind that is that integration with social media email integration with you know, direct customer contact, like things like Hubspot, and the others, which actually allows you to keep the track, set reminders and things like that. It's slowly winning the market. So I'd say right now, I don't think anybody will set up a company which deals with customers. We have the CRM and enterprise here and whereas five years ago, it was totally doable.

Interviewer   
From your experience, how has the use of data analytics impacted customer retention practices?

Speaker 3  
Well, pretty much very much, because, again, you know, since Tableau and all the other started coming up, like I can see companies like, you know, analysing, what's the profile of the customer? What's the profile of the customers that dropped from the system, even feeding that into machine learning algorithms to predict what's the dropout rate of a customer, purely dicing, you know, tickets on support, like, our customer has an issue, if that customer is already on the category you have, he's going to leave within the next three to six months, you know, like, has a lower priority, but then if you have a customer, which is on the category of A is going to be here for at least another two years, because higher priority? And I think that analytics, it's making them, so to say the revenue streams more efficient? In my opinion, so.

Interviewer   
could you provide a real world scenario, from what you worked at, in which data analytics had a substantial influence on customer retention operations or outcomes?

Speaker 3  
Well, I can, yes, but it's a bit finicky. So we, I used to work for a company called “company”, in the past. And CRM, actually, we want to avoid that we didn't have enough capacity. So, it's basically like, you know, serve the customers we had in the pipeline. So, what we did is we pull out a record of polling traded companies in, in, like, you know, it's full of information on what revenue they have. And we actually need some calculation which shouldn't speak to them, or which customers was going to cut a major or massive impact in our finances. And then we prioritise them. And what we did is we redirected some of the customers to kind of like friendly companies, where we know that we're going to be looked after well, basically, on the fact that we wouldn't be able to attend them as we thought it was going to be possible. And that's coming from a CRM crunch with data from companies, he becomes like growth, you know, like spending and things like that.

Interviewer   
Okay, the next couple of questions are going to be on data analytic methods in customer retention. Could you what are some of the most prevalent data analytic approaches or procedures use in a customer retention setting?

Speaker 3  
Well, I mean, it's something close to Crisp DM. But it's very bespoke, to be honest, like, most of this work was done by marketing, and was done by people who are not into data science. And, like, we supervise it in a way that, you know, like, we, we made sure that the numbers made sense to us. But at the end of the day, it was pretty much you know, bespoke, and it had a bit of a good feeling. But I will say, Crisp DM to me, is possibly the most accurate method. Now, we are talking about big customers, we are talking about accounts, which are millions, rather than hundreds of euros. Like if you were, like dealing with for example, I work for another company, which was about forex, if you were dealing with, with other companies, like, I mean, I don't see the cost benefit of using for that, like, if your customers only deal like a few 100 euros on their lifetime, you probably segment them. And then once you have been segmented, try to maximise the groups that you can stretch the most like, you know, there's always a segment of customers which stay 1,2, 3 months and leave segments of customers that they are there forever, you don't need to worry about this job. But then you have customers which just stay with you two or three years and then go to the competitor or yes go that's where you need to focus the efforts and that's where your own marketing campaigns and you know, free games or things like that. So that's how I think you know, like it will go for segmenting customers, you know, seeing what are the common pain points on the ones that leave after a couple of years or a few years’ time and motivating them to stay.

Interviewer   
What you said there Linked in with another answer I got from one of my other interviewees who stated that like they were looking to invest more in the area and it was going to cost 20,000 just for the use of the systems. Look to the bigger side of companies compared to your smaller set your local bakery down the road. So there what you've said there is 100% collaborative, with other answers that I've gotten. Could you explain how machine learning techniques such as predictive modelling, have been used to obtain customer insights?

Speaker 3  
Well, in a way, it's not really so much about customer insights, but it's more about kind of customer satisfaction or improving that path. So, I used to work for a company that ran a massive dormant campaign where they will give you something like 10 euros, if you trade something within the next 30 days. So, at some point, what happened is the Know Your Customer process was very clumsy. And you need to send two pictures, a passport photo proof of address, you know, like a few things, and getting the customers through the system. We know your customer system. It's really painful, like it's really slow. Like one agent could only process something like 20 or 30 customers a day. I don't remember the numbers. But, you know, so what we did is we introduced machine learning to process things like passport, does dispatch forecasts anywhere, does this part, passport has a phone photo of one person, what's the address is passport. You know, things like that. So we will reduce the noise about 60, 70%. Because what's the point on somebody reading a customer and then finding on the last photo, that it has a glare or it's good. So, you can't accept that as I know your customer. So, we cannot lose the customer there. That actually helped us because the competence at the time was very slow to process, the onboarding. And we could onboard customers on the same day. So that actually gave us insights on customers want to pretty much log into the system, overload the photos and start using it straight away. So that's, that's an example. That was done by machine learning. And it was done by Google Cloud Platform with all the vision API's and all the sort of like composing API can so yeah,

Interviewer   
Have you discovered any issues or limits when using analytical methodologies to data?

Speaker 3  
Yes, the data sets never hold truth 100%, the complete market hypothesis in finance, it's true only if you have all the data, if you don't have all the data, it's not true. And then the most glaring thing here is, you don't have all the data ever, you only have the data of your customers, you don't have the data of the people who are not your customers. So, if you make any decision you maximise for people who are already your customers, but you don't know what people are not working with you are looking for. So that's where I think that analytics, even though it's a very powerful ally, it doesn't really give you the full picture. Does that make sense?

Interviewer   
yes. 100%, as you say, like you're working with your own segmentation of the market and not by what other Companies would have.

Speaker 3  
Send that blend to the wire, and then you come back with the plane. And it's completely, you know, completely wasted with bullets and things like that. And you basically say, you know, like, from all the planes, they got back, where do I need to put more steel to reinforce them, and you put the steel where the bullets are, but you don't have the information of which planes fell into the ocean, because they, they just destroy them, which are the ones that you want to protect, not the ones that came back, the ones that came back are fine. Same with customs.

Interviewer   
It's a very good example. The next three questions are going to be on retention strategies. And I'll start with in your opinion, how can good data analysis help design and strengthen client retention strategies?

Speaker 3  
What I think by loading the data, it's what gives you retention. And let me explain that. So, imagine that you are a bank, and a bank or insurance company or similar, and you start capturing clicks on the website and you start capturing motion of the mouse and things like that. And then there you can work out patterns of this user has been trying to get a quote for the next 20 minutes. And the pattern is you know, 10 minutes getting a quote, 10 minutes of radio silence and then 10 minutes back, I just in the quote. So, things like that indicates to me that this customer is looking for the best price possible. So, you have the information of the customer, you have the information or the pricing of the world. So that's what I think the date analytics of all these data sets will help immensely companies to have retention. So, we get to a point where you know, you know that this customer got car insurance for 600 euros, and then he probably got sick in other websites, what's the best price we can do to them, which will still make money. And the next best action is called the customer as a we can give you another 50% discount or a percent discount or 50 euros, it's gone. If you come with us now, that probably is going to be the tipping point for the customer. And I think this real time analytics where you can see real time which customers are caught in your website, or your systems, it's the future.

Interviewer   
Your answer has actually led into the next question where I was going to say can you provide instances of effective customer retention strategies that were established or improved use and thought analytic insights?

Speaker 3  
For example, anyone, like you send a customer to renew an email for the insurance, and then what happens is they never open the email, or they open the email, and then never pay for the renewal. So that gives you information on what is this customer missing, to retain, you know, to be retained. So, you can do the same reach out to the customer. Hey, we saw you open the email. Is there any problem with the quote, is it too expensive. And then the interesting point is that there might be a multiple amount of reasons. So, you know, that's what I think offering these columns and offering, you know, like, kind of modelling the price of your insurance, with this analytics in mind, will give you some margin to actually provide extra discounts. Like people tend to buy things more on the spot when they're talking to a human rather than a system, like when you talk to a system is very cold, like the gas, you know, get that as price. It doesn't matter if the battery is blue or green, I just want the best price. But when you're talking to a person, and you see reassurance in there, and they're you know, there's a close contact that can help you to maintain the deals. So that's that's one example.

Interviewer   
On the ethical side, what are some of the ethical concerns to consider when using customer data to update retention strategies?

Speaker 3  
Well, depending on the industry, I mean, like, for example, I used to work for a place where the insurance was cheaper for women than for men. So, they wouldn't bother too much about women, because at the end of the day, the competition was fierce. And the mandate was, you know, be pushy on men, but don't worry too much about woman, because the margins are very small. So even if you win the deal, basically, what you are doing is losing money, because the amount of financial effort required to follow up to win a deal is not worth what the money is coming in the company. So that to me, raise ethical concerns. So, you know, if you're working with personal data, medical records, things like that. It's problematic. But yeah, in general, I think there should be the same way that in banking, there is a compliance officer, there shall be a data compliance officer in place on companies, which actually have you know, deals with, with customer data, which is of sensitive nature, you know, like, the car insurance thing actually went away, because it was banned, the discrimination by gender, like you have to provide the same price being man or woman. But I can see holes, clustering customers, even risk factors can lead into ethical issues, like for example, somebody disabled with, you know, like minor vision impairment, which is fit for driving will get a hard time getting an insurance quarter the moment. So, yeah, it's, that's where I think the ethical concerns arise, if that makes sense.

Interviewer  
The next couple of questions are going to be about future trends. And how do you envision the relationship between customer relationship management and data analytics changing in the next few years?

Speaker 3  
I think it's going to be embedded with next gen intelligence. I mean, all these language models, like I don't see how, in the next five years, a company is going to survive. If you're going to start embracing language models to follow up with the customer retention strategies and CRMs and you know, all these customer management, like I just don't see how I mean, it's, I'm doing some work on the side about that about machine learning models and let me tell you, it's scary what you can achieve with very little. So, we are back into the FinTech revolution 2.0. So, when FinTech started growing it just cover some bugs. And they didn't even cut down to realise, I'd say right now, we are in a point that somebody with very low investment could build a CRM, which is driven by AI and gives you insights about the customer from AI, and could take over HubSpot, and the others very quickly. Watching, you know, imagine an agent, which is getting like 200 emails a day, and you don't have time to read them. And that's when you get like, we're going to get back to you in the next week. Something like that. Like, can you imagine instead of reading every single email, getting a prioritisation of which emails are hottest, and two-line resume for every email, like, you know, this guy's not very happy. This person feels like it could wait for a couple of days. I think that I will say this is the next big thing.

Interviewer   
Yeah, it's like integrating a bit of sentiment analysis within the machine learning to be able to tell from the responses. Who do you need to contact first? Or who? Who is happy from the reply, and you don't have to really worry about  
The next question is what advice would you provide to businesses looking to use that analytics to improve their customer retention efforts?

Speaker 3  
Well, I think in general, the advice I would give is model your current process, but the decisions you make make them uninformed data, at the moment. Before data analytics, many companies will actually just do the customer retention problems. As of you know, like, when you are fishing with an IT, like, you know, throw the net into the water, hold off, and then oh, I got 20 fish here. But 200 metres down the line, I got like 2000 fish. So obviously, I'm going to go 20 metres down the line. But then somebody with a fishing rod in that 20 fish per catch up and throat area can be making a huge amount of profits, because they have a more much more finer data analytics process. So, what I recommend is use data analytics to increase the efficiency of your business, but not to do what you always do. So, yep.

Interviewer   
What recommendations would you provide to organisations or businesses wishing to implement more data driven operations,

Speaker 3  
Take care of the quality of your data, the quality of the data is super important. And it's the concern number one, the quality of the data it was drives your noise. So, you know, if you will feature in the TV, you will get a lot of traffic in your website, which really are in sales, and adding converting, but if you use that, it will be troublesome. So, you just need to filter by posts of those customers converted, but you still will have a black swan event because you're featured on TV and more people will buy on the spot, and things like that. So, make sure that your data is curated. It's a concern number one and that by the way is very expensive.

Interviewer   
Alot of the answers have said that in relation to the data quality and then the EDA involved is as you say, not only expensive but the importance and the time consuming more solid tonight and and it takes up 80 to 90% of the priority of the data.   
Just to finish now, we've come to the very final part of this interview David finally is raising for her to say or discuss about the influence of data analytics on client retention.

Speaker 3  
Um I will say that data analytics in my opinion on client retention eats what property agents are to the property market and market dynamics there's so because we data analytics you can reach more suitable customers and you can reach you know more suitable deals, it makes everything more way more efficient, and it makes everything more, you know, dense. So, it raises the bar of the entry level. So, you know, if you are HubSpot, you are everywhere. Like if I want to set up a company and I use a CRM, I will prefer hubspot, because that's what everybody does. But broadly, there are like another 200 SAS startups which do exactly what I need, but because they don't know them. It's hard for me to reach them. But because HubSpot has a huge amount of market and has like a huge amount of data analytics, like they can be what I see them, so I will be more inclined to work with them and any other small startup. So, as I say, data analytics, I think its dynamics in the market and making it very polarised. Is it for the big shots? Harder for the smallest? That's my feeling at the moment.

Interviewer   
Perfect, we have reached the end of the questions I'm going to stop the recording.

APPENDICES- C - Interview ConsentThis section shows the permission of consent given to the researcher, including the confirmation that volunteers are above 18 years of age and have no medical constraints restricting them from partaking in the interview process. The 1st two were confirmed in direct messages and the 3rd confirm at the start of the Interview.

Interviewee 1 consent

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Interviewee 2 consent

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Interviewee 3 consent

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